N00158.AR.000382
NASJRB WILLOW GROVE
5090.3a

REMEDIAL INVESTIGATION REPORT FOR SITE 3 NINTH STREET LANDFILL NASJEB WILLOW GROVE PA

10/01/2011

TETRA TECH NUS

Remedial Investigation Report
for
Site 3 - Ninth Street Landfill

Naval Air Station
Joint Reserve Base (NAS JRB)
Willow Grove, Pennsylvania

Naval Facilities Engineering Command
Mid-Atlantic

Contract Number N62470-08-D-1001
Contract Task Order WE05

VOLUME II - APPENDICES

October 2011

TETRA TECH

APPENDIX A

ANALYTICAL RESULTS

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01I**		**03MW01I**		**03MW01I**		**03MW01I-F**		**03MW01I**		**03MW01S**		**03MW01S-D**		**03MW01S**		**03MW01SI**		**03MW01SI**		**03MW01SI-L**	
Sample Date:	**3/11/2008**		**10/17/2008**		**9/23/1991**		**9/23/1991**		**6/25/1997**		**3/11/2008**		**3/11/2008**		**10/16/2008**		**3/20/2008**		**10/17/2008**		**10/17/2008**	
Duplicate:																						
TOTAL INORGANICS	**ug/L**				**ug/L**				**ug/L**		**ug/L**		**ug/L**				**ug/L**					
Aluminum	1160		NA		2480	J	NA		73.9	B	80	U	80	U	NA		80	U	NA		NA	
Antimony	1.2	J	NA		45	U	NA		20	U	1.2	J	0.7	J	NA		2	U	NA		NA	
Arsenic	6		NA		7.4	J	NA		8.6	J	6	U	6	U	NA		6	U	NA		NA	
Barium	215		NA		379		NA		199		111		111		NA		107		NA		NA	
Beryllium	1	U	NA		3	B	NA		1	U	0.1	J	0.09	J	NA		1	U	NA		NA	
Cadmium	0.1	J	NA		4	U	NA		5	U	1	U	1	U	NA		1.1		NA		NA	
Calcium	25000		NA		57000		NA		13900		7220		7250		NA		17000		NA		NA	
Chromium	4.3		NA		7	U	NA		5	U	5		4.7		NA		1.5	J	NA		NA	
Cobalt	0.8	J	NA		10	U	NA		5	U	0.2	J	0.2	J	NA		6	U	NA		NA	
Copper	0.6	J	NA		5	B	NA		10	U	0.3	J	0.3	J	NA		0.4	J	NA		NA	
Cyanide	NA		NA		10	U	NA		5	U	NA		NA		NA		NA		NA		NA	
Iron	1200	K	NA		1660		NA		103		110	K	140	K	NA		70	U	NA		NA	
Lead	0.4	J	NA		7.6		NA		1	U	0.06	J	0.04	J	NA		2	U	NA		NA	
Magnesium	10600		NA		9790		NA		8990		1880		1880		NA		2670		NA		NA	
Manganese	16.3		NA		103		NA		38.1		3	J	2.8	J	NA		0.4	J	NA		NA	
Mercury	0.5	U	NA		0.2	U	NA		0.2	U	0.5	U	0.5	U	NA		0.5	U	NA		NA	
Nickel	3.9	J	NA		12	U	NA		20	U	3.8	J	3.9	J	NA		1.7	J	NA		NA	
Potassium	1480		NA		62600		NA		14100		670		600		NA		560	U	NA		NA	
Selenium	2	J	NA		20	UJ	NA		5	U	3	J	3	J	NA		2	J	NA		NA	
Silver	1	U	NA		6	U	NA		5	U	1	U	1	U	NA		0.6	B	NA		NA	
Sodium	12700		NA		30700		NA		16900		12300		12300		NA		9570		NA		NA	
Thallium	1	U	NA		2	UJ	NA		1	U	1	U	1	U	NA		1	U	NA		NA	
Vanadium	0.5	J	NA		4	U	NA		5	U	1	U	1	U	NA		0.4	B	NA		NA	
Zinc	3	J	NA		14	B	NA		6.9	B	2.8	J	2.8	J	NA		6	U	NA		NA	
DISSOLVED INORGANICS	**ug/L**						**ug/L**				**ug/L**		**ug/L**				**ug/L**					
Aluminum	36	J	NA		NA		72	U	NA		7	J	5	J	NA		80	U	NA		NA	
Antimony	2	U	NA		NA		45	U	NA		1.4	J	2	U	NA		2	U	NA		NA	
Arsenic	6.4		NA		NA		5.2	J	NA		3	U	3	U	NA		3	U	NA		NA	
Barium	199		NA		NA		49		NA		104		102		NA		106		NA		NA	
Beryllium	1	U	NA		NA		4	B	NA		0.2	J	1	U	NA		1	U	NA		NA	
Cadmium	1	U	NA		NA		4	U	NA		1	U	1	U	NA		1.2		NA		NA	
Calcium	24900		NA		NA		5020		NA		7690		7840		NA		19000		NA		NA	
Chromium	3.5		NA		NA		8		NA		6.1		6.3		NA		1.3	J	NA		NA	
Cobalt	5	U	NA		NA		10	U	NA		0.2	J	0.2	J	NA		5	U	NA		NA	
Copper	5	U	NA		NA		7	B	NA		5	U	5	U	NA		5	U	NA		NA	
Iron	20	J	NA		NA		40	B	NA		60	U	9	J	NA		60	U	NA		NA	
Lead	2	U	NA		NA		1	U	NA		2	U	2	U	NA		2	U	NA		NA	
Magnesium	10400	L	NA		NA		3760		NA		1900	L	1930	L	NA		2960		NA		NA	
Manganese	3.6	J	NA		NA		1	B	NA		1.8	J	2	J	NA		1.2	J	NA		NA	
Mercury	0.09	J	NA		NA		0.2	U	NA		0.09	J	0.09	J	NA		0.5	U	NA		NA	
Nickel	1.8	J	NA		NA		12	U	NA		4.8	J	5.4		NA		1.3	J	NA		NA	
Potassium	1560		NA		NA		45900		NA		790		780		NA		580		NA		NA	
Selenium	5	U	NA		NA		4	UJ	NA		3	J	3	J	NA		3	J	NA		NA	
Silver	1	U	NA		NA			R	NA		1	U	1	U	NA		1	U	NA		NA	
Sodium	13200		NA		NA		23700		NA		12700		12800		NA		11400		NA		NA	
Thallium	1	U	NA		NA		2	U	NA		1	U	1	U	NA		1	U	NA		NA	
Vanadium	1		NA		NA		4	U	NA		1	U	1	U	NA		0.8	B	NA		NA	
Zinc	0.4	J	NA		NA		5		NA		1.8	J	1.5	J	NA		0.6	J	NA		NA	
MISCELLANEOUS PARAMETERS	**mg/L**										**mg/L**		**mg/L**									
Hexavalent Chromium	0.01	U	NA		NA		NA		NA		0.01	U	0.01	U	NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW01I		03MW01I		03MW01I		03MW01I-F		03MW01I		03MW01S		03MW01S-D		03MW01S		03MW01SI		03MW01SI		03MW01SI-L	
Sample Date:	3/11/2008		10/17/2008		9/23/1991		9/23/1991		6/25/1997		3/11/2008		3/11/2008		10/16/2008		3/20/2008		10/17/2008		10/17/2008	
Duplicate:																						
SEMIVOLATILES	ug/L				ug/L				ug/L		ug/L		ug/L				ug/L					
1,2,4-Trichlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,4-Dioxane	2.8	U	NA		NA		NA		NA		2.8	U	2.8	U	NA		2.9	U	NA		NA	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
2,4,6-Trichlorophenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4-Dichlorophenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4-Dimethylphenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4-Dinitrophenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
2,4-Dinitrotoluene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,6-Dinitrotoluene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Chloronaphthalene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Chlorophenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Methylphenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Nitroaniline	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
2-Nitrophenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
3,3'-Dichlorobenzidine	NA		NA		20	U	NA		10	U	NA		NA		NA		NA		NA		NA	
3-Nitroaniline	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
4,6-Dinitro-2-methylphenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
4-Bromophenyl Phenyl Ether	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Chloro-3-methylphenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Chloroaniline	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Chlorophenyl Phenyl Ether	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Methylphenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Nitroaniline	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
4-Nitrophenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
Acenaphthene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Acenaphthylene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzoic Acid	NA		NA		50	U	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Bis(2-chloroethyl)ether	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Bis(2-ethylhexyl)phthalate	NA		NA		4	J	NA		10	U	NA		NA		NA		NA		NA		NA	
Butylbenzylphthalate	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA	
Chrysene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Di-n-butylphthalate	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	

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SITE 3 GROUNDWATER
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Sample ID:	**03MW01I**		**03MW01I**		**03MW01I**		**03MW01I-F**		**03MW01I**		**03MW01S**		**03MW01S-D**		**03MW01S**		**03MW01SI**		**03MW01SI**		**03MW01SI-L**	
Sample Date:	**3/11/2008**		**10/17/2008**		**9/23/1991**		**9/23/1991**		**6/25/1997**		**3/11/2008**		**3/11/2008**		**10/16/2008**		**3/20/2008**		**10/17/2008**		**10/17/2008**	
Duplicate:																						
Di-n-octylphthalate	NA		NA		5	J	NA		10	U	NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Dibenzofuran	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Diethylphthalate	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Dimethylphthalate	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Fluoranthene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorobutadiene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorocyclopentadiene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachloroethane	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Isophorone	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Naphthalene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Nitrobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Pentachlorophenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
Phenanthrene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Phenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Pyrene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
1,2,4-Trichlorobenzene	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	7	U	7	U	NA		NA		NA		7	U	7	U	7	U	7	U	7	U	7	U
1,2-Dibromoethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		5	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	NA		320	U	NA		NA		NA		NA		NA		320	U	NA		320	U	320	U
2-Butanone	10	UR	10	UR	10	U	NA		10	U	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR
2-Hexanone	5	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	10	UR	10	U	10	U	NA		10	U	10	UR	10	UR	10	U	10	UR	10	U	10	U
Benzene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Bromodichloromethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromoform	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromomethane	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Disulfide	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U

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SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01I**		**03MW01I**		**03MW01I**		**03MW01I-F**		**03MW01I**		**03MW01S**		**03MW01S-D**		**03MW01S**		**03MW01SI**		**03MW01SI**		**03MW01SI-L**	
Sample Date:	**3/11/2008**		**10/17/2008**		**9/23/1991**		**9/23/1991**		**6/25/1997**		**3/11/2008**		**3/11/2008**		**10/16/2008**		**3/20/2008**		**10/17/2008**		**10/17/2008**	
Duplicate:																						
Chlorobenzene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroethane	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroform	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloromethane	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Cyclohexane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Isopropylbenzene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
M+p-xylenes	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
Methyl Acetate	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
Methyl Cyclohexane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	1	U	1	U	1	B	NA		14	B	1	U	1	U	1	U	1	U	1	U	1	U
O-xylene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Styrene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	1	U	1	U	5	U	NA		10	U	1.9		1.9		2.6		8.8	J	9.7		7.7	
Toluene	1	U	1	U	6		NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichlorofluoromethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Vinyl Acetate	NA		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Xylene (Total)	NA		NA		5	U	NA		10	U	NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS					**ug/L**				**ug/L**													
4,4'-DDD	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
4,4'-DDE	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
4,4'-DDT	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Aldrin	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Alpha-BHC	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Alpha-Chlordane	NA		NA		0.5	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Delta-BHC	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Dieldrin	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endosulfan I	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Endosulfan II	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endosulfan Sulfate	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endrin	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Gamma-Chlordane	NA		NA		0.5	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Heptachlor	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Heptachlor Epoxide	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Methoxychlor	NA		NA		0.5	U	NA		0.5	UJ	NA		NA		NA		NA		NA		NA	
Toxaphene	NA		NA		1	U	NA		5	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1016	NA		NA		0.5	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1221	NA		NA		0.5	U	NA		2	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1232	NA		NA		0.5	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1242	NA		NA		0.5	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1248	NA		NA		0.5	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01I**		**03MW01I**		**03MW01I**		**03MW01I-F**		**03MW01I**		**03MW01S**		**03MW01S-D**		**03MW01S**		**03MW01SI**		**03MW01SI**		**03MW01SI-L**	
Sample Date:	**3/11/2008**		**10/17/2008**		**9/23/1991**		**9/23/1991**		**6/25/1997**		**3/11/2008**		**3/11/2008**		**10/16/2008**		**3/20/2008**		**10/17/2008**		**10/17/2008**	
Duplicate:																						
Aroclor-1254	NA		NA		1	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1260	NA		NA		1	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW01SI-L-D		03MW01SI		03MW01SI-F		03MW01S		03MW01S-D		03MW01S-F		03MW01S-F-D		03MW01S		03MW02I		03MW02I		03MW02I-L	
Sample Date:	**10/17/2008**		**9/20/1991**		**9/20/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/18/2008**		**10/20/2008**		**10/20/2008**	
Duplicate:																						
TOTAL INORGANICS			**ug/L**				**ug/L**		**ug/L**						**ug/L**		**ug/L**					
Aluminum	NA		363	B	NA		4000		6530		NA		NA		126	B	80	U	NA		NA	
Antimony	NA		45	U	NA		45	U	45	U	NA		NA		20	U	2	U	NA		NA	
Arsenic	NA		2	UJ	NA		2	U	2	U	NA		NA		1	UL	1	J	NA		NA	
Barium	NA		263		NA		269		303		NA		NA		154		268		NA		NA	
Beryllium	NA		3	B	NA		3	B	3	B	NA		NA		1	U	1	U	NA		NA	
Cadmium	NA		4	U	NA		4	U	4	U	NA		NA		5	U	1	U	NA		NA	
Calcium	NA		12700		NA		8420		8120		NA		NA		8540		21400		NA		NA	
Chromium	NA		13	B	NA		11	B	13	B	NA		NA		23.3		2	B	NA		NA	
Cobalt	NA		10	U	NA		10	U	10	U	NA		NA		5	U	6	U	NA		NA	
Copper	NA		9	B	NA		2	U	2	U	NA		NA		10	U	0.7	B	NA		NA	
Cyanide	NA		10	U	NA		16.7	U	10	U	NA		NA		5	U	NA		NA		NA	
Iron	NA		508		NA		5680		8880		NA		NA		285		70	U	NA		NA	
Lead	NA		1.6		NA		4.8		4.8		NA		NA		1.3	B	2	U	NA		NA	
Magnesium	NA		2380		NA		2480		2880		NA		NA		1670		9550		NA		NA	
Manganese	NA		37		NA		136		160		NA		NA		8.8	K	1.8	J	NA		NA	
Mercury	NA		0.2	U	NA		0.2	U	0.2	U	NA		NA		0.2	U	0.5	U	NA		NA	
Nickel	NA		14	B	NA		12	U	12	U	NA		NA		22.1		1.4	J	NA		NA	
Potassium	NA		2140	U	NA		2140	U	2790		NA		NA		1500	U	660		NA		NA	
Selenium	NA		4	UJ	NA		20	U	4	U	NA		NA		5	U	6	U	NA		NA	
Silver	NA		6	U	NA		6	U	6	U	NA		NA		5	U	0.6	B	NA		NA	
Sodium	NA		9560		NA		11700		11800		NA		NA		12400		7020		NA		NA	
Thallium	NA		2	UJ	NA		2	U	2	U	NA		NA		1	U	1	U	NA		NA	
Vanadium	NA		4	U	NA		8	B	12		NA		NA		5	U	1.8		NA		NA	
Zinc	NA		5	B	NA		17	B	21	B	NA		NA		11.9	B	6	U	NA		NA	
DISSOLVED INORGANICS					**ug/L**						**ug/L**		**ug/L**				**ug/L**					
Aluminum	NA		NA		73	B	NA		NA		141	B	141	B	NA		80	U	NA		NA	
Antimony	NA		NA		45	U	NA		NA		47		45	U	NA		0.4	B	NA		NA	
Arsenic	NA		NA		2	UJ	NA		NA		2	U	2	U	NA		1.1	J	NA		NA	
Barium	NA		NA		255		NA		NA		135		143		NA		245		NA		NA	
Beryllium	NA		NA		4	B	NA		NA		3	B	3	B	NA		1	U	NA		NA	
Cadmium	NA		NA		4	U	NA		NA		4	U	4	U	NA		1	U	NA		NA	
Calcium	NA		NA		12600		NA		NA		7730		8050		NA		24100		NA		NA	
Chromium	NA		NA		7	U	NA		NA		7	U	7	B	NA		2.3		NA		NA	
Cobalt	NA		NA		10	U	NA		NA		10	U	10	U	NA		5	U	NA		NA	
Copper	NA		NA		7	B	NA		NA		7	B	7	B	NA		0.3	J	NA		NA	
Iron	NA		NA		45	B	NA		NA		54		43		NA		60	U	NA		NA	
Lead	NA		NA		1.6		NA		NA		1	U	1	U	NA		2	U	NA		NA	
Magnesium	NA		NA		2370		NA		NA		1730		1760		NA		9740		NA		NA	
Manganese	NA		NA		5	B	NA		NA		18		19		NA		0.08	B	NA		NA	
Mercury	NA		NA		0.2	U	NA		NA		0.2	U	0.2	U	NA		0.5	U	NA		NA	
Nickel	NA		NA		12	U	NA		NA		12	U	12	U	NA		0.8	J	NA		NA	
Potassium	NA		NA		2140	U	NA		NA		2140	U	2140	U	NA		840		NA		NA	
Selenium	NA		NA		4	UJ	NA		NA		4	U	4	U	NA		1	J	NA		NA	
Silver	NA		NA			R	NA		NA		6	U	6	U	NA		1	UR	NA		NA	
Sodium	NA		NA		8410		NA		NA		12400		12000		NA		8170		NA		NA	
Thallium	NA		NA		2	U	NA		NA		2	U	2	U	NA		1	U	NA		NA	
Vanadium	NA		NA		4	U	NA		NA		4	U	4	U	NA		1.7		NA		NA	
Zinc	NA		NA		11		NA		NA		10	B	27		NA		6.5		NA		NA	
MISCELLANEOUS PARAMETERS																						
Hexavalent Chromium	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW01SI-L-D		03MW01SI		03MW01SI-F		03MW01S		03MW01S-D		03MW01S-F		03MW01S-F-D		03MW01S		03MW02I		03MW02I		03MW02I-L	
Sample Date:	10/17/2008		9/20/1991		9/20/1991		9/18/1991		9/18/1991		9/18/1991		9/18/1991		6/25/1997		3/18/2008		10/20/2008		10/20/2008	
Duplicate:																						
SEMIVOLATILES			ug/L				ug/L		ug/L						ug/L		ug/L					
1,2,4-Trichlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
1,2-Dichlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
1,3-Dichlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
1,4-Dichlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
1,4-Dioxane	NA		NA		NA		NA		NA		NA		NA		NA		2.9	U	NA		NA	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,4,5-Trichlorophenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
2,4,6-Trichlorophenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,4-Dichlorophenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,4-Dimethylphenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,4-Dinitrophenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
2,4-Dinitrotoluene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,6-Dinitrotoluene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2-Chloronaphthalene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2-Chlorophenol	NA		10	U	NA		33	U	1	J	NA		NA		10	U	NA		NA		NA	
2-Methylnaphthalene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2-Methylphenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2-Nitroaniline	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
2-Nitrophenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
3,3'-Dichlorobenzidine	NA		20	U	NA		33	U	20	U	NA		NA		10	U	NA		NA		NA	
3-Nitroaniline	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
4,6-Dinitro-2-methylphenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
4-Bromophenyl Phenyl Ether	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Chloro-3-methylphenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Chloroaniline	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Chlorophenyl Phenyl Ether	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Methylphenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Nitroaniline	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
4-Nitrophenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
Acenaphthene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Acenaphthylene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzo(b)fluoranthene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzo(g,h,i)perylene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzo(k)fluoranthene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzoic Acid	NA		50	U	NA		160	U	50	U	NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		10	U	NA		33	U	10	U	NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Bis(2-chloroethyl)ether	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Bis(2-ethylhexyl)phthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Butylbenzylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		NA		10	U	NA		NA		NA	
Chrysene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Di-n-butylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01SI-L-D**		**03MW01SI**		**03MW01SI-F**		**03MW01S**		**03MW01S-D**		**03MW01S-F**		**03MW01S-F-D**		**03MW01S**		**03MW02I**		**03MW02I**		**03MW02I-L**	
Sample Date:	**10/17/2008**		**9/20/1991**		**9/20/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/18/2008**		**10/20/2008**		**10/20/2008**	
Duplicate:																						
Di-n-octylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Dibenz(a,h)anthracene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Dibenzofuran	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Diethylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Dimethylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Fluoranthene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Fluorene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Hexachlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Hexachlorobutadiene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Hexachlorocyclopentadiene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Hexachloroethane	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Isophorone	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Naphthalene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Nitrobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Pentachlorophenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
Phenanthrene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Phenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Pyrene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**				**ug/L**		**ug/L**						**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,1-Dichloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
1,2,4-Trichlorobenzene	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	7	U	NA		NA		NA		NA		NA		NA		NA		7	U	7	U	7	U
1,2-Dibromoethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		5	U	NA		5	U	5	U	NA		NA		10	U	NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloropropane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,4-Dioxane	320	U	NA		NA		NA		NA		NA		NA		NA		NA		320	U	320	U
2-Butanone	10	UR	10	U	NA		10	U	10	U	NA		NA		10	U	10	UR	10	UR	10	UR
2-Hexanone	5	U	10	U	NA		10	U	10	U	NA		NA		10	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	10	U	NA		10	U	10	U	NA		NA		10	U	5	U	5	U	5	U
Acetone	10	U	10	U	NA		10	U	10	U	NA		NA		10	U	10	UR	10	U	10	U
Benzene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Bromochloromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Bromodichloromethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Bromoform	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Bromomethane	1	U	10	U	NA		10	U	10	U	NA		NA		10	U	1	U	1	U	1	U
Carbon Disulfide	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	0.38	J	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01SI-L-D**		**03MW01SI**		**03MW01SI-F**		**03MW01S**		**03MW01S-D**		**03MW01S-F**		**03MW01S-F-D**		**03MW01S**		**03MW02I**		**03MW02I**		**03MW02I-L**	
Sample Date:	**10/17/2008**		**9/20/1991**		**9/20/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/18/2008**		**10/20/2008**		**10/20/2008**	
Duplicate:																						
Chlorobenzene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Chloroethane	1	U	10	U	NA		10	U	10	U	NA		NA		10	U	1	U	1	U	1	U
Chloroform	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Chloromethane	1	U	10	U	NA		10	U	10	U	NA		NA		10	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Cyclohexane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Dibromochloromethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Ethylbenzene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Isopropylbenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
M+p-xylenes	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
Methyl Acetate	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
Methyl Cyclohexane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Methylene Chloride	1	U	5	U	NA		4	B	3	B	NA		NA		14	B	1	U	1	U	1	U
O-xylene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Styrene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Tetrachloroethene	7.4		29		NA		15		15		NA		NA		6	J	7.8		9.1		7.3	
Toluene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Trichloroethene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Trichlorofluoromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Vinyl Acetate	NA		10	U	NA		10	U	10	U	NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	10	U	NA		10	U	10	U	NA		NA		10	U	1	U	1	U	1	U
Xylene (Total)	NA		5	U	NA		5	U	5	U	NA		NA		10	U	NA		NA		NA	
PESTICIDES/PCBS			**ug/L**				**ug/L**		**ug/L**						**ug/L**							
4,4'-DDD	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
4,4'-DDE	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
4,4'-DDT	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Aldrin	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Alpha-BHC	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Alpha-Chlordane	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		0.05	U	NA		NA		NA	
Beta-BHC	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Delta-BHC	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Dieldrin	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Endosulfan I	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Endosulfan II	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Endosulfan Sulfate	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Endrin	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		0.1	U	NA		NA		NA	
Endrin Ketone	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Gamma-BHC (Lindane)	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Gamma-Chlordane	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		0.05	U	NA		NA		NA	
Heptachlor	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Heptachlor Epoxide	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Methoxychlor	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		0.5	U	NA		NA		NA	
Toxaphene	NA		1	U	NA		3.3	U	1	U	NA		NA		5	U	NA		NA		NA	
Aroclor-1016	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		1	U	NA		NA		NA	
Aroclor-1221	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		2	U	NA		NA		NA	
Aroclor-1232	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		1	U	NA		NA		NA	
Aroclor-1242	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		1	U	NA		NA		NA	
Aroclor-1248	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		1	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01SI-L-D**		**03MW01SI**		**03MW01SI-F**		**03MW01S**		**03MW01S-D**		**03MW01S-F**		**03MW01S-F-D**		**03MW01S**		**03MW02I**		**03MW02I**		**03MW02I-L**	
Sample Date:	**10/17/2008**		**9/20/1991**		**9/20/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/18/2008**		**10/20/2008**		**10/20/2008**	
Duplicate:																						
Aroclor-1254	NA		1	U	NA		3.3	U	1	U	NA		NA		1	U	NA		NA		NA	
Aroclor-1260	NA		1	U	NA		3.3	U	1	U	NA		NA		1	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW02I-L-D**		**03MW02I**		**03MW02S**		**03MW02S**		**03MW02SI**		**03MW02SI**		**03MW02SI**		**03MW02S**		**03MW02S-F**		**03MW02S**		**03MW03I**		**03MW03I**
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
TOTAL INORGANICS			**ug/L**		**ug/L**				**ug/L**				**ug/L**		**ug/L**				**ug/L**		**ug/L**		
Aluminum	NA		50	U	80	U	NA		80	U	NA		50	U	214	B	NA		50	U	80	U	NA
Antimony	NA		20	U	2	U	NA		2	U	NA		20	U	45	U	NA		20	U	2	U	NA
Arsenic	NA		1	U	6	U	NA		0.4	J	NA		1	U	2	U	NA		1	U	1.4	J	NA
Barium	NA		226		123		NA		347		NA		325		99		NA		111		209		NA
Beryllium	NA		1	U	1	U	NA		1	U	NA		1	U	3	B	NA		1	U	1	U	NA
Cadmium	NA		5	U	1	U	NA		1	U	NA		5	U	4	U	NA		5	U	1	U	NA
Calcium	NA		21600		9590		NA		23700		NA		24200		6820		NA		9190		23700		NA
Chromium	NA		5	U	1.9	B	NA		2.1	B	NA		5	U	7	U	NA		5	U	1.2	B	NA
Cobalt	NA		5	U	6	U	NA		0.2	J	NA		10.3		10	U	NA		5	U	6	U	NA
Copper	NA		10	U	0.3	B	NA		0.3	B	NA		10	U	6	B	NA		10	U	6	U	NA
Cyanide	NA		5	U	NA		NA		NA		NA		5	U	10	U	NA		5	U	NA		NA
Iron	NA		228	J	70	U	NA		30	J	NA		108	J	328		NA		50	U	70	U	NA
Lead	NA		1	U	2	U	NA		2	U	NA		1	U	1.4		NA		1	U	2	U	NA
Magnesium	NA		9440		4060		NA		9150		NA		9150		2940		NA		3710		11400		NA
Manganese	NA		14.6		2.5	J	NA		1.6	J	NA		5.4		15		NA		5	U	6	U	NA
Mercury	NA		0.2	U	0.5	U	NA		0.5	U	NA		0.2	U	0.2	U	NA		0.2	U	0.5	U	NA
Nickel	NA		20	U	1.6	J	NA		1.3	J	NA		20	U	12	U	NA		20	U	0.7	J	NA
Potassium	NA		1500	U	930		NA		640		NA		1500	U	2140	U	NA		1500	U	1200		NA
Selenium	NA		1	UL	6	U	NA		6	U	NA		5	U	4	U	NA		5	U	1	J	NA
Silver	NA		5	U	0.6	B	NA		0.6	B	NA		5	U	6	U	NA		5	U	0.6	B	NA
Sodium	NA		7240		7580		NA		7600		NA		8140		6680		NA		7540		8180		NA
Thallium	NA		1	U	1	U	NA		1	U	NA		1	U	2	U	NA		1	U	1	U	NA
Vanadium	NA		5	U	0.3	B	NA		2.6		NA		5	U	4	U	NA		5	U	1.8		NA
Zinc	NA		5	U	2.7	J	NA		2	J	NA		5		8	B	NA		5	U	6	U	NA
DISSOLVED INORGANICS					**ug/L**				**ug/L**								**ug/L**				**ug/L**		
Aluminum	NA		NA		80	U	NA		80	U	NA		NA		NA		137	B	NA		80	U	NA
Antimony	NA		NA		0.5	B	NA		0.4	B	NA		NA		NA		45	U	NA		0.6	B	NA
Arsenic	NA		NA		5	U	NA		0.4	J	NA		NA		NA		2	U	NA		1.5	J	NA
Barium	NA		NA		113		NA		313		NA		NA		NA		103		NA		197		NA
Beryllium	NA		NA		1	U	NA		1	U	NA		NA		NA		3	B	NA		1	U	NA
Cadmium	NA		NA		1	U	NA		1	U	NA		NA		NA		4	U	NA		1	U	NA
Calcium	NA		NA		10800		NA		26700		NA		NA		NA		7340		NA		26600		NA
Chromium	NA		NA		2.8		NA		2.4		NA		NA		NA		7	U	NA		2.2		NA
Cobalt	NA		NA		0.8	J	NA		5	U	NA		NA		NA		10	U	NA		5	U	NA
Copper	NA		NA		0.4	J	NA		5	U	NA		NA		NA		6	B	NA		5	U	NA
Iron	NA		NA		60	U	NA		60	U	NA		NA		NA		223		NA		60	U	NA
Lead	NA		NA		2	U	NA		2	U	NA		NA		NA		1	U	NA		2	U	NA
Magnesium	NA		NA		4450		NA		9360		NA		NA		NA		3140		NA		11600		NA
Manganese	NA		NA		4.5		NA		4	U	NA		NA		NA		3	B	NA		4	U	NA
Mercury	NA		NA		0.5	U	NA		0.5	U	NA		NA		NA		0.2	U	NA		0.5	U	NA
Nickel	NA		NA		1.3	J	NA		0.7	J	NA		NA		NA		12	U	NA		0.3	J	NA
Potassium	NA		NA		1070		NA		660		NA		NA		NA		2140	U	NA		1360		NA
Selenium	NA		NA		0.6	J	NA		1	J	NA		NA		NA		4	U	NA		2	J	NA
Silver	NA		NA		1	UR	NA		1	UR	NA		NA		NA		6	U	NA		1	UR	NA
Sodium	NA		NA		8740		NA		9130		NA		NA		NA		6840		NA		8080		NA
Thallium	NA		NA		1	U	NA		1	U	NA		NA		NA		2	U	NA		1	U	NA
Vanadium	NA		NA		0.3	J	NA		2.3		NA		NA		NA		4	U	NA		1.9		NA
Zinc	NA		NA		5	U	NA		5	U	NA		NA		NA		19	B	NA		5	U	NA
MISCELLANEOUS PARAMETERS																					**mg/L**		
Hexavalent Chromium	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.01	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW02I-L-D		03MW02I		03MW02S		03MW02S		03MW02SI		03MW02SI		03MW02SI		03MW02S		03MW02S-F		03MW02S		03MW03I		03MW03I
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
SEMIVOLATILES			**ug/L**		**ug/L**				**ug/L**				**ug/L**		**ug/L**				**ug/L**		**ug/L**		
1,2,4-Trichlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
1,2-Dichlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
1,3-Dichlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
1,4-Dichlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
1,4-Dioxane	NA		NA		2.9	U	NA		2.9	U	NA		NA		NA		NA		NA		2.8	U	NA
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
2,2'-Oxybis(1-chloropropane)	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,4,5-Trichlorophenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
2,4,6-Trichlorophenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,4-Dichlorophenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,4-Dimethylphenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,4-Dinitrophenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
2,4-Dinitrotoluene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,6-Dinitrotoluene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Chloronaphthalene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Chlorophenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Methylnaphthalene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Methylphenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Nitroaniline	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
2-Nitrophenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
3,3'-Dichlorobenzidine	NA		10	U	NA		NA		NA		NA		10	U	20	U	NA		10	U	NA		NA
3-Nitroaniline	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
4,6-Dinitro-2-methylphenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
4-Bromophenyl Phenyl Ether	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Chloro-3-methylphenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Chloroaniline	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Chlorophenyl Phenyl Ether	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Methylphenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Nitroaniline	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
4-Nitrophenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
Acenaphthene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Acenaphthylene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Anthracene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benz(a)anthracene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benzo(a)pyrene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzo(b)fluoranthene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzo(g,h,i)perylene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzo(k)fluoranthene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		50	U	NA		NA		NA		NA
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		10	U	NA		NA		NA		NA
Bis(2-chloroethoxy)methane	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Bis(2-chloroethyl)ether	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Bis(2-ethylhexyl)phthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Butylbenzylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Carbazole	NA		10	U	NA		NA		NA		NA		10	U	NA		NA		10	U	NA		NA
Chrysene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Di-n-butylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW02I-L-D**		**03MW02I**		**03MW02S**		**03MW02S**		**03MW02SI**		**03MW02SI**		**03MW02SI**		**03MW02S**		**03MW02S-F**		**03MW02S**		**03MW03I**		**03MW03I**
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
Di-n-octylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Dibenz(a,h)anthracene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Dibenzofuran	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Diethylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Dimethylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Fluoranthene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Fluorene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Hexachlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Hexachlorobutadiene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Hexachlorocyclopentadiene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Hexachloroethane	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Indeno(1,2,3-cd)pyrene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Isophorone	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
N-Nitroso-di-n-propylamine	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
N-Nitrosodiphenylamine (1)	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Naphthalene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Nitrobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Pentachlorophenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
Phenanthrene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Phenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Pyrene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**
1,1,1-Trichloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,1,2,2-Tetrachloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,1,2-Trichloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,1,2-Trichlorotrifluoroethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,1-Dichloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,1-Dichloroethene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,2,3-Trichlorobenzene	2	U	NA		2	U	2	U	2	U	2	U	NA		NA		NA		NA		2	U	2
1,2,4-Trichlorobenzene	2	U	NA		2	U	2	U	2	U	2	U	NA		NA		NA		NA		2	U	2
1,2-Dibromo-3-chloropropane	7	U	NA		7	U	7	U	7	U	7	U	NA		NA		NA		NA		7	U	7
1,2-Dibromoethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,2-Dichlorobenzene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,2-Dichloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,2-Dichloroethene (cis)	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,2-Dichloroethene (Total)	NA		10	U	NA		NA		NA		NA		10	U	5	U	NA		10	U	NA		NA
1,2-Dichloroethene (trans)	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,2-Dichloropropane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,3-Dichlorobenzene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,4-Dichlorobenzene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,4-Dioxane	320	U	NA		NA		320	U	NA		320	U	NA		NA		NA		NA		NA		320
2-Butanone	10	UR	10	U	10	UR	10	UR	10	UR	10	UR	10	U	10	U	NA		10	U	10	UR	10
2-Hexanone	5	U	10	U	5	U	5	U	5	U	5	U	10	U	10	U	NA		10	U	5	U	5
4-Methyl-2-pentanone	5	U	10	U	5	U	5	U	5	U	5	U	10	U	10	U	NA		10	U	5	U	5
Acetone	10	U	10	U	10	UR	10	U	10	UR	10	U	10	U	10	U	NA		10	U	10	UR	10
Benzene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Bromochloromethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Bromodichloromethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Bromoform	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Bromomethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	10	U	NA		10	U	1	U	1
Carbon Disulfide	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Carbon Tetrachloride	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW02I-L-D**		**03MW02I**		**03MW02S**		**03MW02S**		**03MW02SI**		**03MW02SI**		**03MW02SI**		**03MW02S**		**03MW02S-F**		**03MW02S**		**03MW03I**		**03MW03I**
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
Chlorobenzene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Chloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	10	U	NA		10	U	1	U	1
Chloroform	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Chloromethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	10	U	NA		10	U	1	U	1
cis-1,3-Dichloropropene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Cyclohexane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Dibromochloromethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Dichlorodifluoromethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Ethylbenzene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Isopropylbenzene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
M+p-xylenes	2	U	NA		2	U	2	U	2	U	2	U	NA		NA		NA		NA		2	U	2
Methyl Acetate	2	U	NA		2	U	2	U	2	U	2	U	NA		NA		NA		NA		2	U	2
Methyl Cyclohexane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Methyl Tert-butyl Ether	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Methylene Chloride	1	U	21	B	1	U	1	U	1	U	1	U	5	B	5	U	NA		12	B	1	U	1
O-xylene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Styrene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Tetrachloroethene	7.6		8	J	1	U	1	U	3.3		3.3		6	J	5	U	NA		10	U	6.9		10.4
Toluene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
trans-1,3-Dichloropropene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Trichloroethene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Trichlorofluoromethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		10	U	NA		NA		NA		NA
Vinyl Chloride	1	U	10	U	1	U	1	U	1	U	1	U	10	U	10	U	NA		10	U	1	U	1
Xylene (Total)	NA		10	U	NA		NA		NA		NA		10	U	5	U	NA		10	U	NA		NA
PESTICIDES/PCBS			**ug/L**										**ug/L**		**ug/L**				**ug/L**				
4,4'-DDD	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
4,4'-DDE	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
4,4'-DDT	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Aldrin	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Alpha-BHC	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Alpha-Chlordane	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.5	U	NA		0.05	U	NA		NA
Beta-BHC	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Delta-BHC	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Dieldrin	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Endosulfan I	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Endosulfan II	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Endosulfan Sulfate	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Endrin	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Endrin Aldehyde	NA		0.1	U	NA		NA		NA		NA		0.1	U	NA		NA		0.1	U	NA		NA
Endrin Ketone	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Gamma-BHC (Lindane)	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Gamma-Chlordane	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.5	U	NA		0.05	U	NA		NA
Heptachlor	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Heptachlor Epoxide	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Methoxychlor	NA		0.5	U	NA		NA		NA		NA		0.5	U	0.5	U	NA		0.5	U	NA		NA
Toxaphene	NA		5	U	NA		NA		NA		NA		5	U	1	U	NA		5	U	NA		NA
Aroclor-1016	NA		1	U	NA		NA		NA		NA		1	U	0.5	U	NA		1	U	NA		NA
Aroclor-1221	NA		2	U	NA		NA		NA		NA		2	U	0.5	U	NA		2	U	NA		NA
Aroclor-1232	NA		1	U	NA		NA		NA		NA		1	U	0.5	U	NA		1	U	NA		NA
Aroclor-1242	NA		1	U	NA		NA		NA		NA		1	U	0.5	U	NA		1	U	NA		NA
Aroclor-1248	NA		1	U	NA		NA		NA		NA		1	U	0.5	U	NA		1	U	NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW02I-L-D**		**03MW02I**		**03MW02S**		**03MW02S**		**03MW02SI**		**03MW02SI**		**03MW02SI**		**03MW02S**		**03MW02S-F**		**03MW02S**		**03MW03I**		**03MW03I**
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
Aroclor-1254	NA		1	U	NA		NA		NA		NA		1	U	1	U	NA		1	U	NA		NA
Aroclor-1260	NA		1	U	NA		NA		NA		NA		1	U	1	U	NA		1	U	NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03I1**		**03MW03I**		**03MW03I-D**		**03MW03I-F**		**03MW03I-F-D**		**03MW03I**		**03MW03I-D**		**03MW03S**		**03MW03S**		**03MW03S**		**03MW03S-D**
Sample Date:	**4/11/2009**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**6/30/1997**		**6/30/1997**		**3/17/2008**		**10/20/2008**		**4/1/2009**		**4/1/2009**
Duplicate:																					
TOTAL INORGANICS			**ug/L**		**ug/L**						**ug/L**		**ug/L**		**ug/L**						
Aluminum	NA		87	B	87	B	NA		NA		50	U	50	U	80	U	NA		NA		NA
Antimony	NA		45	U	45	U	NA		NA		20	U	20	U	2	U	NA		NA		NA
Arsenic	NA		2.4	J	2.4	J	NA		NA		2.4		2.5	B	6	U	NA		NA		NA
Barium	NA		175		177		NA		NA		197		194	B	157		NA		NA		NA
Beryllium	NA		3	B	3	B	NA		NA		1	U	1	U	1	U	NA		NA		NA
Cadmium	NA		4	U	4	U	NA		NA		5	U	5	U	1	U	NA		NA		NA
Calcium	NA		16900		177		NA		NA		21000		20900		13800		NA		NA		NA
Chromium	NA		14	B	7	U	NA		NA		5	U	5	U	2.4	B	NA		NA		NA
Cobalt	NA		10	U	10	U	NA		NA		5	U	5	U	6	U	NA		NA		NA
Copper	NA		6	B	6	B	NA		NA		10	U	10	U	1	B	NA		NA		NA
Cyanide	NA		10	U	10	U	NA		NA		5	U	5	U	NA		NA		NA		NA
Iron	NA		80	B	43	B	NA		NA		50	U	50	U	40	J	NA		NA		NA
Lead	NA		1	U	1	U	NA		NA		1	U	1	U	2	U	NA		NA		NA
Magnesium	NA		10200		10500		NA		NA		11400		11200		5580		NA		NA		NA
Manganese	NA		2		1		NA		NA		5	U	5	U	3.3	J	NA		NA		NA
Mercury	NA		0.2	U	0.2	U	NA		NA		0.2	U	0.2	U	0.5	U	NA		NA		NA
Nickel	NA		15	B	12	U	NA		NA		20	U	20	U	2.7	J	NA		NA		NA
Potassium	NA		2140	U	2140	U	NA		NA		1500	U	1500	U	1180		NA		NA		NA
Selenium	NA		4	UL	4	UL	NA		NA		5	UL	5	UL	2	J	NA		NA		NA
Silver	NA		6	U	6	U	NA		NA		5	U	5	U	0.6	B	NA		NA		NA
Sodium	NA		5930		6120		NA		NA		6840		6700		11300		NA		NA		NA
Thallium	NA		2	UJ	2	UJ	NA		NA		1	U	1	U	1	U	NA		NA		NA
Vanadium	NA		4	U	4	U	NA		NA		5	U	5	U	0.3	B	NA		NA		NA
Zinc	NA		3	B	7	B	NA		NA		5	U	5	U	4.3	J	NA		NA		NA
DISSOLVED INORGANICS							**ug/L**		**ug/L**						**ug/L**						
Aluminum	NA		NA		NA		72	U	72	U	NA		NA		80	U	NA		NA		NA
Antimony	NA		NA		NA		45	U	45	U	NA		NA		0.6	B	NA		NA		NA
Arsenic	NA		NA		NA		3.8	J	2.8	J	NA		NA		5	U	NA		NA		NA
Barium	NA		NA		NA		184		175		NA		NA		141		NA		NA		NA
Beryllium	NA		NA		NA		4	B	4	B	NA		NA		1	U	NA		NA		NA
Cadmium	NA		NA		NA		4	B	4	U	NA		NA		1	U	NA		NA		NA
Calcium	NA		NA		NA		18400		17600		NA		NA		15500		NA		NA		NA
Chromium	NA		NA		NA		7	U	7	U	NA		NA		3.7		NA		NA		NA
Cobalt	NA		NA		NA		10	U	10	U	NA		NA		5	U	NA		NA		NA
Copper	NA		NA		NA		6	B	7	B	NA		NA		1.1	J	NA		NA		NA
Iron	NA		NA		NA		41	B	39	B	NA		NA		60	U	NA		NA		NA
Lead	NA		NA		NA		1	U	1.6		NA		NA		2	U	NA		NA		NA
Magnesium	NA		NA		NA		11400		10600		NA		NA		5870		NA		NA		NA
Manganese	NA		NA		NA		2	B	1	B	NA		NA		3.3	J	NA		NA		NA
Mercury	NA		NA		NA		0.2	U	0.2	U	NA		NA		0.5	U	NA		NA		NA
Nickel	NA		NA		NA		12	U	12	U	NA		NA		2.2	J	NA		NA		NA
Potassium	NA		NA		NA		2140	U	2140	U	NA		NA		1390		NA		NA		NA
Selenium	NA		NA		NA		4	UJ	4	UJ	NA		NA		3	J	NA		NA		NA
Silver	NA		NA		NA			R		R	NA		NA		1	UR	NA		NA		NA
Sodium	NA		NA		NA		5560		5460		NA		NA		11600		NA		NA		NA
Thallium	NA		NA		NA		2	U	2	U	NA		NA		1	U	NA		NA		NA
Vanadium	NA		NA		NA		4	U	4	U	NA		NA		0.5	J	NA		NA		NA
Zinc	NA		NA		NA		10		5		NA		NA		1.1	J	NA		NA		NA
MISCELLANEOUS PARAMETERS																					
Hexavalent Chromium	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03I1**		**03MW03I**		**03MW03I-D**		**03MW03I-F**	**03MW03I-F-D**	**03MW03I**		**03MW03I-D**		**03MW03S**	**03MW03S**	**03MW03S**	**03MW03S-D**
Sample Date:	**4/11/2009**		**9/23/1991**		**9/23/1991**		**9/23/1991**	**9/23/1991**	**6/30/1997**		**6/30/1997**		**3/17/2008**	**10/20/2008**	**4/1/2009**	**4/1/2009**
Duplicate:																
SEMIVOLATILES			**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**			
1,2,4-Trichlorobenzene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
1,2-Dichlorobenzene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
1,3-Dichlorobenzene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
1,4-Dichlorobenzene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
1,4-Dioxane	NA		NA		NA		NA	NA	NA		NA		2.8	U NA	NA	NA
1,1'-Biphenyl	NA		NA		NA		NA	NA	NA		NA		NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA		50	U	50	U	NA	NA	25	U	25	U	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2,4-Dichlorophenol	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2,4-Dimethylphenol	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2,4-Dinitrophenol	NA		50	U	50	U	NA	NA	25	U	25	U	NA	NA	NA	NA
2,4-Dinitrotoluene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2,6-Dinitrotoluene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2-Chloronaphthalene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2-Chlorophenol	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2-Methylnaphthalene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2-Methylphenol	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
2-Nitroaniline	NA		50	U	50	U	NA	NA	25	U	25	U	NA	NA	NA	NA
2-Nitrophenol	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA		20	U	20	U	NA	NA	10	U	10	U	NA	NA	NA	NA
3-Nitroaniline	NA		50	U	50	U	NA	NA	25	U	25	U	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA		50	U	50	U	NA	NA	25	U	25	U	NA	NA	NA	NA
4-Bromophenyl Phenyl Ether	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
4-Chloroaniline	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
4-Chlorophenyl Phenyl Ether	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
4-Methylphenol	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
4-Nitroaniline	NA		50	U	50	U	NA	NA	25	U	25	U	NA	NA	NA	NA
4-Nitrophenol	NA		50	U	50	U	NA	NA	25	U	25	U	NA	NA	NA	NA
Acenaphthene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Acenaphthylene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Acetophenone	NA		NA		NA		NA	NA	NA		NA		NA	NA	NA	NA
Anthracene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Atrazine	NA		NA		NA		NA	NA	NA		NA		NA	NA	NA	NA
Benz(a)anthracene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Benzaldehyde	NA		NA		NA		NA	NA	NA		NA		NA	NA	NA	NA
Benzo(a)pyrene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Benzo(b)fluoranthene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Benzo(k)fluoranthene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Benzoic Acid	NA		50	U	50	U	NA	NA	NA		NA		NA	NA	NA	NA
Benzyl Alcohol	NA		10	U	10	U	NA	NA	NA		NA		NA	NA	NA	NA
Bis(2-chloroethoxy)methane	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Bis(2-chloroethyl)ether	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Butylbenzylphthalate	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Caprolactam	NA		NA		NA		NA	NA	NA		NA		NA	NA	NA	NA
Carbazole	NA		NA		NA		NA	NA	10	U	10	U	NA	NA	NA	NA
Chrysene	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA
Di-n-butylphthalate	NA		10	U	10	U	NA	NA	10	U	10	U	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW03I1**		**03MW03I**		**03MW03I-D**		**03MW03I-F**		**03MW03I-F-D**		**03MW03I**		**03MW03I-D**		**03MW03S**		**03MW03S**		**03MW03S**		**03MW03S-D**	
Sample Date:		**4/11/2009**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**6/30/1997**		**6/30/1997**		**3/17/2008**		**10/20/2008**		**4/1/2009**		**4/1/2009**	
Duplicate:																							
Di-n-octylphthalate		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Dibenz(a,h)anthracene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Dibenzofuran		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Diethylphthalate		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Dimethylphthalate		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Fluoranthene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Fluorene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Hexachlorobenzene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Hexachlorobutadiene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Hexachlorocyclopentadiene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Hexachloroethane		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Isophorone		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
N-Nitroso-di-n-propylamine		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Naphthalene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Nitrobenzene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Pentachlorophenol		NA		50	U	50	U	NA		NA		25	U	25	U	NA		NA		NA		NA	
Phenanthrene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Phenol		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Pyrene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
VOLATILES		**ug/L**		**ug/L**		**ug/L**						**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,1-Dichloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	U	2	U	NA		NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U
1,2,4-Trichlorobenzene	U	2	U	NA		NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	U	7	U	NA		NA		NA		NA		NA		NA		7	U	7	U	7	U	7	U
1,2-Dibromoethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,2-Dichloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)		NA		5	U	5	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
1,2-Dichloroethene (trans)	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,2-Dichloropropane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,4-Dioxane	U	NA		NA		NA		NA		NA		NA		NA		NA		320	U	NA		NA	
2-Butanone	UR	10	UR	10	U	10	U	NA		NA		10	U	10	U	10	UR	10	UR	10	UR	10	UR
2-Hexanone	U	5	U	10	U	10	U	NA		NA		10	U	10	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	U	5	U	10	U	10	U	NA		NA		10	U	10	U	5	U	5	U	5	U	5	U
Acetone	U	10	UR	10	U	10	U	NA		NA		10	U	10	U	10	UR	10	U	10	UR	10	UR
Benzene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Bromochloromethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Bromodichloromethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Bromoform	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Bromomethane	U	1	U	10	U	10	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Carbon Disulfide	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW03I1**		**03MW03I**		**03MW03I-D**		**03MW03I-F**		**03MW03I-F-D**		**03MW03I**		**03MW03I-D**		**03MW03S**		**03MW03S**		**03MW03S**		**03MW03S-D**	
Sample Date:		**4/11/2009**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**6/30/1997**		**6/30/1997**		**3/17/2008**		**10/20/2008**		**4/1/2009**		**4/1/2009**	
Duplicate:																							
Chlorobenzene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Chloroethane	U	1	U	10	U	10	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Chloroform	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Chloromethane	U	1	U	10	U	10	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Cyclohexane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Dibromochloromethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Ethylbenzene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Isopropylbenzene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
M+p-xylenes	U	2	U	NA		NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U
Methyl Acetate	U	2	U	NA		NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U
Methyl Cyclohexane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	0.63	J	0.42	J
Methylene Chloride	U	1	U	5	U	5	U	NA		NA		4	B	10	UJ	1	U	1	U	1	U	1	U
O-xylene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Styrene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Tetrachloroethene		4.3		5		5		NA		NA		6	J	6	J	2.5		2.6		3		3.2	
Toluene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Trichloroethene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Trichlorofluoromethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Vinyl Acetate		NA		10	U	10	U	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	U	1	U	10	U	10	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Xylene (Total)		NA		5	U	5	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
PESTICIDES/PCBS				**ug/L**		**ug/L**						**ug/L**		**ug/L**									
4,4'-DDD		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
4,4'-DDE		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
4,4'-DDT		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Aldrin		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Alpha-BHC		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Alpha-Chlordane		NA		0.5	U	0.5	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Beta-BHC		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Delta-BHC		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Dieldrin		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endosulfan I		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Endosulfan II		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endosulfan Sulfate		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endrin		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endrin Aldehyde		NA		NA		NA		NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endrin Ketone		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Gamma-BHC (Lindane)		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Gamma-Chlordane		NA		0.5	U	0.5	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Heptachlor		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Heptachlor Epoxide		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Methoxychlor		NA		0.5	U	0.5	U	NA		NA		0.5	U	0.5	U	NA		NA		NA		NA	
Toxaphene		NA		1	U	1	U	NA		NA		5	U	5	U	NA		NA		NA		NA	
Aroclor-1016		NA		0.5	U	0.5	U	NA		NA		1	U	1	U	NA		NA		NA		NA	
Aroclor-1221		NA		0.5	U	0.5	U	NA		NA		2	U	2	U	NA		NA		NA		NA	
Aroclor-1232		NA		0.5	U	0.5	U	NA		NA		1	U	1	U	NA		NA		NA		NA	
Aroclor-1242		NA		0.5	U	0.5	U	NA		NA		1	U	1	U	NA		NA		NA		NA	
Aroclor-1248		NA		0.5	U	0.5	U	NA		NA		1	U	1	U	NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03I1**	**03MW03I**	**03MW03I-D**	**03MW03I-F**	**03MW03I-F-D**	**03MW03I**	**03MW03I-D**	**03MW03S**	**03MW03S**	**03MW03S**	**03MW03S-D**
Sample Date:	**4/11/2009**	**9/23/1991**	**9/23/1991**	**9/23/1991**	**9/23/1991**	**6/30/1997**	**6/30/1997**	**3/17/2008**	**10/20/2008**	**4/1/2009**	**4/1/2009**
Duplicate:											
Aroclor-1254	NA	1 U	1 U	NA	NA	1 U	1 U	NA	NA	NA	NA
Aroclor-1260	NA	1 U	1 U	NA	NA	1 U	1 U	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW03S-L		03MW03SI		03MW03SI-D		03MW03SI		03MW03SI		03MW03SI		03MW03SI-F		03MW03SI		03MW03S		03MW03S-F		03MW03S	
Sample Date:	**10/20/2008**		**3/17/2008**		**3/17/2008**		**10/21/2008**		**4/1/2009**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**	
Duplicate:																						
TOTAL INORGANICS			**ug/L**		**ug/L**						**ug/L**				**ug/L**		**ug/L**				**ug/L**	
Aluminum	NA		80	U	80	U	NA		NA		72	UJ	NA		75.4	B	214	B	NA		50.4	B
Antimony	NA		2	U	0.08	J	NA		NA		45	U	NA		20	U	45	U	NA		20	U
Arsenic	NA		6	U	0.5	J	NA		NA		2	UJ	NA		1	U	2	U	NA		1	U
Barium	NA		353		362		NA		NA		250		NA		294		154		NA		147	
Beryllium	NA		1	U	1	U	NA		NA		3	B	NA		1	U	3	B	NA		1	U
Cadmium	NA		1	U	1	U	NA		NA		4		NA		5	U	4	U	NA		5	U
Calcium	NA		25900		25600		NA		NA		19500		NA		22600		15100		NA		14700	
Chromium	NA		1.8	B	1.4	B	NA		NA		7	U	NA		5	U	8	B	NA		5	U
Cobalt	NA		6	U	6	U	NA		NA		10	U	NA		5	U	10	U	NA		5	U
Copper	NA		6	U	6	U	NA		NA		9	B	NA		10	U	7	B	NA		10	U
Cyanide	NA		NA		NA		NA		NA		10	U	NA		5	U	10	U	NA		5	U
Iron	NA		70	U	70	U	NA		NA		43	B	NA		50	U	243		NA		50	U
Lead	NA		2	U	2	U	NA		NA		1	U	NA		13	B	1	U	NA		14.4	B
Magnesium	NA		9960		9860		NA		NA		7710		NA		8370		4570		NA		4950	
Manganese	NA		6	U	6	U	NA		NA		1		NA		5	U	10	B	NA		5	U
Mercury	NA		0.03	J	0.5	U	NA		NA		0.2	U	NA		0.2	U	0.2	U	NA		0.2	U
Nickel	NA		0.9	J	0.8	J	NA		NA		12	U	NA		20	U	12	U	NA		20	U
Potassium	NA		670		670		NA		NA		2140	U	NA		1500	U	2140	U	NA		1500	U
Selenium	NA		2	J	2	J	NA		NA		20	UJ	NA		5	UL	4	U	NA		5	U
Silver	NA		0.6	B	0.7	B	NA		NA		6	U	NA		5	U	6	U	NA		5	U
Sodium	NA		9300		9470		NA		NA		6420		NA		7840		7700		NA		7320	
Thallium	NA		1	U	1	U	NA		NA		2	UJ	NA		1	U	2	U	NA		1	U
Vanadium	NA		1.5		1.5		NA		NA		4	U	NA		5	U	4	U	NA		5	U
Zinc	NA		6	U	6	U	NA		NA		5	B	NA		5	U	8	B	NA		12	B
DISSOLVED INORGANICS			**ug/L**		**ug/L**								**ug/L**						**ug/L**			
Aluminum	NA		80	U	80	U	NA		NA		NA		72	B	NA		NA		128	B	NA	
Antimony	NA		1.6	B	0.8	B	NA		NA		NA		45	U	NA		NA		45	U	NA	
Arsenic	NA		0.5	J	0.4	J	NA		NA		NA		2	UJ	NA		NA		2	U	NA	
Barium	NA		344		351		NA		NA		NA		263		NA		NA		145		NA	
Beryllium	NA		1	U	1	U	NA		NA		NA		4	B	NA		NA		3	B	NA	
Cadmium	NA		1	U	1	U	NA		NA		NA		4	U	NA		NA		4	U	NA	
Calcium	NA		28300		29000		NA		NA		NA		20000		NA		NA		14400		NA	
Chromium	NA		2.7		2.6		NA		NA		NA		7	U	NA		NA		7	U	NA	
Cobalt	NA		5	U	5	U	NA		NA		NA		10	U	NA		NA		10	U	NA	
Copper	NA		5	U	5	U	NA		NA		NA		6	B	NA		NA		7	B	NA	
Iron	NA		60	U	60	U	NA		NA		NA		48	B	NA		NA		42	B	NA	
Lead	NA		2	U	2	U	NA		NA		NA		1.1	U	NA		NA		1	U	NA	
Magnesium	NA		10200		10100		NA		NA		NA		7800		NA		NA		4340		NA	
Manganese	NA		4	U	4	U	NA		NA		NA		1	B	NA		NA		2	B	NA	
Mercury	NA		0.5	U	0.5	U	NA		NA		NA		0.2	U	NA		NA		0.2	U	NA	
Nickel	NA		0.7	J	0.5	J	NA		NA		NA		12	U	NA		NA		12	U	NA	
Potassium	NA		770		760		NA		NA		NA		2140	U	NA		NA		2140	U	NA	
Selenium	NA		2	J	2	J	NA		NA		NA		4	UJ	NA		NA		4	U	NA	
Silver	NA		1	UR	1	UR	NA		NA		NA			R	NA		NA		6	U	NA	
Sodium	NA		9770		9900		NA		NA		NA		6090		NA		NA		7270		NA	
Thallium	NA		1	U	1	U	NA		NA		NA		2	U	NA		NA		2	U	NA	
Vanadium	NA		1.7		1.7		NA		NA		NA		4	U	NA		NA		4	U	NA	
Zinc	NA		5	U	5	U	NA		NA		NA		14		NA		NA		11	B	NA	
MISCELLANEOUS PARAMETERS																						
Hexavalent Chromium	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW03S-L		03MW03SI		03MW03SI-D		03MW03SI		03MW03SI		03MW03SI		03MW03SI-F		03MW03SI		03MW03S		03MW03S-F		03MW03S	
Sample Date:	**10/20/2008**		**3/17/2008**		**3/17/2008**		**10/21/2008**		**4/1/2009**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**	
Duplicate:																						
SEMIVOLATILES			**ug/L**		**ug/L**						**ug/L**				**ug/L**		**ug/L**				**ug/L**	
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
1,4-Dioxane	NA		2.9	U	2.9	UJ	NA		NA		NA		NA		NA		NA		NA		NA	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,4,5-Trichlorophenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
2,4,6-Trichlorophenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,4-Dichlorophenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,4-Dimethylphenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,4-Dinitrophenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
2,4-Dinitrotoluene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,6-Dinitrotoluene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Chloronaphthalene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Chlorophenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Methylnaphthalene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Methylphenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Nitroaniline	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
2-Nitrophenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
3,3'-Dichlorobenzidine	NA		NA		NA		NA		NA		20	U	NA		10	U	20	U	NA		10	U
3-Nitroaniline	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
4,6-Dinitro-2-methylphenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
4-Bromophenyl Phenyl Ether	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Chloro-3-methylphenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Chloroaniline	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Chlorophenyl Phenyl Ether	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Methylphenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Nitroaniline	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
4-Nitrophenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
Acenaphthene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Acenaphthylene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzo(b)fluoranthene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzo(g,h,i)perylene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzo(k)fluoranthene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzoic Acid	NA		NA		NA		NA		NA		50	U	NA		NA		50	U	NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		10	U	NA		NA		10	U	NA		NA	
Bis(2-chloroethoxy)methane	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Bis(2-chloroethyl)ether	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Bis(2-ethylhexyl)phthalate	NA		NA		NA		NA		NA		1	J	NA		10	U	10	U	NA		10	U
Butylbenzylphthalate	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		NA		10	U	NA		NA		10	U
Chrysene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Di-n-butylphthalate	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03S-L**		**03MW03SI**		**03MW03SI-D**		**03MW03SI**		**03MW03SI**		**03MW03SI**		**03MW03SI-F**		**03MW03SI**		**03MW03S**		**03MW03S-F**		**03MW03S**	
Sample Date:	**10/20/2008**		**3/17/2008**		**3/17/2008**		**10/21/2008**		**4/1/2009**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**	
Duplicate:																						
Di-n-octylphthalate	NA		NA		NA		NA		NA		2	J	NA		10	U	10	U	NA		10	U
Dibenz(a,h)anthracene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Dibenzofuran	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Diethylphthalate	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Dimethylphthalate	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Fluoranthene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Fluorene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Hexachlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Hexachlorobutadiene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Hexachlorocyclopentadiene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Hexachloroethane	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Isophorone	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
N-Nitroso-di-n-propylamine	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
N-Nitrosodiphenylamine (1)	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Naphthalene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Nitrobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Pentachlorophenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
Phenanthrene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Phenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Pyrene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**				**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,1-Dichloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,1-Dichloroethene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,2,3-Trichlorobenzene	2	U	2	U	2	U	2	U	2	U	NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	2	U	2	U	2	U	2	U	2	U	NA		NA		NA		NA		NA		NA	
1,2-Dibromo-3-chloropropane	7	U	7	U	7	U	7	U	7	U	NA		NA		NA		NA		NA		NA	
1,2-Dibromoethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,2-Dichloroethene (cis)	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		5	U	NA		10	U	5	U	NA		10	U
1,2-Dichloroethene (trans)	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloropropane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,4-Dioxane	320	U	NA		NA		320	U	NA		NA		NA		NA		NA		NA		NA	
2-Butanone	10	UR	10	UR	10	UR	10	UR	10	UR	10	U	NA		10	U	10	U	NA		10	U
2-Hexanone	5	U	5	U	5	U	5	U	5	U	10	U	NA		10	U	10	U	NA		10	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U	5	U	10	U	NA		10	U	10	U	NA		10	U
Acetone	10	U	10	UR	10	UR	10	U	10	UR	10	U	NA		10	U	10	U	NA		10	U
Benzene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Bromochloromethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Bromodichloromethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Bromoform	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Bromomethane	1	U	1	U	1	U	1	U	1	U	10	U	NA		10	U	10	U	NA		10	U
Carbon Disulfide	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Carbon Tetrachloride	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03S-L**		**03MW03SI**		**03MW03SI-D**		**03MW03SI**		**03MW03SI**		**03MW03SI**		**03MW03SI-F**		**03MW03SI**		**03MW03S**		**03MW03S-F**		**03MW03S**	
Sample Date:	**10/20/2008**		**3/17/2008**		**3/17/2008**		**10/21/2008**		**4/1/2009**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**	
Duplicate:																						
Chlorobenzene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Chloroethane	1	U	1	U	1	U	1	U	1	U	10	U	NA		10	U	10	U	NA		10	U
Chloroform	1	U	1	U	1	U	0.57	J	1	U	5	U	NA		10	U	5	U	NA		10	U
Chloromethane	1	U	1	U	1	U	1	U	1	U	10	U	NA		10	U	10	U	NA		10	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Cyclohexane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Dibromochloromethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Dichlorodifluoromethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Ethylbenzene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Isopropylbenzene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
M+p-xylenes	2	U	2	U	2	U	2	U	2	U	NA		NA		NA		NA		NA		NA	
Methyl Acetate	2	U	2	U	2	U	2	U	2	U	NA		NA		NA		NA		NA		NA	
Methyl Cyclohexane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Methyl Tert-butyl Ether	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Methylene Chloride	1	U	1	U	1	U	1	U	1	U	5	U	NA		13	B	3	B	NA		15	B
O-xylene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Styrene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Tetrachloroethene	2.1		12		11.7		12.4		10.8		35		NA		18		8		NA		5	J
Toluene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
trans-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Trichloroethene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Trichlorofluoromethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Vinyl Acetate	NA		NA		NA		NA		NA		10	U	NA		NA		10	U	NA		NA	
Vinyl Chloride	1	U	1	U	1	U	1	U	1	U	10	U	NA		10	U	10	U	NA		10	U
Xylene (Total)	NA		NA		NA		NA		NA		5	U	NA		10	U	5	U	NA		10	U
PESTICIDES/PCBS											**ug/L**				**ug/L**		**ug/L**				**ug/L**	
4,4'-DDD	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
4,4'-DDE	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
4,4'-DDT	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Aldrin	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Alpha-BHC	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Alpha-Chlordane	NA		NA		NA		NA		NA		0.5	U	NA		0.05	U	0.5	U	NA		0.05	U
Beta-BHC	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Delta-BHC	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Dieldrin	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Endosulfan I	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Endosulfan II	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Endosulfan Sulfate	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Endrin	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		0.1	U	NA		NA		0.1	U
Endrin Ketone	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Gamma-BHC (Lindane)	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Gamma-Chlordane	NA		NA		NA		NA		NA		0.5	U	NA		0.05	U	0.5	U	NA		0.05	U
Heptachlor	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Heptachlor Epoxide	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Methoxychlor	NA		NA		NA		NA		NA		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Toxaphene	NA		NA		NA		NA		NA		1	U	NA		5	U	1	U	NA		5	U
Aroclor-1016	NA		NA		NA		NA		NA		0.5	U	NA		1	U	0.5	U	NA		1	U
Aroclor-1221	NA		NA		NA		NA		NA		0.5	U	NA		2	U	0.5	U	NA		2	U
Aroclor-1232	NA		NA		NA		NA		NA		0.5	U	NA		1	U	0.5	U	NA		1	U
Aroclor-1242	NA		NA		NA		NA		NA		0.5	U	NA		1	U	0.5	U	NA		1	U
Aroclor-1248	NA		NA		NA		NA		NA		0.5	U	NA		1	U	0.5	U	NA		1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03S-L**		**03MW03SI**		**03MW03SI-D**		**03MW03SI**		**03MW03SI**		**03MW03SI**		**03MW03SI-F**		**03MW03SI**		**03MW03S**		**03MW03S-F**		**03MW03S**	
Sample Date:	**10/20/2008**		**3/17/2008**		**3/17/2008**		**10/21/2008**		**4/1/2009**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**	
Duplicate:																						
Aroclor-1254	NA		NA		NA		NA		NA		1	U	NA		1	U	1	U	NA		1	U
Aroclor-1260	NA		NA		NA		NA		NA		1	U	NA		1	U	1	U	NA		1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I-F**		**03MW04I**		**03MW04S**		**03MW04S**		**03MW04S**		**03MW04SI**		**03MW04SI**		**03MW04SI**	
Sample Date:	**3/14/2008**		**10/14/2008**		**4/2/2009**		**9/20/1991**		**9/20/1991**		**6/30/1997**		**3/14/2008**		**10/16/2008**		**4/2/2009**		**3/14/2008**		**10/14/2008**		**4/2/2009**	
Duplicate:																								
TOTAL INORGANICS	**ug/L**						**ug/L**				**ug/L**		**ug/L**						**ug/L**					
Aluminum	80	U	NA		NA		87	B	NA		50	U	80	U	NA		NA		80	U	NA		NA	
Antimony	0.7	J	NA		NA		45	U	NA		20	U	0.2	J	NA		NA		0.6	J	NA		NA	
Arsenic	0.6	J	NA		NA		2	UJ	NA		1	U	6	U	NA		NA		0.6	J	NA		NA	
Barium	455		NA		NA		405		NA		395		434		NA		NA		487		NA		NA	
Beryllium	1	U	NA		NA		3	B	NA		1	U	1	U	NA		NA		1	U	NA		NA	
Cadmium	1	U	NA		NA		4	U	NA		5	U	1	U	NA		NA		1	U	NA		NA	
Calcium	31900		NA		NA		24000		NA		25600		36500		NA		NA		37200		NA		NA	
Chromium	1	J	NA		NA		7	U	NA		5	U	5.4	B	NA		NA		0.9	J	NA		NA	
Cobalt	6	U	NA		NA		10	U	NA		5	U	6	U	NA		NA		6	U	NA		NA	
Copper	0.08	J	NA		NA		6	B	NA		10	U	1.3	B	NA		NA		0.1	J	NA		NA	
Cyanide	NA		NA		NA		10	U	NA		5	U	NA		NA		NA		NA		NA		NA	
Iron	40	J	NA		NA		35	B	NA		50	U	70	U	NA		NA		20	J	NA		NA	
Lead	2	U	NA		NA		1	U	NA		1	U	2	U	NA		NA		2	U	NA		NA	
Magnesium	8260		NA		NA		6440		NA		6220		13200		NA		NA		9650		NA		NA	
Manganese	6	U	NA		NA		1		NA		5	U	1	J	NA		NA		6	U	NA		NA	
Mercury	0.5	U	NA		NA		0.2	U	NA		0.2	U	0.5	U	NA		NA		0.5	U	NA		NA	
Nickel	1.8	J	NA		NA		12	U	NA		20	U	4.2	J	NA		NA		2.6	J	NA		NA	
Potassium	680		NA		NA		2140	U	NA		1500	U	840		NA		NA		880		NA		NA	
Selenium	3	J	NA		NA		20	UJ	NA		5	UL	1	J	NA		NA		3	J	NA		NA	
Silver	1	U	NA		NA		6	U	NA		5	U	0.7	B	NA		NA		1	U	NA		NA	
Sodium	13300		NA		NA		8900		NA		11100		12100		NA		NA		17600		NA		NA	
Thallium	1	U	NA		NA		2	UJ	NA		1	U	1	U	NA		NA		1	U	NA		NA	
Vanadium	1	U	NA		NA		4	U	NA		5	U	0.8	B	NA		NA		1	U	NA		NA	
Zinc	6.2		NA		NA		3	B	NA		5	U	6	U	NA		NA		1.9	J	NA		NA	
DISSOLVED INORGANICS	**ug/L**								**ug/L**				**ug/L**						**ug/L**					
Aluminum	80	UL	NA		NA		NA		72	U	NA		80	U	NA		NA		80	UL	NA		NA	
Antimony	2	U	NA		NA		NA		45	U	NA		0.4	B	NA		NA		2	U	NA		NA	
Arsenic	3	U	NA		NA		NA		2	U	NA		0.3	J	NA		NA		3	U	NA		NA	
Barium	461		NA		NA		NA		431		NA		411		NA		NA		496		NA		NA	
Beryllium	1	U	NA		NA		NA		4	B	NA		1	U	NA		NA		1	U	NA		NA	
Cadmium	1	U	NA		NA		NA		4	U	NA		1	U	NA		NA		1	U	NA		NA	
Calcium	35700		NA		NA		NA		25200		NA		39900		NA		NA		42400		NA		NA	
Chromium	1.5	J	NA		NA		NA		7	U	NA		3.6		NA		NA		2.5		NA		NA	
Cobalt	0.1	J	NA		NA		NA		10	U	NA		5	U	NA		NA		0.2	J	NA		NA	
Copper	5	U	NA		NA		NA		7	B	NA		5	U	NA		NA		5	U	NA		NA	
Iron	60	U	NA		NA		NA		50	B	NA		60	U	NA		NA		60	U	NA		NA	
Lead	2	U	NA		NA		NA		1	U	NA		2	U	NA		NA		2	U	NA		NA	
Magnesium	8570	L	NA		NA		NA		6630		NA		13600		NA		NA		10100		NA		NA	
Manganese	4	U	NA		NA		NA		2	B	NA		4	U	NA		NA		0.06	J	NA		NA	
Mercury	0.09	J	NA		NA		NA		0.2	U	NA		0.5	U	NA		NA		0.09	J	NA		NA	
Nickel	5	U	NA		NA		NA		12	U	NA		1.2	J	NA		NA		0.9	J	NA		NA	
Potassium	870		NA		NA		NA		2140	U	NA		960		NA		NA		1020		NA		NA	
Selenium	2	J	NA		NA		NA		4	UJ	NA		2	J	NA		NA		2	J	NA		NA	
Silver	1	U	NA		NA		NA			R	NA		1	UR	NA		NA		1	U	NA		NA	
Sodium	13600		NA		NA		NA		8170		NA		13000		NA		NA		18500		NA		NA	
Thallium	1	U	NA		NA		NA		2	U	NA		1	U	NA		NA		1	U	NA		NA	
Vanadium	1.2		NA		NA		NA		4	U	NA		1.1		NA		NA		1.3		NA		NA	
Zinc	5	U	NA		NA		NA		6		NA		5	U	NA		NA		5	U	NA		NA	
MISCELLANEOUS PARAMETERS																								
Hexavalent Chromium	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW04I		03MW04I		03MW04I		03MW04I		03MW04I-F		03MW04I		03MW04S		03MW04S		03MW04S		03MW04SI		03MW04SI		03MW04SI	
Sample Date:	3/14/2008		10/14/2008		4/2/2009		9/20/1991		9/20/1991		6/30/1997		3/14/2008		10/16/2008		4/2/2009		3/14/2008		10/14/2008		4/2/2009	
Duplicate:																								
SEMIVOLATILES	**ug/L**						**ug/L**				**ug/L**		**ug/L**						**ug/L**					
1,2,4-Trichlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,4-Dioxane	2.9	U	NA		NA		NA		NA		NA		2.9	U	NA		NA		2.8	U	NA		NA	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
2,4,6-Trichlorophenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4-Dichlorophenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4-Dimethylphenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4-Dinitrophenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
2,4-Dinitrotoluene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,6-Dinitrotoluene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Chloronaphthalene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Chlorophenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Methylphenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Nitroaniline	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
2-Nitrophenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
3,3'-Dichlorobenzidine	NA		NA		NA		20	U	NA		10	U	NA		NA		NA		NA		NA		NA	
3-Nitroaniline	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
4,6-Dinitro-2-methylphenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
4-Bromophenyl Phenyl Ether	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Chloro-3-methylphenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Chloroaniline	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Chlorophenyl Phenyl Ether	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Methylphenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Nitroaniline	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
4-Nitrophenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
Acenaphthene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Acenaphthylene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzoic Acid	NA		NA		NA		50	U	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Bis(2-chloroethyl)ether	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Bis(2-ethylhexyl)phthalate	NA		NA		NA		1	J	NA		10	U	NA		NA		NA		NA		NA		NA	
Butylbenzylphthalate	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA	
Chrysene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Di-n-butylphthalate	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I-F**		**03MW04I**		**03MW04S**		**03MW04S**		**03MW04S**		**03MW04SI**		**03MW04SI**		**03MW04SI**	
Sample Date:	**3/14/2008**		**10/14/2008**		**4/2/2009**		**9/20/1991**		**9/20/1991**		**6/30/1997**		**3/14/2008**		**10/16/2008**		**4/2/2009**		**3/14/2008**		**10/14/2008**		**4/2/2009**	
Duplicate:																								
Di-n-octylphthalate	NA		NA		NA		2	J	NA		10	U	NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Dibenzofuran	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Diethylphthalate	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Dimethylphthalate	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Fluoranthene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorobutadiene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorocyclopentadiene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachloroethane	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Isophorone	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Naphthalene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Nitrobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Pentachlorophenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
Phenanthrene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Phenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Pyrene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	2	U	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
1,2,4-Trichlorobenzene	2	U	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	7	U	7	U	7	U	NA		NA		NA		7	U	7	U	7	U	7	U	7	U	7	U
1,2-Dibromoethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		NA		5	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	NA		320	U	NA		NA		NA		NA		NA		320	U	NA		NA		320	U	NA	
2-Butanone	10	UR	10	U	10	UR	10	U	NA		10	U	10	UR	10	UR	10	UR	10	UR	10	U	10	UR
2-Hexanone	5	U	5	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	10	UR	10	U	10	UR	10	U	NA		10	U	10	UR	10	U	10	UR	10	UR	10	U	10	UR
Benzene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Bromodichloromethane	1	U	1	U	1	U	5	U	NA		10	U	1.1		1	U	1	U	1	U	1	U	1	U
Bromoform	1	U	1	U	1	U	5	U	NA		10	U	0.87	J	1	U	1	U	1	U	1	U	1	U
Bromomethane	1	U	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Disulfide	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
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Sample ID:	03MW04I		03MW04I		03MW04I		03MW04I		03MW04I-F		03MW04I		03MW04S		03MW04S		03MW04S		03MW04SI		03MW04SI		03MW04SI	
Sample Date:	3/14/2008		10/14/2008		4/2/2009		9/20/1991		9/20/1991		6/30/1997		3/14/2008		10/16/2008		4/2/2009		3/14/2008		10/14/2008		4/2/2009	
Duplicate:																								
Chlorobenzene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroethane	1	U	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroform	1	U	1	U	1	U	5	U	NA		10	U	0.4	J	1.6		1	U	0.22	J	1.6		1	U
Chloromethane	1	U	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Cyclohexane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	1	U	5	U	NA		10	U	1.5		1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Isopropylbenzene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
M+p-xylenes	2	U	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
Methyl Acetate	2	U	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
Methyl Cyclohexane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	0.26	J	1	U	1	U
Methylene Chloride	1	U	1	U	1	U	5	U	NA		10	UJ	1	U	1	U	1	U	1	U	1	U	1	U
O-xylene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Styrene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	0.45	J	1	U	0.41	J	5	U	NA		10	U	4.5		2.7		3.1		4.6		3.9		5.7	
Toluene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichlorofluoromethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Vinyl Acetate	NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Xylene (Total)	NA		NA		NA		5	U	NA		10	U	NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS							**ug/L**				**ug/L**													
4,4'-DDD	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
4,4'-DDE	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
4,4'-DDT	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Aldrin	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Alpha-BHC	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Alpha-Chlordane	NA		NA		NA		0.5	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Delta-BHC	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Dieldrin	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endosulfan I	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Endosulfan II	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endosulfan Sulfate	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endrin	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Gamma-Chlordane	NA		NA		NA		0.5	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Heptachlor	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Heptachlor Epoxide	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Methoxychlor	NA		NA		NA		0.5	U	NA		0.5	U	NA		NA		NA		NA		NA		NA	
Toxaphene	NA		NA		NA		1	U	NA		5	U	NA		NA		NA		NA		NA		NA	
Aroclor-1016	NA		NA		NA		0.5	U	NA		1	U	NA		NA		NA		NA		NA		NA	
Aroclor-1221	NA		NA		NA		0.5	U	NA		2	U	NA		NA		NA		NA		NA		NA	
Aroclor-1232	NA		NA		NA		0.5	U	NA		1	U	NA		NA		NA		NA		NA		NA	
Aroclor-1242	NA		NA		NA		0.5	U	NA		1	U	NA		NA		NA		NA		NA		NA	
Aroclor-1248	NA		NA		NA		0.5	U	NA		1	U	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I-F**		**03MW04I**		**03MW04S**		**03MW04S**		**03MW04S**		**03MW04SI**		**03MW04SI**		**03MW04SI**	
Sample Date:	**3/14/2008**		**10/14/2008**		**4/2/2009**		**9/20/1991**		**9/20/1991**		**6/30/1997**		**3/14/2008**		**10/16/2008**		**4/2/2009**		**3/14/2008**		**10/14/2008**		**4/2/2009**	
Duplicate:																								
Aroclor-1254	NA		NA		NA		1	U	NA		1	U	NA		NA		NA		NA		NA		NA	
Aroclor-1260	NA		NA		NA		1	U	NA		1	U	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW04SI-L		03MW04SI		03MW04SI-F		03MW04SI		03MW04SI-D		03MW04S		03MW04S-F		03MW04S		03MW05I		03MW05I		03MW05I		03MW05S
Sample Date:	**10/14/2008**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/11/2008**		**10/16/2008**		**6/18/1997**		**3/12/2008**
Duplicate:																							
TOTAL INORGANICS			**ug/L**				**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**				**ug/L**		**ug/L**
Aluminum	NA		379	B	NA		91.9	B	50	U	551	B	NA		67.1	B	80	U	NA		1040		80
Antimony	NA		45	U	NA		20	U	20	U	45	U	NA		20	U	0.8	J	NA		20	UL	0.7
Arsenic	NA		2	UJ	NA		1	U	1	U	2	U	NA		1	U	0.5	J	NA		1	UL	6
Barium	NA		326		NA		369		364		306		NA		322		209		NA		480		55
Beryllium	NA		3	B	NA		1	U	1	U	3	B	NA		1	U	1	U	NA		1	U	1
Cadmium	NA		4	U	NA		5	U	5	U	4	U	NA		5	U	1	U	NA		5	U	1
Calcium	NA		18800		NA		24400		23900		22900		NA		26300		12000		NA		12000		9690
Chromium	NA		12	B	NA		5	U	5	U	7	U	NA		5	U	7.6		NA		53.3		2.7
Cobalt	NA		10	U	NA		5	U	5	U	10	U	NA		5	U	4	J	NA		5	U	6
Copper	NA		9	B	NA		10	U	10	U	7	B	NA		10	U	1	J	NA		10	U	6
Cyanide	NA		10	U	NA		5	U	5	U	10	U	NA		5	U	NA		NA		5	U	NA
Iron	NA		757		NA		50	U	50	U	562		NA		59.6		130	K	NA		1860		40
Lead	NA		1.7		NA		4.2	B	1	U	1	U	NA		1	U	2	U	NA		4.7	B	2
Magnesium	NA		5330		NA		6150		6020		8460		NA		9040		3160		NA		3430		3240
Manganese	NA		226		NA		5	U	5	U	50		NA		5.1	K	2.8	J	NA		138		1.7
Mercury	NA		0.2	U	NA		0.2	U	0.2	U	0.2	U	NA		0.2	U	0.5	U	NA		0.2	U	0.5
Nickel	NA		15	B	NA		20	U	20	U	12	U	NA		20	U	5.7	J	NA		44.4		1.8
Potassium	NA		2140	U	NA		1500	U	1500	U	2140	U	NA		1500	U	790		NA		1500	U	800
Selenium	NA		20	UJ	NA		5	UL	5	U	20	U	NA		5	UL	2	J	NA		5	U	3
Silver	NA		6	U	NA		5	U	5	U	6	U	NA		5	U	0.06	J	NA		5	U	1
Sodium	NA		9880		NA		12100		11900		7780		NA		9230		9320		NA		9760		11500
Thallium	NA		2	UJ	NA		1	U	1	U	2	U	NA		1	U	1	U	NA		1	U	1
Vanadium	NA		4	U	NA		5	U	5	U	5	B	NA		5	U	1	U	NA		5	U	1
Zinc	NA		9	B	NA		5	U	5	U	8	B	NA		5	U	6	U	NA		37.1		2.8
DISSOLVED INORGANICS					**ug/L**								**ug/L**				**ug/L**						**ug/L**
Aluminum	NA		NA		72	B	NA		NA		NA		105	B	NA		80	U	NA		NA		5
Antimony	NA		NA		45	U	NA		NA		NA		45	U	NA		2	U	NA		NA		2
Arsenic	NA		NA		2	UJ	NA		NA		NA		2	U	NA		3	U	NA		NA		3
Barium	NA		NA		358		NA		NA		NA		334		NA		201		NA		NA		54.8
Beryllium	NA		NA		4	B	NA		NA		NA		3	B	NA		1	U	NA		NA		1
Cadmium	NA		NA		4	U	NA		NA		NA		4	U	NA		1	U	NA		NA		1
Calcium	NA		NA		22000		NA		NA		NA		26100		NA		12800		NA		NA		11100
Chromium	NA		NA		7	U	NA		NA		NA		7	U	NA		3.9		NA		NA		4.9
Cobalt	NA		NA		10	U	NA		NA		NA		10	U	NA		2.5	J	NA		NA		0.5
Copper	NA		NA		6	B	NA		NA		NA		6	B	NA		5	U	NA		NA		5
Iron	NA		NA		54	B	NA		NA		NA		38	B	NA		60	U	NA		NA		9
Lead	NA		NA		1	U	NA		NA		NA		1	U	NA		2	U	NA		NA		2
Magnesium	NA		NA		6080		NA		NA		NA		9620		NA		3240	L	NA		NA		3720
Manganese	NA		NA		2	B	NA		NA		NA		1	B	NA		4	U	NA		NA		2.4
Mercury	NA		NA		0.2	U	NA		NA		NA		0.2	U	NA		0.1	J	NA		NA		0.09
Nickel	NA		NA		12	U	NA		NA		NA		12	U	NA		3.6	J	NA		NA		2.2
Potassium	NA		NA		2140	U	NA		NA		NA		2140	U	NA		860		NA		NA		1140
Selenium	NA		NA		4	UJ	NA		NA		NA		20	U	NA		5	U	NA		NA		3
Silver	NA		NA			R	NA		NA		NA		6	U	NA		1	U	NA		NA		1
Sodium	NA		NA		9840		NA		NA		NA		8680		NA		9470		NA		NA		12600
Thallium	NA		NA		2	U	NA		NA		NA		2	U	NA		1	U	NA		NA		1
Vanadium	NA		NA		4	U	NA		NA		NA		4	B	NA		1	U	NA		NA		1
Zinc	NA		NA		13		NA		NA		NA		6	B	NA		0.3	J	NA		NA		1.4
MISCELLANEOUS PARAMETERS																	**mg/L**						**mg/L**
Hexavalent Chromium	NA		NA		NA		NA		NA		NA		NA		NA		0.01	U	NA		NA		0.01

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW04SI-L		03MW04SI		03MW04SI-F		03MW04SI		03MW04SI-D		03MW04S		03MW04S-F		03MW04S		03MW05I		03MW05I		03MW05I		03MW05S
Sample Date:	10/14/2008		9/20/1991		9/20/1991		6/25/1997		6/25/1997		9/18/1991		9/18/1991		6/25/1997		3/11/2008		10/16/2008		6/18/1997		3/12/2008
Duplicate:																							
SEMIVOLATILES			ug/L				ug/L		ug/L		ug/L				ug/L		ug/L				ug/L		ug/L
1,2,4-Trichlorobenzene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
1,2-Dichlorobenzene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
1,3-Dichlorobenzene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
1,4-Dichlorobenzene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
1,4-Dioxane	NA		NA		NA		NA		NA		NA		NA		NA		2.8	U	NA		NA		2.8
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
2,2'-Oxybis(1-chloropropane)	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2,4,5-Trichlorophenol	NA		50	U	NA		25	U	25	U	50	U	NA		25	U	NA		NA		25	U	NA
2,4,6-Trichlorophenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2,4-Dichlorophenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2,4-Dimethylphenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2,4-Dinitrophenol	NA		50	U	NA		25	U	25	U	50	U	NA		25	U	NA		NA		25	U	NA
2,4-Dinitrotoluene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2,6-Dinitrotoluene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2-Chloronaphthalene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2-Chlorophenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2-Methylnaphthalene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2-Methylphenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
2-Nitroaniline	NA		50	U	NA		25	U	25	U	50	U	NA		25	U	NA		NA		25	U	NA
2-Nitrophenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
3,3'-Dichlorobenzidine	NA		20	U	NA		10	U	10	U	20	U	NA		10	U	NA		NA		10	U	NA
3-Nitroaniline	NA		50	U	NA		25	U	25	U	50	U	NA		25	U	NA		NA		25	U	NA
4,6-Dinitro-2-methylphenol	NA		50	U	NA		25	U	25	U	50	U	NA		25	U	NA		NA		25	U	NA
4-Bromophenyl Phenyl Ether	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
4-Chloro-3-methylphenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
4-Chloroaniline	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
4-Chlorophenyl Phenyl Ether	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
4-Methylphenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
4-Nitroaniline	NA		50	U	NA		25	U	25	U	50	U	NA		25	U	NA		NA		25	U	NA
4-Nitrophenol	NA		50	U	NA		25	U	25	U	50	U	NA		25	U	NA		NA		25	U	NA
Acenaphthene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Acenaphthylene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Anthracene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benz(a)anthracene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benzo(a)pyrene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Benzo(b)fluoranthene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Benzo(g,h,i)perylene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Benzo(k)fluoranthene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Benzoic Acid	NA		50	U	NA		NA		NA		50	U	NA		NA		NA		NA		NA		NA
Benzyl Alcohol	NA		10	U	NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA
Bis(2-chloroethoxy)methane	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Bis(2-chloroethyl)ether	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Bis(2-ethylhexyl)phthalate	NA		1	J	NA		10	U	10	U	10	U	NA		10	U	NA		NA		6	J	NA
Butylbenzylphthalate	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Carbazole	NA		NA		NA		10	U	10	U	NA		NA		10	U	NA		NA		10	U	NA
Chrysene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Di-n-butylphthalate	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04SI-L**		**03MW04SI**		**03MW04SI-F**		**03MW04SI**		**03MW04SI-D**		**03MW04S**		**03MW04S-F**		**03MW04S**		**03MW05I**		**03MW05I**		**03MW05I**		**03MW05S**
Sample Date:	**10/14/2008**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/11/2008**		**10/16/2008**		**6/18/1997**		**3/12/2008**
Duplicate:																							
Di-n-octylphthalate	NA		2	J	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Dibenz(a,h)anthracene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Dibenzofuran	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Diethylphthalate	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Dimethylphthalate	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Fluoranthene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Fluorene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Hexachlorobenzene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Hexachlorobutadiene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Hexachlorocyclopentadiene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Hexachloroethane	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Indeno(1,2,3-cd)pyrene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Isophorone	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
N-Nitroso-di-n-propylamine	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
N-Nitrosodiphenylamine (1)	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Naphthalene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Nitrobenzene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Pentachlorophenol	NA		50	U	NA		25	U	25	U	50	U	NA		25	U	NA		NA		25	U	NA
Phenanthrene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Phenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Pyrene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
VOLATILES	**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**
1,1,1-Trichloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,1,2,2-Tetrachloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,1,2-Trichloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,1,2-Trichlorotrifluoroethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,1-Dichloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,1-Dichloroethene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,2,3-Trichlorobenzene	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	NA		2
1,2,4-Trichlorobenzene	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	NA		2
1,2-Dibromo-3-chloropropane	7	U	NA		NA		NA		NA		NA		NA		NA		7	U	7	U	NA		7
1,2-Dibromoethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,2-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,2-Dichloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,2-Dichloroethene (cis)	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,2-Dichloroethene (Total)	NA		5	U	NA		10	U	10	U	5	U	NA		10	U	NA		NA		10	U	NA
1,2-Dichloroethene (trans)	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,2-Dichloropropane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,3-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,4-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,4-Dioxane	320	U	NA		NA		NA		NA		NA		NA		NA		NA		320	U	NA		NA
2-Butanone	10	U	10	U	NA		10	U	10	U	10	U	NA		10	U	10	UR	10	UR	10	U	10
2-Hexanone	5	U	10	U	NA		10	U	10	U	10	U	NA		10	U	5	U	5	U	10	U	5
4-Methyl-2-pentanone	5	U	10	U	NA		10	U	10	U	10	U	NA		10	U	5	U	5	U	10	U	5
Acetone	10	U	10	U	NA		10	U	10	U	10	U	NA		10	U	10	UR	10	U	10	U	10
Benzene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Bromochloromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Bromodichloromethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Bromoform	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Bromomethane	1	U	10	U	NA		10	U	10	U	10	U	NA		10	U	1	U	1	U	10	U	1
Carbon Disulfide	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Carbon Tetrachloride	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW04SI-L		03MW04SI		03MW04SI-F		03MW04SI		03MW04SI-D		03MW04S		03MW04S-F		03MW04S		03MW05I		03MW05I		03MW05I		03MW05S
Sample Date:	**10/14/2008**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/11/2008**		**10/16/2008**		**6/18/1997**		**3/12/2008**
Duplicate:																							
Chlorobenzene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Chloroethane	1	U	10	U	NA		10	U	10	U	10	U	NA		10	U	1	U	1	U	10	U	1
Chloroform	1.5		5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Chloromethane	1	U	10	U	NA		10	U	10	U	10	U	NA		10	U	1	U	1	U	10	U	1
cis-1,3-Dichloropropene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Cyclohexane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Dibromochloromethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Dichlorodifluoromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Ethylbenzene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Isopropylbenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
M+p-xylenes	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	NA		2
Methyl Acetate	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	NA		2
Methyl Cyclohexane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Methyl Tert-butyl Ether	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Methylene Chloride	1	U	5	U	NA		12	B	16	B	5	U	NA		18	B	1	U	1	U	8	B	1
O-xylene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Styrene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Tetrachloroethene	4		56		NA		20		22		61		NA		21		0.46	J	1	U	10	U	1
Toluene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
trans-1,3-Dichloropropene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Trichloroethene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Trichlorofluoromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Vinyl Acetate	NA		10	U	NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA
Vinyl Chloride	1	U	10	U	NA		10	U	10	U	10	U	NA		10	U	1	U	1	U	10	U	1
Xylene (Total)	NA		5	U	NA		10	U	10	U	5	U	NA		10	U	NA		NA		10	U	NA
PESTICIDES/PCBS			**ug/L**				**ug/L**		**ug/L**		**ug/L**				**ug/L**						**ug/L**		
4,4'-DDD	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
4,4'-DDE	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
4,4'-DDT	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Aldrin	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Alpha-BHC	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Alpha-Chlordane	NA		0.5	U	NA		0.05	U	0.05	U	0.5	U	NA		0.05	U	NA		NA		0.05	U	NA
Beta-BHC	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Delta-BHC	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Dieldrin	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Endosulfan I	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Endosulfan II	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Endosulfan Sulfate	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Endrin	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Endrin Aldehyde	NA		NA		NA		0.1	U	0.1	U	NA		NA		0.1	U	NA		NA		0.1	U	NA
Endrin Ketone	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Gamma-BHC (Lindane)	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Gamma-Chlordane	NA		0.5	U	NA		0.05	U	0.05	U	0.5	U	NA		0.05	U	NA		NA		0.05	U	NA
Heptachlor	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Heptachlor Epoxide	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Methoxychlor	NA		0.5	U	NA		0.5	U	0.5	U	0.5	U	NA		0.5	U	NA		NA		0.5	U	NA
Toxaphene	NA		1	U	NA		5	U	5	U	1	U	NA		5	U	NA		NA		5	U	NA
Aroclor-1016	NA		0.5	U	NA		1	U	1	U	0.5	U	NA		1	U	NA		NA		1	U	NA
Aroclor-1221	NA		0.5	U	NA		2	U	2	U	0.5	U	NA		2	U	NA		NA		2	U	NA
Aroclor-1232	NA		0.5	U	NA		1	U	1	U	0.5	U	NA		1	U	NA		NA		1	U	NA
Aroclor-1242	NA		0.5	U	NA		1	U	1	U	0.5	U	NA		1	U	NA		NA		1	U	NA
Aroclor-1248	NA		0.5	U	NA		1	U	1	U	0.5	U	NA		1	U	NA		NA		1	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04SI-L**		**03MW04SI**		**03MW04SI-F**		**03MW04SI**		**03MW04SI-D**		**03MW04S**		**03MW04S-F**		**03MW04S**		**03MW05I**		**03MW05I**		**03MW05I**		**03MW05S**
Sample Date:	**10/14/2008**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/11/2008**		**10/16/2008**		**6/18/1997**		**3/12/2008**
Duplicate:																							
Aroclor-1254	NA		1	U	NA		1	U	1	U	1	U	NA		1	U	NA		NA		1	U	NA
Aroclor-1260	NA		1	U	NA		1	U	1	U	1	U	NA		1	U	NA		NA		1	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW05S**		**03MW05S**		**03MW05S-F**		**03MW05S**		**03MW06I**		**03MW06I**	**03MW06I-L**		**03MW06I**		**03MW06S**		**03MW06S**		**03MW06SI**		**03MW06SI**
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**	**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																							
TOTAL INORGANICS				**ug/L**				**ug/L**		**ug/L**					**ug/L**		**ug/L**				**ug/L**		
Aluminum	U	NA		185	J	NA		50	U	2030		NA	NA		6970		89		NA		144		NA
Antimony	J	NA		45	U	NA		20	UL	0.7	J	NA	NA		20	U	0.7	J	NA		0.7	J	NA
Arsenic	U	NA		2.1	J	NA		1	U	9.1		NA	NA		4.9	J	0.4	J	NA		6	U	NA
Barium		NA		172		NA		62.7		413		NA	NA		591		37		NA		111		NA
Beryllium	U	NA		4	B	NA		1	U	1	U	NA	NA		1	U	0.1	J	NA		1	U	NA
Cadmium	U	NA		4	U	NA		5	U	1	U	NA	NA		5	U	1	U	NA		1	U	NA
Calcium		NA		5020		NA		10100		25900		NA	NA		36300		12000		NA		7310		NA
Chromium		NA		17	B	NA		7.7		12		NA	NA		90.9		4.9		NA		5.1		NA
Cobalt	U	NA		10	U	NA		5	U	3	J	NA	NA		11.7		6	U	NA		6	U	NA
Copper	U	NA		32	B	NA		10	U	2.4	J	NA	NA		12.7	K	1.7	J	NA		1.7	J	NA
Cyanide		NA		10	U	NA		5	U	NA		NA	NA		5	U	NA		NA		NA		NA
Iron	J	NA		14300		NA		118		2400	K	NA	NA		8170		90	K	NA		230	K	NA
Lead	U	NA		2.6		NA		2.2	B	1.4	J	NA	NA		9.5	B	2	U	NA		2	U	NA
Magnesium		NA		2200		NA		2670		11100		NA	NA		14300		6420		NA		2260		NA
Manganese	J	NA		316		NA		7	K	103		NA	NA		457		8.2		NA		10.2		NA
Mercury	U	NA		1.7		NA		0.2	U	0.5	U	NA	NA		0.2	U	0.5	U	NA		0.5	U	NA
Nickel	J	NA		18	B	NA		20	U	9.6		NA	NA		84		5	J	NA		4.3	J	NA
Potassium		NA		2140	U	NA		1500	U	3080		NA	NA		6750		1370		NA		980		NA
Selenium	J	NA		20	UJ	NA		5	U	2	J	NA	NA		5	UL	5	J	NA		1	J	NA
Silver	U	NA		6	U	NA		5	U	1	U	NA	NA		5	U	1	U	NA		1	U	NA
Sodium		NA		6600		NA		12000		9550		NA	NA		20100		13500		NA		8680		NA
Thallium	U	NA		2	UJ	NA		1	U	1	U	NA	NA		1	U	1	U	NA		1	U	NA
Vanadium	U	NA		16		NA		5	U	6.4		NA	NA		14		1	U	NA		1	U	NA
Zinc	J	NA		39		NA		12.2		10.6		NA	NA		49.8		8.4		NA		5.2	J	NA
DISSOLVED INORGANICS						**ug/L**				**ug/L**							**ug/L**				**ug/L**		
Aluminum	J	NA		NA		77	B	NA		4	J	NA	NA		NA		10	J	NA		3	J	NA
Antimony	U	NA		NA		45	U	NA		2	U	NA	NA		NA		2	U	NA		2	U	NA
Arsenic	U	NA		NA		2	UJ	NA		10.1		NA	NA		NA		3	U	NA		3	U	NA
Barium		NA		NA		61		NA		299		NA	NA		NA		34.8		NA		104		NA
Beryllium	U	NA		NA		4	B	NA		1	U	NA	NA		NA		0.4	J	NA		1	U	NA
Cadmium	U	NA		NA		4	U	NA		1	U	NA	NA		NA		1	U	NA		1	U	NA
Calcium		NA		NA		11500		NA		24900		NA	NA		NA		14000		NA		8310		NA
Chromium		NA		NA		7	U	NA		1.4	J	NA	NA		NA		4.7		NA		3.6		NA
Cobalt	J	NA		NA		10	U	NA		0.1	J	NA	NA		NA		5	U	NA		5	U	NA
Copper	U	NA		NA		7		NA		5	U	NA	NA		NA		1.4	J	NA		5	U	NA
Iron	J	NA		NA		37	B	NA		60	U	NA	NA		NA		10	J	NA		10	J	NA
Lead	U	NA		NA		1.6	B	NA		2	U	NA	NA		NA		2	U	NA		2	U	NA
Magnesium	L	NA		NA		2840		NA		10200	L	NA	NA		NA		6760	L	NA		2490	L	NA
Manganese	J	NA		NA		16		NA		0.4	J	NA	NA		NA		5.8		NA		0.6	J	NA
Mercury	J	NA		NA		0.2	U	NA		0.09	J	NA	NA		NA		0.09	J	NA		0.08	J	NA
Nickel	J	NA		NA		12	U	NA		0.5	J	NA	NA		NA		4.4	J	NA		2.6	J	NA
Potassium		NA		NA		2140	U	NA		2090		NA	NA		NA		1670		NA		1100		NA
Selenium	J	NA		NA		4	U	NA		2	J	NA	NA		NA		5	J	NA		5	U	NA
Silver	U	NA		NA			R	NA		1	U	NA	NA		NA		1	U	NA		1	U	NA
Sodium		NA		NA		11800		NA		9310		NA	NA		NA		14400		NA		9110		NA
Thallium	U	NA		NA		2	U	NA		1	U	NA	NA		NA		1	U	NA		1	U	NA
Vanadium	U	NA		NA		4	U	NA		4.9		NA	NA		NA		1	U	NA		1	U	NA
Zinc	J	NA		NA		18		NA		5	U	NA	NA		NA		6		NA		0.7	J	NA
MISCELLANEOUS PARAMETERS										**mg/L**							**mg/L**				**mg/L**		
Hexavalent Chromium	U	NA		NA		NA		NA		0.01	U	NA	NA		NA		0.01	U	NA		0.01	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		03MW05S		03MW05S		03MW05S-F		03MW05S		03MW06I		03MW06I	03MW06I-L		03MW06I		03MW06S		03MW06S		03MW06SI		03MW06SI
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**	**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																							
SEMIVOLATILES				**ug/L**				**ug/L**		**ug/L**					**ug/L**		**ug/L**				**ug/L**		
1,2,4-Trichlorobenzene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
1,2-Dichlorobenzene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
1,3-Dichlorobenzene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
1,4-Dichlorobenzene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
1,4-Dioxane	U	NA		NA		NA		NA		2.8	U	NA	NA		NA		2.9	U	NA		2.8	U	NA
1,1'-Biphenyl		NA		NA		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA
2,2'-Oxybis(1-chloropropane)		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2,4,5-Trichlorophenol		NA		50	U	NA		25	U	NA		NA	NA		26	U	NA		NA		NA		NA
2,4,6-Trichlorophenol		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2,4-Dichlorophenol		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2,4-Dimethylphenol		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2,4-Dinitrophenol		NA		50	U	NA		25	U	NA		NA	NA		26	U	NA		NA		NA		NA
2,4-Dinitrotoluene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2,6-Dinitrotoluene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2-Chloronaphthalene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2-Chlorophenol		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2-Methylnaphthalene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2-Methylphenol		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
2-Nitroaniline		NA		50	U	NA		25	U	NA		NA	NA		26	U	NA		NA		NA		NA
2-Nitrophenol		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
3,3'-Dichlorobenzidine		NA		20	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
3-Nitroaniline		NA		50	U	NA		25	U	NA		NA	NA		26	U	NA		NA		NA		NA
4,6-Dinitro-2-methylphenol		NA		50	U	NA		25	U	NA		NA	NA		26	U	NA		NA		NA		NA
4-Bromophenyl Phenyl Ether		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
4-Chloro-3-methylphenol		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
4-Chloroaniline		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
4-Chlorophenyl Phenyl Ether		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
4-Methylphenol		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
4-Nitroaniline		NA		50	U	NA		25	U	NA		NA	NA		26	U	NA		NA		NA		NA
4-Nitrophenol		NA		50	U	NA		25	U	NA		NA	NA		26	U	NA		NA		NA		NA
Acenaphthene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Acenaphthylene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Acetophenone		NA		NA		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA
Anthracene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Atrazine		NA		NA		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA
Benz(a)anthracene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Benzaldehyde		NA		NA		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA
Benzo(a)pyrene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Benzo(b)fluoranthene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Benzo(g,h,i)perylene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Benzo(k)fluoranthene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Benzoic Acid		NA		50	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA
Benzyl Alcohol		NA		10	U	NA		NA		NA		NA	NA		NA		NA		NA		NA		NA
Bis(2-chloroethoxy)methane		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Bis(2-chloroethyl)ether		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Bis(2-ethylhexyl)phthalate		NA		1	J	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Butylbenzylphthalate		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Caprolactam		NA		NA		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA
Carbazole		NA		NA		NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Chrysene		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA
Di-n-butylphthalate		NA		10	U	NA		10	U	NA		NA	NA		11	U	NA		NA		NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW05S**		**03MW05S**		**03MW05S-F**		**03MW05S**		**03MW06I**		**03MW06I**		**03MW06I-L**		**03MW06I**		**03MW06S**		**03MW06S**		**03MW06SI**		**03MW06SI**
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**		**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																								
Di-n-octylphthalate		NA		1	J	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Dibenz(a,h)anthracene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Dibenzofuran		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Diethylphthalate		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Dimethylphthalate		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Fluoranthene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Fluorene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Hexachlorobenzene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Hexachlorobutadiene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Hexachlorocyclopentadiene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Hexachloroethane		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Indeno(1,2,3-cd)pyrene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Isophorone		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
N-Nitroso-di-n-propylamine		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
N-Nitrosodiphenylamine (1)		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Naphthalene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Nitrobenzene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Pentachlorophenol		NA		50	U	NA		25	U	NA		NA		NA		26	U	NA		NA		NA		NA
Phenanthrene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Phenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Pyrene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
VOLATILES		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**
1,1,1-Trichloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,1,2,2-Tetrachloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,1,2-Trichloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,1,2-Trichlorotrifluoroethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,1-Dichloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,1-Dichloroethene	U	1	U	5	U	NA		10	U	0.2	J	1	U	1	U	10	U	1	U	1	U	1	U	1
1,2,3-Trichlorobenzene	U	2	U	NA		NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U	2
1,2,4-Trichlorobenzene	U	2	U	NA		NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U	2
1,2-Dibromo-3-chloropropane	U	7	U	NA		NA		NA		7	U	7	U	7	U	NA		7	U	7	U	7	U	7
1,2-Dibromoethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,2-Dichlorobenzene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,2-Dichloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,2-Dichloroethene (cis)	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,2-Dichloroethene (Total)		NA		5	U	NA		10	U	NA		NA		NA		10	U	NA		NA		NA		NA
1,2-Dichloroethene (trans)	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,2-Dichloropropane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,3-Dichlorobenzene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,4-Dichlorobenzene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,4-Dioxane		320	U	NA		NA		NA		NA		320	U	320	U	NA		NA		320	U	NA		320
2-Butanone	UR	10	UR	10	U	NA		10	U	10	UR	10	U	10	U	10	U	10	UR	10	U	10	UR	10
2-Hexanone	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	10	U	5	U	5	U	5	U	5
4-Methyl-2-pentanone	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	10	U	5	U	5	U	5	U	5
Acetone	UR	10	U	10	U	NA		10	U	10	UR	10	U	10	U	10	U	10	UR	10	U	10	UR	10
Benzene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Bromochloromethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Bromodichloromethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Bromoform	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Bromomethane	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Carbon Disulfide	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Carbon Tetrachloride	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW05S**		**03MW05S**		**03MW05S-F**		**03MW05S**		**03MW06I**		**03MW06I**		**03MW06I-L**		**03MW06I**		**03MW06S**		**03MW06S**		**03MW06SI**		**03MW06SI**
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**		**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																								
Chlorobenzene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Chloroethane	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Chloroform	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Chloromethane	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
cis-1,3-Dichloropropene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Cyclohexane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Dibromochloromethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Dichlorodifluoromethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Ethylbenzene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Isopropylbenzene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
M+p-xylenes	U	2	U	NA		NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U	2
Methyl Acetate	U	2	U	NA		NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U	2
Methyl Cyclohexane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Methyl Tert-butyl Ether	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Methylene Chloride	U	1	U	5	U	NA		7	B	1	U	1	U	1	U	15	B	1	U	1	U	1	U	1
O-xylene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Styrene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Tetrachloroethene	U	0.49	J	7		NA		2	J	1	U	1	U	1	U	39		0.76	J	1.8		1	U	1
Toluene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
trans-1,3-Dichloropropene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Trichloroethene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Trichlorofluoromethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Vinyl Acetate		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Vinyl Chloride	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Xylene (Total)		NA		5	U	NA		10	U	NA		NA		NA		10	U	NA		NA		NA		NA
PESTICIDES/PCBS				**ug/L**				**ug/L**								**ug/L**								
4,4'-DDD		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
4,4'-DDE		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
4,4'-DDT		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Aldrin		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Alpha-BHC		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Alpha-Chlordane		NA		0.5	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Beta-BHC		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Delta-BHC		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Dieldrin		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endosulfan I		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Endosulfan II		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endosulfan Sulfate		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endrin		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endrin Aldehyde		NA		NA		NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endrin Ketone		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Gamma-BHC (Lindane)		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Gamma-Chlordane		NA		0.5	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Heptachlor		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Heptachlor Epoxide		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Methoxychlor		NA		0.5	U	NA		0.5	U	NA		NA		NA		0.5	U	NA		NA		NA		NA
Toxaphene		NA		1	U	NA		5	U	NA		NA		NA		5	U	NA		NA		NA		NA
Aroclor-1016		NA		0.5	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA
Aroclor-1221		NA		0.5	U	NA		2	U	NA		NA		NA		2	U	NA		NA		NA		NA
Aroclor-1232		NA		0.5	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA
Aroclor-1242		NA		0.5	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA
Aroclor-1248		NA		0.5	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW05S**		**03MW05S**		**03MW05S-F**		**03MW05S**		**03MW06I**		**03MW06I**		**03MW06I-L**		**03MW06I**		**03MW06S**		**03MW06S**		**03MW06SI**		**03MW06SI**
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**		**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																								
Aroclor-1254		NA		1	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA
Aroclor-1260		NA		1	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW06SI**		**03MW06S**		**03MW07S**		**03MW07S**	**03MW07S**	**03MW07S**		**03MW08D**		**03MW08D**	**03MW08S**	
Sample Date:	**6/18/1997**		**6/30/1997**		**3/19/2008**		**10/21/2008**	**4/2/2009**	**7/7/1997**		**3/12/2008**		**10/18/2008**	**3/12/2008**	
Duplicate:															
TOTAL INORGANICS	**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**			**ug/L**	
Aluminum	466		206		96		NA	NA	263		80	U	NA	80	U
Antimony	20	UL	20	U	2	U	NA	NA	20	U	0.7	J	NA	0.8	J
Arsenic	1	UL	1	UL	6	U	NA	NA	1	U	0.5	J	NA	6	U
Barium	162		102		625		NA	NA	339		340		NA	50.1	
Beryllium	1	U	1	U	1	U	NA	NA	1	U	1	U	NA	0.6	J
Cadmium	5	U	5	U	1	U	NA	NA	5	U	1	U	NA	1	U
Calcium	7770		16100		62900		NA	NA	25700		31900		NA	11500	
Chromium	36.9		10.7	K	2.2	B	NA	NA	5	U	2.5		NA	2.8	
Cobalt	6.6		5	U	0.2	J	NA	NA	5	U	2.4	J	NA	0.2	J
Copper	10	U	10	U	0.1	B	NA	NA	10	U	6	U	NA	2	J
Cyanide	5	U	5	U	NA		NA	NA	5	U	NA		NA	NA	
Iron	962		340	B	90		NA	NA	318	J	170	K	NA	70	K
Lead	1.7	B	2.5	B	2	U	NA	NA	2.7	B	2	U	NA	2	U
Magnesium	2350		6240		16200		NA	NA	6200		13800		NA	3470	
Manganese	90.2		93.2		12.9		NA	NA	12.2		1.9	J	NA	35.3	
Mercury	0.2	U	0.2	U	0.5	U	NA	NA	0.2	U	0.5	U	NA	0.5	U
Nickel	30		20	U	4.8	J	NA	NA	20	U	2.8	J	NA	4	J
Potassium	1500	U	1500	U	1060		NA	NA	1500	U	770		NA	1140	
Selenium	5	U	5	UL	6	U	NA	NA	5	U	1	J	NA	1	J
Silver	5	U	5	U	0.6	B	NA	NA	5	U	1	U	NA	1	U
Sodium	9310		14200		22400		NA	NA	25300		10800		NA	14600	
Thallium	1	U	1	U	1	U	NA	NA	1	U	1	U	NA	1	U
Vanadium	5	U	5	U	0.6	B	NA	NA	5	U	0.09	J	NA	1	U
Zinc	17		20.8	B	2.4	J	NA	NA	8.3	B	6	U	NA	3.1	J
DISSOLVED INORGANICS					**ug/L**						**ug/L**			**ug/L**	
Aluminum	NA		NA		80	U	NA	NA	NA		17	J	NA	5	J
Antimony	NA		NA		0.4	B	NA	NA	NA		2	U	NA	2	U
Arsenic	NA		NA		5	U	NA	NA	NA		3	U	NA	3	U
Barium	NA		NA		544		NA	NA	NA		324		NA	46.9	
Beryllium	NA		NA		1	U	NA	NA	NA		1	U	NA	0.6	J
Cadmium	NA		NA		1	U	NA	NA	NA		1	U	NA	1	U
Calcium	NA		NA		71100		NA	NA	NA		35500		NA	12600	
Chromium	NA		NA		3.4		NA	NA	NA		3.7		NA	3.9	
Cobalt	NA		NA		5	U	NA	NA	NA		1.9	J	NA	5	U
Copper	NA		NA		5	U	NA	NA	NA		5	U	NA	1.6	J
Iron	NA		NA		60	U	NA	NA	NA		60	U	NA	60	U
Lead	NA		NA		2	U	NA	NA	NA		2	U	NA	2	U
Magnesium	NA		NA		17100		NA	NA	NA		15300	L	NA	3780	L
Manganese	NA		NA		0.1	B	NA	NA	NA		0.05	J	NA	34.6	
Mercury	NA		NA		0.5	U	NA	NA	NA		0.1	J	NA	0.09	J
Nickel	NA		NA		2.9	J	NA	NA	NA		1.7	J	NA	3.8	J
Potassium	NA		NA		1180		NA	NA	NA		970		NA	1430	
Selenium	NA		NA		1	J	NA	NA	NA		9		NA	5	U
Silver	NA		NA		1	UR	NA	NA	NA		1	U	NA	1	U
Sodium	NA		NA		26000		NA	NA	NA		11300		NA	15300	
Thallium	NA		NA		1	U	NA	NA	NA		1	U	NA	1	U
Vanadium	NA		NA		0.7	J	NA	NA	NA		1	J	NA	1	U
Zinc	NA		NA		5	U	NA	NA	NA		0.7	J	NA	3.4	J
MISCELLANEOUS PARAMETERS															
Hexavalent Chromium	NA		NA		NA		NA	NA	NA		NA		NA	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW06SI**		**03MW06S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW08D**		**03MW08D**		**03MW08S**	
Sample Date:	**6/18/1997**		**6/30/1997**		**3/19/2008**		**10/21/2008**		**4/2/2009**		**7/7/1997**		**3/12/2008**		**10/18/2008**		**3/12/2008**	
Duplicate:																		
SEMIVOLATILES	**ug/L**		**ug/L**		**ug/L**						**ug/L**		**ug/L**				**ug/L**	
1,2,4-Trichlorobenzene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
1,2-Dichlorobenzene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
1,3-Dichlorobenzene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
1,4-Dichlorobenzene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
1,4-Dioxane	NA		NA		2.9	U	NA		NA		NA		2.8	U	NA		2.8	U
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2,4,5-Trichlorophenol	25	U	25	U	NA		NA		NA		25	U	NA		NA		NA	
2,4,6-Trichlorophenol	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2,4-Dichlorophenol	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2,4-Dimethylphenol	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2,4-Dinitrophenol	25	U	25	U	NA		NA		NA		25	U	NA		NA		NA	
2,4-Dinitrotoluene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2,6-Dinitrotoluene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2-Chloronaphthalene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2-Chlorophenol	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2-Methylnaphthalene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2-Methylphenol	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
2-Nitroaniline	25	U	25	U	NA		NA		NA		25	U	NA		NA		NA	
2-Nitrophenol	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
3,3'-Dichlorobenzidine	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
3-Nitroaniline	25	U	25	U	NA		NA		NA		25	U	NA		NA		NA	
4,6-Dinitro-2-methylphenol	25	U	25	U	NA		NA		NA		25	U	NA		NA		NA	
4-Bromophenyl Phenyl Ether	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
4-Chloro-3-methylphenol	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
4-Chloroaniline	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
4-Chlorophenyl Phenyl Ether	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
4-Methylphenol	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
4-Nitroaniline	25	U	25	U	NA		NA		NA		25	U	NA		NA		NA	
4-Nitrophenol	25	U	25	U	NA		NA		NA		25	U	NA		NA		NA	
Acenaphthene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Acenaphthylene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Benzo(b)fluoranthene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Benzo(g,h,i)perylene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Benzo(k)fluoranthene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Bis(2-chloroethyl)ether	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Bis(2-ethylhexyl)phthalate	11		10	U	NA		NA		NA		10	U	NA		NA		NA	
Butylbenzylphthalate	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Chrysene	10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Di-n-butylphthalate	10	U	10	U	NA		NA		NA		1	B	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW06SI**		**03MW06S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW08D**		**03MW08D**		**03MW08S**	
Sample Date:		**6/18/1997**		**6/30/1997**		**3/19/2008**		**10/21/2008**		**4/2/2009**		**7/7/1997**		**3/12/2008**		**10/18/2008**		**3/12/2008**	
Duplicate:																			
Di-n-octylphthalate		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Dibenz(a,h)anthracene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Dibenzofuran		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Diethylphthalate		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Dimethylphthalate		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Fluoranthene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Fluorene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Hexachlorobenzene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Hexachlorobutadiene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Hexachlorocyclopentadiene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Hexachloroethane		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Indeno(1,2,3-cd)pyrene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Isophorone		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
N-Nitroso-di-n-propylamine		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
N-Nitrosodiphenylamine (1)		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Naphthalene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Nitrobenzene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Pentachlorophenol		25	U	25	U	NA		NA		NA		25	U	NA		NA		NA	
Phenanthrene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Phenol		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Pyrene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
VOLATILES		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	2.6		4.1		1	U
1,1,2,2-Tetrachloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
1,1,2-Trichloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	U	NA		NA		1	U	1	U	0.34	J	NA		1	U	1	U	1	U
1,1-Dichloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	6.3		8.2		1	U
1,1-Dichloroethene	U	10	U	10	U	1	U	1	U	1	U	10	U	3.1		5.1		1	U
1,2,3-Trichlorobenzene	U	NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U
1,2,4-Trichlorobenzene	U	NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	U	NA		NA		7	U	7	U	7	U	NA		7	U	7	U	7	U
1,2-Dibromoethane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,2-Dichlorobenzene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,2-Dichloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	U	NA		NA		1	U	1	U	1	U	NA		1.2		1.5		1	U
1,2-Dichloroethene (Total)		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
1,2-Dichloroethene (trans)	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,2-Dichloropropane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
1,3-Dichlorobenzene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,4-Dichlorobenzene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,4-Dioxane	U	NA		NA		NA		320	U	NA		NA		NA		320	U	NA	
2-Butanone	U	10	U	10	U	10	UR	10	UR	10	UR	10	U	10	UR	10	U	10	UR
2-Hexanone	U	10	U	10	U	5	U	5	U	5	U	10	U	5	U	5	U	5	U
4-Methyl-2-pentanone	U	10	U	10	U	5	U	5	U	5	U	10	U	5	U	5	U	5	U
Acetone	U	10	U	10	U	10	UR	10	U	10	UR	10	U	10	UR	10	U	10	UR
Benzene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Bromochloromethane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Bromodichloromethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Bromoform	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Bromomethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Carbon Disulfide	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Carbon Tetrachloride	U	10	U	10	U	1	U	1	U	1	U	10	U	0.28	J	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW06SI**		**03MW06S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW08D**		**03MW08D**		**03MW08S**	
Sample Date:		**6/18/1997**		**6/30/1997**		**3/19/2008**		**10/21/2008**		**4/2/2009**		**7/7/1997**		**3/12/2008**		**10/18/2008**		**3/12/2008**	
Duplicate:																			
Chlorobenzene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Chloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Chloroform	U	10	U	10	U	1	U	1.6		1	U	10	U	1	U	1	U	1	U
Chloromethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Cyclohexane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Dibromochloromethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Dichlorodifluoromethane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Ethylbenzene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Isopropylbenzene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
M+p-xylenes	U	NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U
Methyl Acetate	U	NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U
Methyl Cyclohexane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Methyl Tert-butyl Ether	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Methylene Chloride	U	8	B	10	UJ	1	U	1	U	1	U	5	B	1	U	1	U	1	U
O-xylene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Styrene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Tetrachloroethene	U	10	U	29		1.1		0.41	J	0.74	J	10	U	1		1.3		1	U
Toluene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Trichloroethene	U	10	U	10	U	1	U	1	U	1	U	10	U	1.9		3.1		1	U
Trichlorofluoromethane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Vinyl Acetate		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Xylene (Total)		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
PESTICIDES/PCBS		**ug/L**		**ug/L**								**ug/L**							
4,4'-DDD		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
4,4'-DDE		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
4,4'-DDT		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Aldrin		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Alpha-BHC		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Alpha-Chlordane		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Beta-BHC		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Delta-BHC		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Dieldrin		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endosulfan I		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Endosulfan II		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endosulfan Sulfate		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endrin		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endrin Aldehyde		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endrin Ketone		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Gamma-BHC (Lindane)		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Gamma-Chlordane		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Heptachlor		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Heptachlor Epoxide		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Methoxychlor		0.5	U	0.5	U	NA		NA		NA		0.5	U	NA		NA		NA	
Toxaphene		5	U	5	U	NA		NA		NA		5	U	NA		NA		NA	
Aroclor-1016		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	
Aroclor-1221		2	U	2	U	NA		NA		NA		2	U	NA		NA		NA	
Aroclor-1232		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	
Aroclor-1242		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	
Aroclor-1248		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW06SI**		**03MW06S**		**03MW07S**	**03MW07S**	**03MW07S**	**03MW07S**		**03MW08D**	**03MW08D**	**03MW08S**
Sample Date:	**6/18/1997**		**6/30/1997**		**3/19/2008**	**10/21/2008**	**4/2/2009**	**7/7/1997**		**3/12/2008**	**10/18/2008**	**3/12/2008**
Duplicate:												
Aroclor-1254	1	U	1	U	NA	NA	NA	1	U	NA	NA	NA
Aroclor-1260	1	U	1	U	NA	NA	NA	1	U	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**	**03MW09S**	**03MW09O**	**03MW01I**	**03MW01I-DUP**	**03MW01S**	**03MW01SI**	**03MW02I**	**03MW02S**	**03MW02SI**	**03MW03S**
Sample Date:	**10/15/2008**	**2/17/2010**	**2/17/2010**	**2/6/2006**	**2/6/2006**	**2/3/2006**	**2/3/2006**	**2/1/2006**	**2/6/2006**	**2/1/2006**	**2/8/2006**
Duplicate:			**03MW01I-DUP**		**03MW01I**						
TOTAL INORGANICS											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DISSOLVED INORGANICS											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MISCELLANEOUS PARAMETERS											
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**	**03MW09S**	**03MW09O**	**03MW01I**	**03MW01I-DUP**	**03MW01S**	**03MW01SI**	**03MW02I**	**03MW02S**	**03MW02SI**	**03MW03S**
Sample Date:	**10/15/2008**	**2/17/2010**	**2/17/2010**	**2/6/2006**	**2/6/2006**	**2/3/2006**	**2/3/2006**	**2/1/2006**	**2/6/2006**	**2/1/2006**	**2/8/2006**
Duplicate:				**03MW01I-DUP**	**03MW01I**						
SEMIVOLATILES											
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl Phenyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl Phenyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**		**03MW09S**		**03MW09O**		**03MW01I**		**03MW01I-DUP**		**03MW01S**		**03MW01SI**		**03MW02I**		**03MW02S**		**03MW02SI**		**03MW03S**	
Sample Date:	**10/15/2008**		**2/17/2010**		**2/17/2010**		**2/6/2006**		**2/6/2006**		**2/3/2006**		**2/3/2006**		**2/1/2006**		**2/6/2006**		**2/1/2006**		**2/8/2006**	
Duplicate:							**03MW01I-DUP**		**03MW01I**													
Di-n-octylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenzofuran	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Diethylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dimethylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluoranthene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorobutadiene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorocyclopentadiene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachloroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Isophorone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Naphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Nitrobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pentachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenanthrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pyrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	2	U	0.5	U	0.5	U	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	2	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dibromo-3-chloropropane	7	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dibromoethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	320	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	10	U	2.5	UR	10	UR	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	5	U	2.5	U	2.5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	2.5	U	2.5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	10	U	3.5	U	3.5	U	5	U	5	U	5	U	5	U	3.4	J	5	U	5	U	5	U
Benzene	1	U	0.1	B	0.13	B	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	1	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromoform	1	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromomethane	1	U	1.4	UJ	1.4	UJ	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Disulfide	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.27	J	1	U	0.32	J	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**		**03MW09S**		**03MW09O**		**03MW01I**		**03MW01I-DUP**		**03MW01S**		**03MW01SI**		**03MW02I**		**03MW02S**		**03MW02SI**		**03MW03S**	
Sample Date:	**10/15/2008**		**2/17/2010**		**2/17/2010**		**2/6/2006**		**2/6/2006**		**2/3/2006**		**2/3/2006**		**2/1/2006**		**2/6/2006**		**2/1/2006**		**2/8/2006**	
Duplicate:							**03MW01I-DUP**		**03MW01I**													
Chlorobenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroform	1	U	0.42	J	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloromethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Cyclohexane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Isopropylbenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
M+p-xylenes	2	U	1	U	1	U	NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	2	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Cyclohexane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	1	U	0.13	B	0.12	B	1	U	1	U	1	U	1	U	1.7	B	1	U	1.9	B	1	U
O-xylene	1	U	0.5	U	0.5	U	NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	1	U	6.8		0.35	J	0.23	J	1	U	0.9	J	4.9		2.4		1	U	1.9		14	
Toluene	1	U	0.5	U	0.16	J	0.2	J	1	U	1	U	1	U	0.5	B	1	U	0.2	B	1	U
trans-1,3-Dichloropropene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	0.11	J	0.5	U	1	U	1	U	1	U	1	U	0.36	B	1	U	0.59	B	1	U
Trichlorofluoromethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Xylene (Total)	NA		NA		NA		3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U
PESTICIDES/PCBS																						
4,4'-DDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDE	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDT	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aldrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Alpha-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Alpha-Chlordane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Delta-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dieldrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan I	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan II	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan Sulfate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Gamma-Chlordane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Heptachlor	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Heptachlor Epoxide	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methoxychlor	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Toxaphene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1016	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1221	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1232	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1242	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1248	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**	**03MW09S**	**03MW09O**	**03MW01I**	**03MW01I-DUP**	**03MW01S**	**03MW01SI**	**03MW02I**	**03MW02S**	**03MW02SI**	**03MW03S**
Sample Date:	**10/15/2008**	**2/17/2010**	**2/17/2010**	**2/6/2006**	**2/6/2006**	**2/3/2006**	**2/3/2006**	**2/1/2006**	**2/6/2006**	**2/1/2006**	**2/8/2006**
Duplicate:			**03MW01I-DUP**		**03MW01I**						
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03SI**	**03MW04I**	**03MW04S**	**03MW04S-DUP**	**03MW04SI**	**03MW05I**	**03MW05S**	**03MW06I**	**03MW06S**	**03MW06SI**	**03MW07S**
Sample Date:	**2/8/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/3/2006**	**2/3/2006**	**2/6/2006**	**2/6/2006**	**2/7/2006**	**1/31/2006**
Duplicate:			**03MW04S-DUP**	**03MW04S**							
TOTAL INORGANICS											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DISSOLVED INORGANICS											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MISCELLANEOUS PARAMETERS											
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03MW03SI	03MW04I	03MW04S	03MW04S-DUP	03MW04SI	03MW05I	03MW05S	03MW06I	03MW06S	03MW06SI	03MW07S
Sample Date:	2/8/2006	2/10/2006	2/10/2006	2/10/2006	2/10/2006	2/3/2006	2/3/2006	2/6/2006	2/6/2006	2/7/2006	1/31/2006
Duplicate:			03MW04S-DUP	03MW04S							
SEMIVOLATILES											
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl Phenyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl Phenyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03SI**		**03MW04I**		**03MW04S**		**03MW04S-DUP**		**03MW04SI**		**03MW05I**		**03MW05S**		**03MW06I**		**03MW06S**		**03MW06SI**		**03MW07S**	
Sample Date:	**2/8/2006**		**2/10/2006**		**2/10/2006**		**2/10/2006**		**2/10/2006**		**2/3/2006**		**2/3/2006**		**2/6/2006**		**2/6/2006**		**2/7/2006**		**1/31/2006**	
Duplicate:					**03MW04S-DUP**		**03MW04S**															
Di-n-octylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenzofuran	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Diethylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dimethylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluoranthene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorobutadiene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorocyclopentadiene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachloroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Isophorone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Naphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Nitrobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pentachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenanthrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pyrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.37	J
1,1-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dibromo-3-chloropropane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dibromoethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromoform	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromomethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Disulfide	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03SI**		**03MW04I**		**03MW04S**		**03MW04S-DUP**		**03MW04SI**		**03MW05I**		**03MW05S**		**03MW06I**		**03MW06S**		**03MW06SI**		**03MW07S**	
Sample Date:	**2/8/2006**		**2/10/2006**		**2/10/2006**		**2/10/2006**		**2/10/2006**		**2/3/2006**		**2/3/2006**		**2/6/2006**		**2/6/2006**		**2/7/2006**		**1/31/2006**	
Duplicate:					**03MW04S-DUP**		**03MW04S**															
Chlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroform	1	U	1	U	0.4	J	0.17	J	0.32	J	1	U	1	U	1	U	1	U	1	U	1	U
Chloromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Cyclohexane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Isopropylbenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
M+p-xylenes	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Cyclohexane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	1	U	1	U	1	U	0.45	J	1	U	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1.1	B
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	12		0.52	J	8.8		9.1		10		0.7	J	0.67	J	0.79	J	1.3		1	U	1.4	
Toluene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.22	J	1	U	1	U	1	U
trans-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.37	B
Trichlorofluoromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Xylene (Total)	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U
PESTICIDES/PCBS																						
4,4'-DDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDE	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDT	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aldrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Alpha-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Alpha-Chlordane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Delta-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dieldrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan I	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan II	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan Sulfate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Gamma-Chlordane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Heptachlor	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Heptachlor Epoxide	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methoxychlor	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Toxaphene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1016	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1221	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1232	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1242	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1248	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03SI**	**03MW04I**	**03MW04S**	**03MW04S-DUP**	**03MW04SI**	**03MW05I**	**03MW05S**	**03MW06I**	**03MW06S**	**03MW06SI**	**03MW07S**
Sample Date:	**2/8/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/3/2006**	**2/3/2006**	**2/6/2006**	**2/6/2006**	**2/7/2006**	**1/31/2006**
Duplicate:			**03MW04S-DUP**	**03MW04S**							
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
TOTAL INORGANICS						
Aluminum	NA		NA		NA	
Antimony	NA		NA		NA	
Arsenic	NA		NA		NA	
Barium	NA		NA		NA	
Beryllium	NA		NA		NA	
Cadmium	NA		NA		NA	
Calcium	NA		NA		NA	
Chromium	NA		NA		NA	
Cobalt	NA		NA		NA	
Copper	NA		NA		NA	
Cyanide	NA		NA		NA	
Iron	NA		NA		NA	
Lead	NA		NA		NA	
Magnesium	NA		NA		NA	
Manganese	NA		NA		NA	
Mercury	NA		NA		NA	
Nickel	NA		NA		NA	
Potassium	NA		NA		NA	
Selenium	NA		NA		NA	
Silver	NA		NA		NA	
Sodium	NA		NA		NA	
Thallium	NA		NA		NA	
Vanadium	NA		NA		NA	
Zinc	NA		NA		NA	
DISSOLVED INORGANICS						
Aluminum	NA		NA		NA	
Antimony	NA		NA		NA	
Arsenic	NA		NA		NA	
Barium	NA		NA		NA	
Beryllium	NA		NA		NA	
Cadmium	NA		NA		NA	
Calcium	NA		NA		NA	
Chromium	NA		NA		NA	
Cobalt	NA		NA		NA	
Copper	NA		NA		NA	
Iron	NA		NA		NA	
Lead	NA		NA		NA	
Magnesium	NA		NA		NA	
Manganese	NA		NA		NA	
Mercury	NA		NA		NA	
Nickel	NA		NA		NA	
Potassium	NA		NA		NA	
Selenium	NA		NA		NA	
Silver	NA		NA		NA	
Sodium	NA		NA		NA	
Thallium	NA		NA		NA	
Vanadium	NA		NA		NA	
Zinc	NA		NA		NA	
MISCELLANEOUS PARAMETERS						
Hexavalent Chromium	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
SEMIVOLATILES	**ug/L**		**ug/L**		**ug/L**	
1,2,4-Trichlorobenzene	NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA	
1,4-Dioxane	NA		NA		NA	
1,1'-Biphenyl	10	U	10	U	10	U
2,2'-Oxybis(1-chloropropane)	10	U	10	U	10	U
2,4,5-Trichlorophenol	10	U	10	U	10	U
2,4,6-Trichlorophenol	10	U	10	U	10	U
2,4-Dichlorophenol	10	U	10	U	10	U
2,4-Dimethylphenol	10	U	10	U	10	U
2,4-Dinitrophenol	52	U	51	U	51	U
2,4-Dinitrotoluene	10	U	10	U	10	U
2,6-Dinitrotoluene	10	U	10	U	10	U
2-Chloronaphthalene	10	U	10	U	10	U
2-Chlorophenol	10	U	10	U	10	U
2-Methylnaphthalene	10	U	10	U	10	U
2-Methylphenol	10	U	10	U	10	U
2-Nitroaniline	52	U	51	U	51	U
2-Nitrophenol	10	U	10	U	10	U
3,3'-Dichlorobenzidine	52	U	51	U	51	U
3-Nitroaniline	52	U	51	U	51	U
4,6-Dinitro-2-methylphenol	52	U	51	U	51	U
4-Bromophenyl Phenyl Ether	10	U	10	U	10	U
4-Chloro-3-methylphenol	10	U	10	U	10	U
4-Chloroaniline	10	U	10	U	10	U
4-Chlorophenyl Phenyl Ether	10	U	10	U	10	U
4-Methylphenol	10	U	10	U	10	U
4-Nitroaniline	52	U	51	U	51	U
4-Nitrophenol	52	U	51	U	51	U
Acenaphthene	0.21	U	0.2	U	0.2	U
Acenaphthylene	0.21	U	0.2	U	0.2	U
Acetophenone	10	U	10	U	10	U
Anthracene	0.21	U	0.2	U	0.2	U
Atrazine	10	U	10	U	10	U
Benz(a)anthracene	0.21	U	0.2	U	0.2	U
Benzaldehyde	10	U	10	U	10	U
Benzo(a)pyrene	0.21	U	0.2	U	0.2	U
Benzo(b)fluoranthene	0.21	U	0.2	U	0.2	U
Benzo(g,h,i)perylene	0.21	U	0.2	U	0.2	U
Benzo(k)fluoranthene	0.21	U	0.2	U	0.2	U
Benzoic Acid	NA		NA		NA	
Benzyl Alcohol	NA		NA		NA	
Bis(2-chloroethoxy)methane	10	U	10	U	10	U
Bis(2-chloroethyl)ether	10	U	10	U	10	U
Bis(2-ethylhexyl)phthalate	10	U	10	U	10	U
Butylbenzylphthalate	10	U	10	U	10	U
Caprolactam	10	U	10	U	10	U
Carbazole	10	U	10	U	10	U
Chrysene	0.21	U	0.2	U	0.2	U
Di-n-butylphthalate	10	U	10	U	10	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
Di-n-octylphthalate	10	U	10	U	10	U
Dibenz(a,h)anthracene	0.21	U	0.2	U	0.2	U
Dibenzofuran	10	U	10	U	10	U
Diethylphthalate	10	U	10	U	10	U
Dimethylphthalate	10	U	10	U	10	U
Fluoranthene	0.21	U	0.2	U	0.2	U
Fluorene	0.21	U	0.2	U	0.2	U
Hexachlorobenzene	10	U	10	U	10	U
Hexachlorobutadiene	10	U	10	U	10	U
Hexachlorocyclopentadiene	52	U	51	U	51	U
Hexachloroethane	10	U	10	U	10	U
Indeno(1,2,3-cd)pyrene	0.21	U	0.2	U	0.2	U
Isophorone	10	U	10	U	10	U
N-Nitroso-di-n-propylamine	10	U	10	U	10	U
N-Nitrosodiphenylamine (1)	10	U	10	U	10	U
Naphthalene	0.21	U	0.057	B	0.2	U
Nitrobenzene	10	U	10	U	10	U
Pentachlorophenol	52	U	51	U	51	U
Phenanthrene	0.11	B	0.098	B	0.15	B
Phenol	10	U	10	U	10	U
Pyrene	0.21	U	0.2	U	0.2	U
VOLATILES	**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	3		1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U
1,1-Dichloroethane	5.9		1	U	1	U
1,1-Dichloroethene	2.5		1	U	1	U
1,2,3-Trichlorobenzene	NA		NA		NA	
1,2,4-Trichlorobenzene	1	U	1	U	1	U
1,2-Dibromo-3-chloropropane	1	U	1	U	1	U
1,2-Dibromoethane	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	1	U
1,2-Dichloroethene (cis)	0.9	J	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	1	U
1,4-Dioxane	NA		NA		NA	
2-Butanone	5	U	5	U	5	U
2-Hexanone	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	5	U
Acetone	5	U	5	U	5	U
Benzene	1	U	1	U	1	U
Bromochloromethane	NA		NA		NA	
Bromodichloromethane	1	U	1	U	1	U
Bromoform	1	U	1	U	1	U
Bromomethane	1	U	1	U	1	U
Carbon Disulfide	1	U	1	U	1	U
Carbon Tetrachloride	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
Chlorobenzene	1	U	1	U	1	U
Chloroethane	1	U	1	U	1	U
Chloroform	1	U	1	U	1	U
Chloromethane	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	1	U
Cyclohexane	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	1	U	1	U
Ethylbenzene	1	U	1	U	1	U
Isopropylbenzene	1	U	1	U	1	U
M+p-xylenes	NA		NA		NA	
Methyl Acetate	1	U	1	U	1	U
Methyl Cyclohexane	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	1	U	1	U
Methylene Chloride	1	U	1	U	1	U
O-xylene	NA		NA		NA	
Styrene	1	U	1	U	1	U
Tetrachloroethene	0.78	J	1	U	1	U
Toluene	0.19	J	1	U	1	U
trans-1,3-Dichloropropene	1	U	1	U	1	U
Trichloroethene	1.5		1	U	1	U
Trichlorofluoromethane	1	U	1	U	1	U
Vinyl Acetate	NA		NA		NA	
Vinyl Chloride	1	U	1	U	1	U
Xylene (Total)	3	U	3	U	3	U
PESTICIDES/PCBS						
4,4'-DDD	NA		NA		NA	
4,4'-DDE	NA		NA		NA	
4,4'-DDT	NA		NA		NA	
Aldrin	NA		NA		NA	
Alpha-BHC	NA		NA		NA	
Alpha-Chlordane	NA		NA		NA	
Beta-BHC	NA		NA		NA	
Delta-BHC	NA		NA		NA	
Dieldrin	NA		NA		NA	
Endosulfan I	NA		NA		NA	
Endosulfan II	NA		NA		NA	
Endosulfan Sulfate	NA		NA		NA	
Endrin	NA		NA		NA	
Endrin Aldehyde	NA		NA		NA	
Endrin Ketone	NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		NA	
Gamma-Chlordane	NA		NA		NA	
Heptachlor	NA		NA		NA	
Heptachlor Epoxide	NA		NA		NA	
Methoxychlor	NA		NA		NA	
Toxaphene	NA		NA		NA	
Aroclor-1016	NA		NA		NA	
Aroclor-1221	NA		NA		NA	
Aroclor-1232	NA		NA		NA	
Aroclor-1242	NA		NA		NA	
Aroclor-1248	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
Aroclor-1254	NA		NA		NA	
Aroclor-1260	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB17-0406**		**03SB17-0608**		**03SB19-0204**		**03SB19-0408**		**03SB20-0608**		**03SB22-0406**		**03SB22-0608**		**03SB23-0406**		**03SB24-0406**		**03SB25-0608**	
Sample Date:	**8/29/1991**		**8/29/1991**								**4/16/1997**						**4/16/1997**			
Duplicate of:																				
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,2'-Oxybis(1-chloropropane)	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4,5-Trichlorophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4,6-Trichlorophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4-Dichlorophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4-Dimethylphenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4-Dinitrophenol	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
2,4-Dinitrotoluene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,6-Dinitrotoluene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Chloronaphthalene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Chlorophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Methylnaphthalene	390	U	380	U	28	J	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Methylphenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Nitroaniline	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
2-Nitrophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
3,3'-Dichlorobenzidine	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
3-Nitroaniline	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
4,6-Dinitro-2-methylphenol	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
4-Bromophenyl Phenyl Ether	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Chloro-3-methylphenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Chloroaniline	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Chlorophenyl Phenyl Ether	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Methylphenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Nitroaniline	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
4-Nitrophenol	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
Acenaphthene	390	U	380	U	230	J	170	J	380	U	390	U	400	U	390	U	400	U	390	U
Acenaphthylene	390	U	380	U	110	J	120	J	380	U	390	U	400	U	390	U	400	U	390	U
Acetophenone	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Anthracene	390	U	380	U	1800		740	J	380	U	390	U	400	U	390	U	400	U	390	U
Atrazine	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Benz(a)anthracene	36	J	380	U	4200		3100		380	U	390	U	400	U	390	U	400	U	390	U
Benzaldehyde	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Benzo(a)pyrene	40	J	380	U	3200		2600		380	U	390	U	400	U	390	U	400	U	390	U
Benzo(b)fluoranthene	68	J	380	U	4200		2900		380	U	390	U	400	U	390	U	400	U	390	U
Benzo(g,h,i)perylene	33	J	380	U	2100		1900		380	U	390	U	400	U	390	U	400	U	390	U
Benzo(k)fluoranthene	17	J	380	U	1400		1300		380	U	390	U	400	U	390	U	400	U	390	U
Bis(2-chloroethoxy)methane	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Bis(2-chloroethyl) Ether	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Bis(2-ethylhexyl)phthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Butylbenzylphthalate	38	J	380	U	780	U	780	U	380	U	390	U	30	J	30	J	400	U	390	U
Caprolactam	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Carbazole	390	U	380	U	340	J	140	J	380	U	390	U	400	U	390	U	400	U	390	U
Chrysene	53	J	380	U	3400		2700		380	U	390	U	400	U	390	U	400	U	390	U
Di-n-butylphthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Di-n-octylphthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Dibenz(a,h)anthracene	390	U	380	U	580	J	500	J	380	U	390	U	400	U	390	U	400	U	390	U
Dibenzofuran	390	U	380	U	150	J	75	J	380	U	390	U	400	U	390	U	400	U	390	U
Diethylphthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Dimethylphthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Fluoranthene	91	J	380	U	6900	E	5200		380	U	390	U	400	U	390	U	400	U	390	U
Fluorene	390	U	380	U	260	J	180	J	380	U	390	U	400	U	390	U	400	U	390	U
Hexachlorobenzene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB17-0406**		**03SB17-0608**		**03SB19-0204**		**03SB19-0408**		**03SB20-0608**		**03SB22-0406**		**03SB22-0608**		**03SB23-0406**		**03SB24-0406**		**03SB25-0608**	
Sample Date:	**8/29/1991**		**8/29/1991**								**4/16/1997**						**4/16/1997**			
Duplicate of:																				
Hexachlorobutadiene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Hexachlorocyclopentadiene	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
Hexachloroethane	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Indeno(1,2,3-cd)pyrene	28	J	380	U	2000		1700		380	U	390	U	400	U	390	U	400	U	390	U
Isophorone	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
N-Nitroso-di-n-propylamine	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
N-Nitrosodiphenylamine (1)	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Naphthalene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Nitrobenzene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Pentachlorophenol	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
Phenanthrene	40	J	380	U	4100		2400		380	U	390	U	400	U	390	U	400	U	390	U
Phenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Pyrene	84	J	380	U	6600		5600		380	U	390	U	400	U	390	U	400	U	390	U
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1,2,2-Tetrachloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1,2-Trichloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1-Dichloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1-Dichloroethene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2,4-Trichlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dibromo-3-chloropropane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dibromoethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichloroethene (cis)	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichloroethene (trans)	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichloropropane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,3-Dichlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,4-Dichlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
2-Butanone	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
2-Hexanone	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
4-Methyl-2-pentanone	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Acetone	26	U	24	U	21	U	21	U	21	U	22	U	20	U	23	U	20	U	19	U
Benzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Bromodichloromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Bromoform	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Bromomethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Carbon Disulfide	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Carbon Tetrachloride	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Chlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Chloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Chloroform	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Chloromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
cis-1,3-Dichloropropene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Cyclohexane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Dibromochloromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Dichlorodifluoromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Ethylbenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Isopropylbenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Methyl Acetate	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Methyl Tert-butyl Ether	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB17-0406**		**03SB17-0608**		**03SB19-0204**		**03SB19-0408**		**03SB20-0608**		**03SB22-0406**		**03SB22-0608**		**03SB23-0406**		**03SB24-0406**		**03SB25-0608**	
Sample Date:	**8/29/1991**		**8/29/1991**								**4/16/1997**						**4/16/1997**			
Duplicate of:																				
Methylcyclohexane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Methylene Chloride	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Styrene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Tetrachloroethene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Toluene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
trans-1,3-Dichloropropene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Trichloroethene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Trichlorofluoromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Vinyl Chloride	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Xylene (Total)	19	U	18	U	16	U	16	U	16	U	17	U	15	U	17	U	15	U	14	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB25-0809.9**		**03SB26-0406**	
Sample Date:			**4/18/1997**	
Duplicate of:				
SEMIVOLATILES	**ug/kg**		**ug/kg**	
1,1'-Biphenyl	380	U	440	U
2,2'-Oxybis(1-chloropropane)	380	U	440	U
2,4,5-Trichlorophenol	380	U	440	U
2,4,6-Trichlorophenol	380	U	440	U
2,4-Dichlorophenol	380	U	440	U
2,4-Dimethylphenol	380	U	440	U
2,4-Dinitrophenol	1900	U	2100	U
2,4-Dinitrotoluene	380	U	440	U
2,6-Dinitrotoluene	380	U	440	U
2-Chloronaphthalene	380	U	440	U
2-Chlorophenol	380	U	440	U
2-Methylnaphthalene	380	U	440	U
2-Methylphenol	380	U	440	U
2-Nitroaniline	1900	U	2100	U
2-Nitrophenol	380	U	440	U
3,3'-Dichlorobenzidine	1900	U	2100	U
3-Nitroaniline	1900	U	2100	U
4,6-Dinitro-2-methylphenol	1900	U	2100	U
4-Bromophenyl Phenyl Ether	380	U	440	U
4-Chloro-3-methylphenol	380	U	440	U
4-Chloroaniline	380	U	440	U
4-Chlorophenyl Phenyl Ether	380	U	440	U
4-Methylphenol	380	U	440	U
4-Nitroaniline	1900	U	2100	U
4-Nitrophenol	1900	U	2100	U
Acenaphthene	380	U	440	U
Acenaphthylene	380	U	440	U
Acetophenone	380	U	440	U
Anthracene	380	U	440	U
Atrazine	380	U	440	U
Benz(a)anthracene	380	U	440	U
Benzaldehyde	380	U	440	U
Benzo(a)pyrene	380	U	440	U
Benzo(b)fluoranthene	380	U	440	U
Benzo(g,h,i)perylene	380	U	440	U
Benzo(k)fluoranthene	380	U	440	U
Bis(2-chloroethoxy)methane	380	U	440	U
Bis(2-chloroethyl) Ether	380	U	440	U
Bis(2-ethylhexyl)phthalate	380	U	440	U
Butylbenzylphthalate	380	U	36	J
Caprolactam	380	U	440	U
Carbazole	380	U	440	U
Chrysene	380	U	440	U
Di-n-butylphthalate	380	U	440	U
Di-n-octylphthalate	380	U	440	U
Dibenz(a,h)anthracene	380	U	440	U
Dibenzofuran	380	U	440	U
Diethylphthalate	380	U	440	U
Dimethylphthalate	380	U	440	U
Fluoranthene	380	U	440	U
Fluorene	380	U	440	U
Hexachlorobenzene	380	U	440	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB25-0809.9**		**03SB26-0406**	
Sample Date:			**4/18/1997**	
Duplicate of:				
Hexachlorobutadiene	380	U	440	U
Hexachlorocyclopentadiene	1900	U	2100	U
Hexachloroethane	380	U	440	U
Indeno(1,2,3-cd)pyrene	380	U	440	U
Isophorone	380	U	440	U
N-Nitroso-di-n-propylamine	380	U	440	U
N-Nitrosodiphenylamine (1)	380	U	440	U
Naphthalene	380	U	440	U
Nitrobenzene	380	U	440	U
Pentachlorophenol	1900	U	2100	U
Phenanthrene	380	U	440	U
Phenol	380	U	440	U
Pyrene	380	U	440	U
VOLATILES	**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5.4	U	5.7	U
1,1,2,2-Tetrachloroethane	5.4	U	5.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.4	U	5.7	U
1,1,2-Trichloroethane	5.4	U	5.7	U
1,1-Dichloroethane	5.4	U	5.7	U
1,1-Dichloroethene	5.4	U	5.7	U
1,2,4-Trichlorobenzene	5.4	U	5.7	U
1,2-Dibromo-3-chloropropane	5.4	U	5.7	U
1,2-Dibromoethane	5.4	U	5.7	U
1,2-Dichlorobenzene	5.4	U	5.7	U
1,2-Dichloroethane	5.4	U	5.7	U
1,2-Dichloroethene (cis)	5.4	U	5.7	U
1,2-Dichloroethene (trans)	5.4	U	5.7	U
1,2-Dichloropropane	5.4	U	5.7	U
1,3-Dichlorobenzene	5.4	U	5.7	U
1,4-Dichlorobenzene	5.4	U	5.7	U
2-Butanone	5.4	U	5.7	U
2-Hexanone	5.4	U	5.7	U
4-Methyl-2-pentanone	5.4	U	5.7	U
Acetone	22	U	23	U
Benzene	5.4	U	5.7	U
Bromodichloromethane	5.4	U	5.7	U
Bromoform	5.4	U	5.7	U
Bromomethane	5.4	U	5.7	U
Carbon Disulfide	5.4	U	5.7	U
Carbon Tetrachloride	5.4	U	5.7	U
Chlorobenzene	5.4	U	5.7	U
Chloroethane	5.4	U	5.7	U
Chloroform	5.4	U	5.7	U
Chloromethane	5.4	U	5.7	U
cis-1,3-Dichloropropene	5.4	U	5.7	U
Cyclohexane	5.4	U	5.7	U
Dibromochloromethane	5.4	U	5.7	U
Dichlorodifluoromethane	5.4	U	5.7	U
Ethylbenzene	5.4	U	5.7	U
Isopropylbenzene	5.4	U	5.7	U
Methyl Acetate	5.4	U	5.7	U
Methyl Tert-butyl Ether	5.4	U	5.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB25-0809.9**		**03SB26-0406**	
Sample Date:			**4/18/1997**	
Duplicate of:				
Methylcyclohexane	5.4	U	5.7	U
Methylene Chloride	5.4	U	5.7	U
Styrene	5.4	U	5.7	U
Tetrachloroethene	5.4	U	5.7	U
Toluene	5.4	U	5.7	U
trans-1,3-Dichloropropene	5.4	U	5.7	U
Trichloroethene	5.4	U	5.7	U
Trichlorofluoromethane	5.4	U	5.7	U
Vinyl Chloride	5.4	U	5.7	U
Xylene (Total)	16	U	17	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
E -- Value exceeds the calibration range of the instrument and is considered estimated.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
U -- Value is a non-detected result as reported by the laboratory.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB18-0002**	
Sample Date:	**3/22/2006**	
Duplicate of:		
SEMIVOLATILES	**ug/kg**	
1,1'-Biphenyl	400	U
2,2'-Oxybis(1-chloropropane)	400	U
2,4,5-Trichlorophenol	400	U
2,4,6-Trichlorophenol	400	U
2,4-Dichlorophenol	400	U
2,4-Dimethylphenol	400	U
2,4-Dinitrophenol	1900	U
2,4-Dinitrotoluene	400	U
2,6-Dinitrotoluene	400	U
2-Chloronaphthalene	400	U
2-Chlorophenol	400	U
2-Methylnaphthalene	18	J
2-Methylphenol	400	U
2-Nitroaniline	1900	U
2-Nitrophenol	400	U
3,3'-Dichlorobenzidine	1900	U
3-Nitroaniline	1900	U
4,6-Dinitro-2-methylphenol	1900	U
4-Bromophenyl Phenyl Ether	400	U
4-Chloro-3-methylphenol	400	U
4-Chloroaniline	400	U
4-Chlorophenyl Phenyl Ether	400	U
4-Methylphenol	400	U
4-Nitroaniline	1900	U
4-Nitrophenol	1900	U
Acenaphthene	62	J
Acenaphthylene	96	J
Acetophenone	400	U
Anthracene	260	J
Atrazine	400	U
Benz(a)anthracene	780	
Benzaldehyde	400	U
Benzo(a)pyrene	860	
Benzo(b)fluoranthene	1100	
Benzo(g,h,i)perylene	740	
Benzo(k)fluoranthene	410	
Bis(2-chloroethoxy)methane	400	U
Bis(2-chloroethyl) Ether	400	U
Bis(2-ethylhexyl)phthalate	52	J
Butylbenzylphthalate	33	J
Caprolactam	400	U
Carbazole	120	J
Chrysene	960	
Di-n-butylphthalate	400	U
Di-n-octylphthalate	400	U
Dibenz(a,h)anthracene	180	J
Dibenzofuran	63	J
Diethylphthalate	400	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB18-0002**	
Sample Date:	**3/22/2006**	
Duplicate of:		
Dimethylphthalate	400	U
Fluoranthene	2100	
Fluorene	110	J
Hexachlorobenzene	400	U
Hexachlorobutadiene	400	U
Hexachlorocyclopentadiene	1900	U
Hexachloroethane	400	U
Indeno(1,2,3-cd)pyrene	680	
Isophorone	400	U
N-Nitroso-di-n-propylamine	400	U
N-Nitrosodiphenylamine (1)	400	U
Naphthalene	400	U
Nitrobenzene	400	U
Pentachlorophenol	1900	U
Phenanthrene	1400	
Phenol	400	U
Pyrene	1500	
VOLATILES	**ug/kg**	
1,1,1-Trichloroethane	5.7	U
1,1,2,2-Tetrachloroethane	5.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.7	U
1,1,2-Trichloroethane	5.7	U
1,1-Dichloroethane	5.7	U
1,1-Dichloroethene	5.7	U
1,2,4-Trichlorobenzene	5.7	U
1,2-Dibromo-3-chloropropane	5.7	U
1,2-Dibromoethane	5.7	U
1,2-Dichlorobenzene	5.7	U
1,2-Dichloroethane	5.7	U
1,2-Dichloroethene (cis)	5.7	U
1,2-Dichloroethene (trans)	5.7	U
1,2-Dichloropropane	5.7	U
1,3-Dichlorobenzene	5.7	U
1,4-Dichlorobenzene	5.7	U
2-Butanone	5.7	U
2-Hexanone	5.7	U
4-Methyl-2-pentanone	5.7	U
Acetone	23	U
Benzene	5.7	U
Bromodichloromethane	5.7	U
Bromoform	5.7	U
Bromomethane	5.7	U
Carbon Disulfide	5.7	U
Carbon Tetrachloride	5.7	U
Chlorobenzene	5.7	U
Chloroethane	5.7	U
Chloroform	5.7	U
Chloromethane	5.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB18-0002**	
Sample Date:	**3/22/2006**	
Duplicate of:		
cis-1,3-Dichloropropene	5.7	U
Cyclohexane	5.7	U
Dibromochloromethane	5.7	U
Dichlorodifluoromethane	5.7	U
Ethylbenzene	5.7	U
Isopropylbenzene	5.7	U
Methyl Acetate	5.7	U
Methyl Tert-butyl Ether	5.7	U
Methylcyclohexane	5.7	U
Methylene Chloride	5.7	U
Styrene	5.7	U
Tetrachloroethene	5.7	U
Toluene	5.7	U
trans-1,3-Dichloropropene	5.7	U
Trichloroethene	5.7	U
Trichlorofluoromethane	5.7	U
Vinyl Chloride	5.7	U
Xylene (Total)	17	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
U -- Value is a non-detected result as reported by the laboratory.

Database source file: H:\WILLOWGROVE\SITE 3 SOIL\DATA SUMMARIES\FOR DON'S APPENDIX\WGH3SS.DBF data retrieved on: 09/29/09

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01-0204**		**03SB01-0608**		**03SB01-1416**		**03SB02**		**03SB04**		**03TP01**		**03TP02-1**		**03TP02-2**		**03TP03**		**03TP04-1**		**03TP04-2**	
Sample Date:	**5/27/1997**		**5/27/1997**		**5/27/1997**		**9/6/1991**		**9/6/1991**		**9/9/1991**		**9/10/1991**		**9/10/1991**		**9/11/1991**		**9/11/1991**		**9/11/1991**	
Duplicate:																						
INORGANICS							**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	NA		NA		NA		16200		14600		14200		20900		18200		17400		23200		28100	
Antimony	NA		NA		NA		9.7	U	12	B	10.3	U	12.3	B	14.7		10.1	U	10	U	14.8	
Arsenic	NA		NA		NA		4		4.5		1.3		4.8		5.2		3.4		5.8		1.9	
Barium	NA		NA		NA		77.6		80.2		166		121		132		171		87.5		115	
Beryllium	NA		NA		NA		1.3		1.4		0.92	B	1.2		1.1		1.1		1.1		1.1	
Cadmium	NA		NA		NA		3.2		3.8		1.8		3.9		3.8		0.9	U	1.3		0.9	U
Calcium	NA		NA		NA		1760		4200		646	B	1950		2370		314	B	554	B	450	B
Chromium	NA		NA		NA		24.9		23.7		24.5		32		30.5		18.4		17	U	18.8	
Cobalt	NA		NA		NA		8.4		10.6		10.8		9.4		9.4		12.1		6		8.5	
Copper	NA		NA		NA		19.5		19		7.1		204		141		36.6		21		22.2	
Cyanide	NA		NA		NA		1.6	U	1.1	U	2.3	U	2.3	U	2.5	U	2.2	U	2.5	U	2.2	U
Iron	NA		NA		NA		25200		25500		30200		28500		26600		20000		27900		25600	
Lead	NA		NA		NA		18		39.7		13.1		106		118		6.1		10.4		11.1	
Magnesium	NA		NA		NA		2410		3520		3260		2320		2420		1430		704		914	
Manganese	NA		NA		NA		482		496		431		617		458		1110		508		478	
Mercury	NA		NA		NA		0.1	U	0.09	U	0.09	U	0.62		0.44		0.09	U	0.11	U	0.1	U
Nickel	NA		NA		NA		13.2		13.8		16.3		16		17.7		11.4		9.6		9.9	
Potassium	NA		NA		NA		1030		1010		3010		1140		903		498		482		509	
Selenium	NA		NA		NA		0.87	U	0.85	U	0.81	U	0.97	U	0.92	U	0.88	U	0.93	U	0.9	U
Silver	NA		NA		NA		1.3	U	1.4	U	1.4	U	3.9		4.9		1.3	U	1.3	U	1.3	U
Sodium	NA		NA		NA		964	U	1000	U	1020	U	1080	U	950	U	999	U	993	U	996	U
Thallium	NA		NA		NA		0.44		0.51		0.41	U	0.48	U	0.46	U	0.44	U	0.46	U	0.45	U
Vanadium	NA		NA		NA		36.2		36.8		27.3		41.4		41.4		28.3		29.5		27.5	
Zinc	NA		NA		NA		44		52.4		47.9		173		441		30.1		40		32.5	
SEMIVOLATILES							**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
2,4,6-Trichlorophenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,4-Dichlorophenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,4-Dimethylphenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,4-Dinitrophenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
2,4-Dinitrotoluene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,6-Dinitrotoluene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2-Chloronaphthalene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2-Chlorophenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2-Methylnaphthalene	NA		NA		NA		390	U	460	J	1100	U	410	U	55	J	380	U	330	J	980	J
2-Methylphenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2-Nitroaniline	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
2-Nitrophenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
3,3'-Dichlorobenzidine	NA		NA		NA		780	U	3900	U	2300	U	820	U	790	U	770	U	820	U	2400	U
3-Nitroaniline	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
4,6-Dinitro-2-methylphenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
4-Bromophenyl Phenyl Ether	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Chloro-3-methylphenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Chloroaniline	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Chlorophenyl Phenyl Ether	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Methylphenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Nitroaniline	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01-0204**		**03SB01-0608**		**03SB01-1416**		**03SB02**		**03SB04**		**03TP01**		**03TP02-1**		**03TP02-2**		**03TP03**		**03TP04-1**		**03TP04-2**	
Sample Date:	**5/27/1997**		**5/27/1997**		**5/27/1997**		**9/6/1991**		**9/6/1991**		**9/9/1991**		**9/10/1991**		**9/10/1991**		**9/11/1991**		**9/11/1991**		**9/11/1991**	
Duplicate:																						
4-Nitrophenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
Acenaphthene	NA		NA		NA		390	U	1400	J	1100	U	410	U	390	U	380	U	410	U	1200	U
Acenaphthylene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	NA		NA		NA		390	U	4100		1100	U	410	U	200	J	380	U	410	U	1200	U
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA		NA		NA		40	J	8200		1100	U	91	J	850		380	U	410	U	1200	U
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA		NA		NA		44	J	7000		1100	U	87	J	670		380	U	410	U	1200	U
Benzo(b)fluoranthene	NA		NA		NA		390	U	7500		1100	U	88	J	890		380	U	410	U	1200	U
Benzo(g,h,i)perylene	NA		NA		NA		390	U	2200		1100	U	410	U	230	J	380	U	410	U	1200	U
Benzo(k)fluoranthene	NA		NA		NA		51	J	6200		1100	U	86	J	530		380	U	410	U	1200	U
Benzoic Acid	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
Benzyl Alcohol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Bis(2-chloroethoxy)methane	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Bis(2-chloroethyl)ether	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Bis(2-ethylhexyl)phthalate	NA		NA		NA		120	J	1900	U	1100	U	51	J	860		380	U	46	J	130	J
Butylbenzylphthalate	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Chrysene	NA		NA		NA		47	J	7700		1100	U	97	J	960		380	U	410	U	1200	U
Di-n-butylphthalate	NA		NA		NA		73	B	1900	U	1100	U	43	B	62	B	380	U	60	B	1200	U
Di-n-octylphthalate	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Dibenz(a,h)anthracene	NA		NA		NA		390	U	320	J	1100	U	410	U	390	U	380	U	410	U	1200	U
Dibenzofuran	NA		NA		NA		390	U	1100	J	1100	U	410	U	390	U	380	U	410	U	1200	U
Diethylphthalate	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Dimethylphthalate	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Fluoranthene	NA		NA		NA		89	J	18000		1100	U	180	J	1600		380	U	42	J	1200	U
Fluorene	NA		NA		NA		390	U	1600	J	1100	U	410	U	390	U	380	U	410	U	1200	U
Hexachlorobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Hexachlorobutadiene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Hexachlorocyclopentadiene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Hexachloroethane	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Indeno(1,2,3-cd)pyrene	NA		NA		NA		390	U	2900		1100	U	44	J	310	J	380	U	410	U	1200	U
Isophorone	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
N-Nitroso-di-n-propylamine	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
N-Nitrosodiphenylamine (1)	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Naphthalene	NA		NA		NA		390	U	690	J	1100	U	410	U	390	U	380	U	2000		7400	
Nitrobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Pentachlorophenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
Phenanthrene	NA		NA		NA		65	J	17000		1100	U	100	J	820		380	U	410	U	1200	U
Phenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Pyrene	NA		NA		NA		84	J	15000		1100	U	170	J	1500		380	U	410	U	1200	U
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,1,2,2-Tetrachloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,1,2-Trichloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,1-Dichloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,1-Dichloroethene	12	U	12	U	12	U	3	B	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01-0204**		**03SB01-0608**		**03SB01-1416**		**03SB02**		**03SB04**		**03TP01**		**03TP02-1**		**03TP02-2**		**03TP03**		**03TP04-1**		**03TP04-2**	
Sample Date:	**5/27/1997**		**5/27/1997**		**5/27/1997**		**9/6/1991**		**9/6/1991**		**9/9/1991**		**9/10/1991**		**9/10/1991**		**9/11/1991**		**9/11/1991**		**9/11/1991**	
Duplicate:																						
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		45	J	1900	U	1100	U	410	U	390	U	380	U	410	U	3600	
1,2-Dichloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (Total)	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloropropane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,3-Dichlorobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
1,4-Dichlorobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	880	J
2-Butanone	12	U	14	J	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
2-Hexanone	12	UJ	12	UJ	12	UJ	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
4-Methyl-2-pentanone	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Acetone	12	UJ	71	J	12	UJ	6	B	6	B	12	U	13	U	12	U	12	U	23	B	140	B
Benzene	12	U	12	U	12	U	3	J	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Bromoform	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Bromomethane	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Carbon Disulfide	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Carbon Tetrachloride	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Chlorobenzene	12	U	12	U	12	U	2	J	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Chloroethane	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Chloroform	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Chloromethane	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
cis-1,3-Dichloropropene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibromochloromethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Ethylbenzene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	24	B	25	B	24	B	6	U	4	B	6	U	6	U	6	U	6	U	6	U	6	B
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Tetrachloroethene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Toluene	12	U	12	U	12	U	2	J	6	U	6	U	6	U	6	U	6	U	6	U	30	U
trans-1,3-Dichloropropene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Trichloroethene	12	U	12	U	12	U	2	J	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Acetate	NA		NA		NA		11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Vinyl Chloride	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Xylene (Total)	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
PESTICIDES/PCBS							**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
4,4'-DDE	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
4,4'-DDT	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
Aldrin	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03SB01-0204		03SB01-0608		03SB01-1416		03SB02		03SB04		03TP01		03TP02-1		03TP02-2		03TP03		03TP04-1		03TP04-2	
Sample Date:	**5/27/1997**		**5/27/1997**		**5/27/1997**		**9/6/1991**		**9/6/1991**		**9/9/1991**		**9/10/1991**		**9/10/1991**		**9/11/1991**		**9/11/1991**		**9/11/1991**	
Duplicate:																						
Alpha-BHC	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Alpha-Chlordane	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1016	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1221	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1232	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1242	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1248	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1254	NA		NA		NA		190	U	190	U	180	U	490		810		190	U	200	U	200	U
Aroclor-1260	NA		NA		NA		190	U	190	U	180	U	200	U	380	U	190	U	200	U	200	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Delta-BHC	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Dieldrin	NA		NA		NA		63		230		18	U	79		38	U	19	U	20	U	20	U
Endosulfan I	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Endosulfan II	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
Endosulfan Sulfate	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
Endrin	NA		NA		NA		19	U	19	U	18	U	25		38	U	19	U	20	U	20	U
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
Gamma-BHC (Lindane)	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Gamma-Chlordane	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Heptachlor	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9	U	9	U
Heptachlor Epoxide	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Methoxychlor	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Toxaphene	NA		NA		NA		190	U	190	U	180	U	200	U	380	U	190	U	200	U	200	U
DIOXINS/FURANS																						
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP04-3**		**03TP04-4**		**03TP05-0506-01**		**03TP05-0910-02**		**03TP05-0910-02-D**		**03TP06-0304-01**		**03TP06-0607-04**		**03TP06-0708-02**		**03TP06-0809-03**	
Sample Date:	**9/11/1991**		**9/11/1991**		**4/30/2007**		**4/30/2007**		**4/30/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**	
Duplicate:							**03TP05-0910-02-D**		**03TP05-0910-02**								**03TP06-0809-03-D**	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	13500		29100		27200		26100		16000		15200		25400		21600		25600	
Antimony	9.3	U	12.7	B	7.2	L	6.9	J	2.6	J	0.58	B	28.8	L	12.9	L	113	L
Arsenic	17.9		3.7		7.4		6.3	J	3.4	J	2.6	L	10.7	L	4.1	L	8.6	L
Barium	96		330		302	J	377	J	186	J	167	J	628	J	267	J	656	J
Beryllium	1		1.2		0.79		0.77		0.94		1.1		1		0.78		0.61	
Cadmium	2.1		0.98	U	57.7	K	14.2	K	17.8	K	1.4	K	99.4	K	25.1	K	155	K
Calcium	9260		277	B	8730		4120	J	2370	J	984		26200		5550		14700	
Chromium	20.6		13.7		73.5	K	78.2	J	30	J	9.4	K	108	K	53.4	K	83.7	K
Cobalt	7.2		21.5		23.8		10.7		8		13.2		30.1		12.1		20.2	
Copper	25.7		77.3		1210	K	363	K	392	K	67.4	K	1280	K	475	K	1500	K
Cyanide	2.3	U	2.3	U	0.41	J	0.49	J	0.8	J	0.25		1		0.63		4.6	
Iron	23200		17000		44400		40100		27900		24100		113000		106000		91600	
Lead	29.9		3.7		1090	J	1100	J	6480	J	63.2	J	2170	J	1370	J	1990	J
Magnesium	6130		841		2610		2400		1760		665		8690		1720		3690	
Manganese	449		3030		975		816		959		1290		2030		1590		3070	
Mercury	0.14		0.1	U	0.46	L	1.6	L	1.6	L	0.58	L	4.8	L	3.9	L	6.7	L
Nickel	13		11.7		296	K	47.1	K	58.9	K	13.8	K	145	K	40.9	K	81.3	K
Potassium	1020		522	U	1120		887		1090		351		1590		553		790	
Selenium	0.82	U	0.96	U	0.34	UR	0.32	UR	0.33	UR	0.32	UR	3.8	UR	1.7	UR	3.7	UR
Silver	1.2	U	1.5	U	18.9		3.2		3.6		0.64		233		6		45.7	
Sodium	917	U	1090	U	578	L	77.7	L	19.5	UR	19.2	UR	987	L	100	UR	158	L
Thallium	0.41	U	0.48	U	0.59	UR	0.57	UR	0.57	UR	0.56	UR	1.3	UR	2.9	UR	1.3	UR
Vanadium	33.6		21.2		22.3		20.7		21.8		16.7		32.9		18		26.2	
Zinc	74.2		20.7		2600	K	892	K	814	K	103	K	7390	K	1230	K	4990	K
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
1,2,4,5-Tetrachlorobenzene	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,3,4,6-Tetrachlorophenol	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4,5-Trichlorophenol	5500	U	1900	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4,6-Trichlorophenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4-Dichlorophenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4-Dimethylphenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4-Dinitrophenol	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
2,4-Dinitrotoluene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,6-Dinitrotoluene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Chloronaphthalene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Chlorophenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Methylnaphthalene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Methylphenol	290	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Nitroaniline	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
2-Nitrophenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
3,3'-Dichlorobenzidine	2200	U	800	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
3-Nitroaniline	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
4,6-Dinitro-2-methylphenol	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
4-Bromophenyl Phenyl Ether	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Chloro-3-methylphenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Chloroaniline	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Chlorophenyl Phenyl Ether	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Methylphenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Nitroaniline	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP04-3**		**03TP04-4**		**03TP05-0506-01**		**03TP05-0910-02**		**03TP05-0910-02-D**		**03TP06-0304-01**		**03TP06-0607-04**		**03TP06-0708-02**		**03TP06-0809-03**	
Sample Date:	**9/11/1991**		**9/11/1991**		**4/30/2007**		**4/30/2007**		**4/30/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**	
Duplicate:							**03TP05-0910-02-D**		**03TP05-0910-02**								**03TP06-0809-03-D**	
4-Nitrophenol	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
Acenaphthene	130	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Acenaphthylene	280	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Acetophenone	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Anthracene	850	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Atrazine	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Benz(a)anthracene	5600		400	U	860	U	820	U	820	U	410	U	480	U	230	J	2300	U
Benzaldehyde	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Benzo(a)pyrene	5100		400	U	860	U	820	U	820	U	410	U	480	U	390	J	2300	U
Benzo(b)fluoranthene	7100		400	U	860	U	820	U	820	U	410	U	480	U	290	J	2300	U
Benzo(g,h,i)perylene	1300		400	U	860	U	820	U	820	U	410	U	63	J	2100	U	2300	U
Benzo(k)fluoranthene	3600		400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Benzoic Acid	5500	U	1900	U	NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	1100	U	400	U	NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Bis(2-chloroethyl)ether	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Bis(2-ethylhexyl)phthalate	1100	U	400	U	860	U	820	U	820	U	130	J	290	J	2100	U	3300	
Butylbenzylphthalate	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Caprolactam	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Carbazole	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Chrysene	5000		400	U	860	U	820	U	820	U	410	U	480	U	250	J	2300	U
Di-n-butylphthalate	1000	U	45	B	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Di-n-octylphthalate	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	220	J
Dibenz(a,h)anthracene	180	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Dibenzofuran	140	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Diethylphthalate	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Dimethylphthalate	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Fluoranthene	8200		400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Fluorene	200	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Hexachlorobenzene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Hexachlorobutadiene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Hexachlorocyclopentadiene	1100	U	400	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
Hexachloroethane	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Indeno(1,2,3-cd)pyrene	1800		400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Isophorone	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
N-Nitroso-di-n-propylamine	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
N-Nitrosodiphenylamine (1)	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Naphthalene	210	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Nitrobenzene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Pentachlorophenol	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
Phenanthrene	3100		400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Phenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Pyrene	9300		400	U	860	U	820	U	820	U	410	U	480	U	580	J	2300	U
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1,2,2-Tetrachloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1,2-Trichloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1-Dichloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1-Dichloroethene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2,3-Trichlorobenzene	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2,4-Trichlorobenzene	1100	U	400	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dibromo-3-chloropropane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP04-3**		**03TP04-4**		**03TP05-0506-01**		**03TP05-0910-02**		**03TP05-0910-02-D**		**03TP06-0304-01**		**03TP06-0607-04**		**03TP06-0708-02**		**03TP06-0809-03**	
Sample Date:	**9/11/1991**		**9/11/1991**		**4/30/2007**		**4/30/2007**		**4/30/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**	
Duplicate:							**03TP05-0910-02-D**		**03TP05-0910-02**								**03TP06-0809-03-D**	
1,2-Dibromoethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichlorobenzene	1100	U	400	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichloroethene (cis)	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichloroethene (Total)	6	U	6	U	NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichloropropane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,3-Dichlorobenzene	1100	U	400	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,4-Dichlorobenzene	1100	U	400	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
2-Butanone	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
2-Hexanone	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
4-Methyl-2-pentanone	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Acetone	7	B	12	U	28	U	9.5	J	21	U	20	U	33	U	24	U	30	U
Benzene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Bromochloromethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Bromodichloromethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Bromoform	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Bromomethane	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Carbon Disulfide	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Carbon Tetrachloride	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Chlorobenzene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Chloroethane	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Chloroform	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Chloromethane	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
cis-1,3-Dichloropropene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Cyclohexane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Dibromochloromethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Dichlorodifluoromethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Ethylbenzene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Isopropylbenzene	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
M,p-xylene	NA		NA		14	U	11	U	11	U	10	U	16	U	12	U	15	U
Methyl Acetate	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Methyl Tert-butyl Ether (mtbe)	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Methylcyclohexane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Methylene Chloride	6	U	2	B	5.9	B	2.4	B	1.6	B	3.5	B	4.5	B	3.3	B	3.9	B
O-xylene	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Styrene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Tetrachloroethene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Toluene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
trans-1,3-Dichloropropene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Trichloroethene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Trichlorofluoromethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Vinyl Acetate	11	U	12	U	NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Xylene (Total)	6	U	6	U	NA		NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	36	U	19	U	9.9	J	5.8	J	1.7	J	0.47	B	72000		24	J	57	J
4,4'-DDE	36	U	19	U	2	J	1.6	J	2.5	J	2.4		8700		13	J	11	J
4,4'-DDT	36	U	19	U	6.2	J	2.1	U	5.8	J	2.2	J	270000		2.2	U	69	J
Aldrin	18	U	9.6	U	1.7	J	3	J	5.6	J	2.1	U	2500	U	9.4	J	9.7	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP04-3**		**03TP04-4**		**03TP05-0506-01**		**03TP05-0910-02**		**03TP05-0910-02-D**		**03TP06-0304-01**		**03TP06-0607-04**		**03TP06-0708-02**		**03TP06-0809-03**	
Sample Date:	**9/11/1991**		**9/11/1991**		**4/30/2007**		**4/30/2007**		**4/30/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**	
Duplicate:							**03TP05-0910-02-D**		**03TP05-0910-02**								**03TP06-0809-03-D**	
Alpha-BHC	18	U	9.6	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	2.4	U
Alpha-Chlordane	180	U	96	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	2.4	U
Aroclor-1016	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1221	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1232	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1242	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1248	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1254	360	U	190	U	22	U	50		81	J	20	U	490	U	450		620	
Aroclor-1260	360	U	190	U	22	U	55		40		20	U	490	U	550		600	
Aroclor-1262	NA		NA		22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1268	NA		NA		22	U	21	U	21	U	20	U	490	U	21	U	24	U
Beta-BHC	18	U	9.6	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	2.4	U
Delta-BHC	18	U	9.6	U	0.35	J	0.43	J	2.1	U	0.96	J	2500	U	2.2	U	0.94	J
Dieldrin	36	U	19	U	200		76		83		10		10000		30		68	
Endosulfan I	18	U	9.6	U	2.2	U	2.1	U	2.1	U	2.1	U	580	J	2.2	U	1.4	J
Endosulfan II	36	U	19	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	16	J
Endosulfan Sulfate	36	U	19	U	2.2	U	2.3	J	0.91	J	2.1	U	2500	U	5.9	J	19	
Endrin	36	U	19	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	17	J
Endrin Aldehyde	NA		NA		0.83	J	2.1	U	2.1	U	0.52	J	2500	U	2.2	U	2.4	U
Endrin Ketone	36	U	19	U	0.39	J	0.55	J	0.32	J	2.1	U	2500	U	5.2	J	2.4	U
Gamma-BHC (Lindane)	18	U	9.6	U	0.9	J	1.3	J	1.8	J	0.69	J	2500	U	3	J	3.4	J
Gamma-Chlordane	180	U	96	U	1.7	J	3.2	J	5.5	J	1.2	J	620	J	16	J	18	J
Heptachlor	18	U	9.6	U	2.2	U	1.8	J	2.1	U	2.1	U	2500	U	8	J	2.4	U
Heptachlor Epoxide	18	U	9.6	U	2.2	U	2.1	U	2.1	U	1.5	J	390	J	2.2	U	1.8	J
Methoxychlor	180	U	96	U	3	J	4.6	J	2.8	J	1	J	4800	U	18		24	J
Toxaphene	360	U	190	U	87	U	83	U	83	U	82	U	98000	U	86	U	95	U
DIOXINS/FURANS					**ng/kg**												**ng/kg**	
1,2,3,4,6,7,8-HpCDD	NA		NA		320		NA		NA		NA		NA		NA		380	J
1,2,3,4,6,7,8-HpCDF	NA		NA		560		NA		NA		NA		NA		NA		490	J
1,2,3,4,7,8,9-HpCDF	NA		NA		60		NA		NA		NA		NA		NA		36	J
1,2,3,4,7,8-HxCDD	NA		NA		21		NA		NA		NA		NA		NA		16	J
1,2,3,4,7,8-HxCDF	NA		NA		230		NA		NA		NA		NA		NA		270	J
1,2,3,6,7,8-HxCDD	NA		NA		45		NA		NA		NA		NA		NA		40	J
1,2,3,6,7,8-HxCDF	NA		NA		150	EMPC	NA		NA		NA		NA		NA		89	EMPC
1,2,3,7,8,9-HxCDD	NA		NA		58		NA		NA		NA		NA		NA		49	J
1,2,3,7,8,9-HxCDF	NA		NA		17		NA		NA		NA		NA		NA		3.2	J
1,2,3,7,8-PeCDD	NA		NA		28	EMPC	NA		NA		NA		NA		NA		16	EMPC
1,2,3,7,8-PeCDF	NA		NA		240	EMPC	NA		NA		NA		NA		NA		52	EMPC
2,3,4,6,7,8-HxCDF	NA		NA		170		NA		NA		NA		NA		NA		150	J
2,3,4,7,8-PeCDF	NA		NA		210	EMPC	NA		NA		NA		NA		NA		110	J
2,3,7,8-TCDD	NA		NA		9.6		NA		NA		NA		NA		NA		17	
2,3,7,8-TCDF	NA		NA		230	EMPC	NA		NA		NA		NA		NA		59	EMPC
OCDD	NA		NA		2100		NA		NA		NA		NA		NA		1700	
OCDF	NA		NA		190		NA		NA		NA		NA		NA		190	J
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP06-0809-03-D**		**03TP07-0203-02**		**03TP07-0304-01**		**03TP08-0203-03**		**03TP08-0304-02**		**03TP08-0405-01**		**03TP09-0506-01**		**03TP09-0506-02**		**03TP10-0304-02**
Sample Date:	**5/1/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/3/2007**		**5/3/2007**		**5/3/2007**
Duplicate:	**03TP06-0809-03**																
INORGANICS			**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**
Aluminum	NA		24700		21700		18000		18700		29600		20700		17800		14300
Antimony	NA		0.39	UL	0.39	UL	29.7	L	0.38	UL	41.9	L	0.4	UL	0.4	UL	0.39
Arsenic	NA		2.8		4.1		6.3		2.2		9.9		2.5		2.8	L	2
Barium	NA		128		69.5		518		149		735		61.3		46.1		129
Beryllium	NA		0.97		0.74		0.86		1		0.84		0.67		0.92		1.3
Cadmium	NA		0.085	U	0.084	U	24.2		0.084	U	51.5		0.087	U	0.088	U	0.084
Calcium	NA		253		624		17900		365		6740		485		402		379
Chromium	NA		7.7	K	16.4	K	49.5	K	4.2	K	133	K	18	K	6.3	K	5.7
Cobalt	NA		10		10.5		18.3		6.1		11.2		2.5		3.8		11.4
Copper	NA		44.9		28.6		734		93.1		932		25.1		60.8		148
Cyanide	NA		0.18		0.6	U	0.18		0.2		2.2		0.63	U	0.63	U	0.6
Iron	NA		15400		21000		27200		10600		60400		9660		19900		17500
Lead	NA		4.3		7.4		2010		2.2		4640		7.6		4.5		4.2
Magnesium	NA		660		1370		8650		408		2340		798		1020		451
Manganese	NA		936		606		712		879		1520		41.6		52		1140
Mercury	NA		0.057		0.057		0.73		0.067		0.35		0.023	L	0.027	L	0.024
Nickel	NA		11.5		12.2		150		7.8		84.6		9		5.8		12.7
Potassium	NA		272		503		1000		191		1070		388		240		168
Selenium	NA		0.32	UL	0.32	UL	0.55	L	0.31	UL	0.36	UR	0.33	UL	0.33	UL	0.32
Silver	NA		0.036	U	0.052	B	8		0.036	U	34		0.037	U	0.038	U	0.036
Sodium	NA		19.1	UR	18.9	UR	529		18.8	UL	1200		19.6	UL	28.1	L	38.7
Thallium	NA		0.56	UL	0.55	UL	0.64	UR	0.55	UL	0.62	UR	0.57	UL	0.57	UR	0.55
Vanadium	NA		17.7		30.4		28.2		11.8		21.7		32.5		19.2		15.4
Zinc	NA		18		25.8		2260		10.6		2560		12.1		30		20.4
SEMIVOLATILES			**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
1,1'-Biphenyl	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
1,2,4,5-Tetrachlorobenzene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA
2,2'-Oxybis(1-chloropropane)	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,3,4,6-Tetrachlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4,5-Trichlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4,6-Trichlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4-Dichlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4-Dimethylphenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4-Dinitrophenol	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
2,4-Dinitrotoluene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,6-Dinitrotoluene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Chloronaphthalene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Chlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Methylnaphthalene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Methylphenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Nitroaniline	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
2-Nitrophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
3,3'-Dichlorobenzidine	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
3-Nitroaniline	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
4,6-Dinitro-2-methylphenol	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
4-Bromophenyl Phenyl Ether	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Chloro-3-methylphenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Chloroaniline	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Chlorophenyl Phenyl Ether	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Methylphenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Nitroaniline	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP06-0809-03-D**		**03TP07-0203-02**		**03TP07-0304-01**		**03TP08-0203-03**		**03TP08-0304-02**		**03TP08-0405-01**		**03TP09-0506-01**		**03TP09-0506-02**		**03TP10-0304-02**
Sample Date:	**5/1/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/3/2007**		**5/3/2007**		**5/3/2007**
Duplicate:	**03TP06-0809-03**																
4-Nitrophenol	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
Acenaphthene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Acenaphthylene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Acetophenone	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Anthracene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Atrazine	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Benz(a)anthracene	NA		400	U	400	U	930	U	400	U	93	J	410	U	420	U	400
Benzaldehyde	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Benzo(a)pyrene	NA		400	U	400	U	930	U	400	U	62	J	410	U	420	U	400
Benzo(b)fluoranthene	NA		400	U	400	U	930	U	400	U	61	J	410	U	420	U	400
Benzo(g,h,i)perylene	NA		400	U	400	U	930	U	400	U	59	J	410	U	420	U	400
Benzo(k)fluoranthene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA		NA
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA		NA
Bis(2-chloroethoxy)methane	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Bis(2-chloroethyl)ether	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Bis(2-ethylhexyl)phthalate	NA		400	U	400	U	390	J	400	U	450	U	410	U	420	U	400
Butylbenzylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Caprolactam	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Carbazole	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Chrysene	NA		400	U	400	U	930	U	400	U	100	J	410	U	420	U	400
Di-n-butylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Di-n-octylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Dibenz(a,h)anthracene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Dibenzofuran	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Diethylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Dimethylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Fluoranthene	NA		400	U	400	U	930	U	400	U	160	J	410	U	420	U	400
Fluorene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Hexachlorobenzene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Hexachlorobutadiene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Hexachlorocyclopentadiene	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
Hexachloroethane	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Indeno(1,2,3-cd)pyrene	NA		400	U	400	U	930	U	400	U	62	J	410	U	420	U	400
Isophorone	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
N-Nitroso-di-n-propylamine	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
N-Nitrosodiphenylamine (1)	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Naphthalene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Nitrobenzene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Pentachlorophenol	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
Phenanthrene	NA		400	U	400	U	930	U	400	U	180	J	410	U	420	U	400
Phenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Pyrene	NA		400	U	400	U	930	U	400	U	160	J	410	U	420	U	400
VOLATILES			**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
1,1,1-Trichloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1,2,2-Tetrachloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1,2-Trichloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1-Dichloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1-Dichloroethene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2,3-Trichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2,4-Trichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dibromo-3-chloropropane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP06-0809-03-D**		**03TP07-0203-02**		**03TP07-0304-01**		**03TP08-0203-03**		**03TP08-0304-02**		**03TP08-0405-01**		**03TP09-0506-01**		**03TP09-0506-02**		**03TP10-0304-02**
Sample Date:	**5/1/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/3/2007**		**5/3/2007**		**5/3/2007**
Duplicate:	**03TP06-0809-03**																
1,2-Dibromoethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichloroethene (cis)	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA
1,2-Dichloroethene (trans)	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichloropropane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,3-Dichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,4-Dichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
2-Butanone	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
2-Hexanone	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
4-Methyl-2-pentanone	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Acetone	NA		20	U	20	U	30	U	21	U	25	U	23	U	24	U	25
Benzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Bromochloromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Bromodichloromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Bromoform	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Bromomethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Carbon Disulfide	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Carbon Tetrachloride	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Chlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Chloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Chloroform	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Chloromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
cis-1,3-Dichloropropene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Cyclohexane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Dibromochloromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Dichlorodifluoromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Ethylbenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Isopropylbenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
M,p-xylene	NA		10	U	10	U	15	U	11	U	12	U	11	U	12	U	13
Methyl Acetate	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Methyl Tert-butyl Ether (mtbe)	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Methylcyclohexane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Methylene Chloride	NA		1.9	B	1.9	B	2.6	B	2.8	B	2.7	B	3.4	B	6.1	B	3.4
O-xylene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Styrene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Tetrachloroethene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Toluene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
trans-1,3-Dichloropropene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Trichloroethene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Trichlorofluoromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA
Vinyl Chloride	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Xylene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA
PESTICIDES/PCBS			**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
4,4'-DDD	NA		2.1	U	2.1	U	1.4	J	2	U	1.4	J	2.1	U	2.1	U	2.1
4,4'-DDE	NA		2.1	U	2.1	U	6.6		2	U	3.8		2.1	U	2.1	U	2.1
4,4'-DDT	NA		2.1	U	2.1	U	15		2	U	8.6		2.1	U	2.1	U	2.1
Aldrin	NA		2.1	U	2.1	U	2.3	J	2	U	0.61	J	2.1	U	2.1	U	2.1

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP06-0809-03-D**		**03TP07-0203-02**		**03TP07-0304-01**		**03TP08-0203-03**		**03TP08-0304-02**		**03TP08-0405-01**		**03TP09-0506-01**		**03TP09-0506-02**		**03TP10-0304-02**
Sample Date:	**5/1/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/3/2007**		**5/3/2007**		**5/3/2007**
Duplicate:	**03TP06-0809-03**																
Alpha-BHC	NA		2.1	U	2.1	U	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1
Alpha-Chlordane	NA		2.1	U	2.1	U	3.1		2	U	1.3	J	2.1	U	2.1	U	0.39
Aroclor-1016	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1221	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1232	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1242	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1248	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1254	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1260	NA		20	U	20	U	46		20	U	23	U	21	U	21	U	20
Aroclor-1262	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1268	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Beta-BHC	NA		2.1	U	2.1	U	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1
Delta-BHC	NA		2.1	U	2.1	U	0.55	J	2	U	2.3	U	2.1	U	2.1	U	2.1
Dieldrin	NA		2.1	U	2.1	U	330		2	U	120		2.1	U	2.1	U	2.1
Endosulfan I	NA		2.1	U	2.1	U	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1
Endosulfan II	NA		2.1	U	0.71	J	0.63	J	2	U	2.3	U	2.1	U	2.1	U	2.1
Endosulfan Sulfate	NA		2.1	U	2.1	U	2.2	J	2	U	0.61	J	2.1	U	2.1	U	2.1
Endrin	NA		2.1	U	2.1	U	4.5	J	2	U	1.8	J	2.1	U	2.1	U	2.1
Endrin Aldehyde	NA		2.1	U	2.1	U	1.6	J	2	U	1	J	2.1	U	2.1	U	2.1
Endrin Ketone	NA		2.1	U	2.1	U	2.7	J	2	U	0.94	J	2.1	U	2.1	U	2.1
Gamma-BHC (Lindane)	NA		2.1	U	2.1	U	0.99	J	2	U	0.81	J	2.1	U	2.1	U	2.1
Gamma-Chlordane	NA		2.1	U	2.1	U	4.2	J	2	U	2.3	J	2.1	U	2.1	U	2.1
Heptachlor	NA		2.1	U	2.1	U	0.52	J	2	U	2.3	U	2.1	U	2.1	U	2.1
Heptachlor Epoxide	NA		2.1	U	2.1	U	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1
Methoxychlor	NA		4	U	4	U	2.2	J	4	U	2.5	J	4.1	U	4.2	U	4
Toxaphene	NA		82	U	81	U	95	U	81	U	91	U	84	U	84	U	81
DIOXINS/FURANS	**ng/kg**																
1,2,3,4,6,7,8-HpCDD	650	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,4,6,7,8-HpCDF	1100	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,4,7,8,9-HpCDF	88	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,4,7,8-HxCDD	39	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,4,7,8-HxCDF	690	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,6,7,8-HxCDD	94	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,6,7,8-HxCDF	230	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,7,8,9-HxCDD	120	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,7,8,9-HxCDF	14		NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,7,8-PeCDD	43	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,7,8-PeCDF	130	J	NA		NA		NA		NA		NA		NA		NA		NA
2,3,4,6,7,8-HxCDF	350	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
2,3,4,7,8-PeCDF	300	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
2,3,7,8-TCDD	17	J	NA		NA		NA		NA		NA		NA		NA		NA
2,3,7,8-TCDF	130	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
OCDD	2200		NA		NA		NA		NA		NA		NA		NA		NA
OCDF	420	J	NA		NA		NA		NA		NA		NA		NA		NA
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03TP10-0405-01**		**03TP11-0304-01**		**03TP11-0405-02**		**03TP12-0304-02**		**03TP12-0405-01**		**03TP13-0203-01**		**03TP14-0203-01**		**03TP15-0405-01**	
Sample Date:		**5/3/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/7/2007**	
Duplicate:																	
INORGANICS		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum		20800		12800		12400		10400		12000		13900		11100		19200	
Antimony	UL	0.39	UL	0.38	UL	0.38	UL	0.4	UL	1	B	0.38	UL	0.4	UL	0.39	UL
Arsenic	L	7		4.6		4.1		4.6		5.3		2.3		6.7		2.8	
Barium		287		58		48.4		117		83.9		77.1		90.9		176	
Beryllium		1.7		0.77		0.78		1.1		0.94		0.67		1.2		0.98	
Cadmium	U	0.085	U	0.083	U	0.083	U	0.086	U	2.7		0.082	U	0.088	U	0.085	UR
Calcium		704		1310		641		1230		1220		396		1420		329	
Chromium	K	22.5	K	18.6	K	18.7	K	14.2	K	21.5	K	6.9	K	18.1	K	8.1	
Cobalt		82.8		7.1		8.1		6.6		8.4		4.1		5.7		9.6	
Copper		43		12.9		16.3		11.3		34.6		21.9		9.3		34.1	K
Cyanide	U	0.14		0.6	U	0.6	U	0.62	U	0.17		0.59	U	0.13		0.61	U
Iron		23000		21200		19800		13800		21600		9570		13200		14100	
Lead		35.7		11.6		7.6		30.2		104		3.3		23.4		4.9	
Magnesium		868		2420		1840		1540		1620		809		1470		979	
Manganese		20000		412		541		947		774		221		321		910	
Mercury	L	0.074	L	0.036	L	0.027	L	0.06	L	0.18	L	0.034	L	0.09	L	0.029	
Nickel		15.6		10.4		10		9.2		10.8		7.4		9.3		15.4	
Potassium		286		605		527		356	B	365	B	350	B	336	B	469	
Selenium	UL	8	U	0.31	UL	0.31	UL	0.32	UL	0.32	UL	0.31	UL	0.33	UL	0.32	U
Silver	U	3.6		0.075	B	0.036	U	0.17	B	0.31		0.035	U	0.038	U	0.036	U
Sodium	L	19.1	UR	26.4	L	19.1	L	19.4	UR	18.9	UR	32.8	L	19.7	UR	19.1	UR
Thallium	UR	13.9	U	0.54	UR	0.55	UR	0.56	UL	0.55	UR	0.54	UL	0.57	UL	0.56	UR
Vanadium		34.9		32.6		30.5		22.3		28.1		13.2		25.4		17.6	
Zinc		28.3		29.1		22.9		37.3		141		14.7		37.9		26.9	
SEMIVOLATILES		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
1,2,4,5-Tetrachlorobenzene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
1-Methylnaphthalene		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,3,4,6-Tetrachlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4,5-Trichlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4,6-Trichlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4-Dichlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4-Dimethylphenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4-Dinitrophenol	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
2,4-Dinitrotoluene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,6-Dinitrotoluene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2-Chloronaphthalene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2-Chlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2-Methylnaphthalene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2-Methylphenol	U	400	U	390	U	390	U	820	U	190	J	390	U	420	U	400	U
2-Nitroaniline	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
2-Nitrophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
3,3'-Dichlorobenzidine	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
3-Nitroaniline	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
4,6-Dinitro-2-methylphenol	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
4-Bromophenyl Phenyl Ether	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Chloro-3-methylphenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Chloroaniline	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Chlorophenyl Phenyl Ether	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Methylphenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Nitroaniline	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03TP10-0405-01**		**03TP11-0304-01**		**03TP11-0405-02**		**03TP12-0304-02**		**03TP12-0405-01**		**03TP13-0203-01**		**03TP14-0203-01**		**03TP15-0405-01**	
Sample Date:		**5/3/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/7/2007**	
Duplicate:																	
4-Nitrophenol	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
Acenaphthene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Acenaphthylene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Acetophenone	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Anthracene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Atrazine	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Benz(a)anthracene	U	400	U	390	U	390	U	110	J	800	U	390	U	71	J	400	U
Benzaldehyde	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Benzo(a)pyrene	U	400	U	390	U	390	U	100	J	800	U	390	U	70	J	400	U
Benzo(b)fluoranthene	U	400	U	390	U	390	U	110	J	800	U	390	U	84	J	400	U
Benzo(g,h,i)perylene	U	400	U	390	U	390	U	100	J	800	U	390	U	73	J	400	U
Benzo(k)fluoranthene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Benzoic Acid		NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol		NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Bis(2-chloroethyl)ether	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Bis(2-ethylhexyl)phthalate	U	400	U	390	U	390	U	820	U	140	J	390	U	420	U	400	U
Butylbenzylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Caprolactam	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Carbazole	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Chrysene	U	400	U	390	U	390	U	180	J	800	U	390	U	150	J	400	U
Di-n-butylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Di-n-octylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Dibenz(a,h)anthracene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Dibenzofuran	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Diethylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Dimethylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Fluoranthene	U	400	U	390	U	390	U	280	J	89	J	390	U	240	J	400	U
Fluorene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Hexachlorobenzene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Hexachlorobutadiene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Hexachlorocyclopentadiene	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
Hexachloroethane	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Indeno(1,2,3-cd)pyrene	U	400	U	390	U	390	U	110	J	800	U	390	U	69	J	400	U
Isophorone	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
N-Nitroso-di-n-propylamine	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
N-Nitrosodiphenylamine (1)	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Naphthalene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Nitrobenzene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Pentachlorophenol	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
Phenanthrene	U	400	U	42	J	390	U	260	J	80	J	390	U	250	J	400	U
Phenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Pyrene	U	400	U	390	U	390	U	280	J	92	J	390	U	240	J	400	U
VOLATILES		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1,2,2-Tetrachloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1,2-Trichloro-1,2,2-trifluoroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1,2-Trichloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1-Dichloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1-Dichloroethene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2,3-Trichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2,4-Trichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dibromo-3-chloropropane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03TP10-0405-01**		**03TP11-0304-01**		**03TP11-0405-02**		**03TP12-0304-02**		**03TP12-0405-01**		**03TP13-0203-01**		**03TP14-0203-01**		**03TP15-0405-01**	
Sample Date:		**5/3/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/7/2007**	
Duplicate:																	
1,2-Dibromoethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichloroethene (cis)	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichloroethene (Total)		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichloropropane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,3-Dichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,4-Dichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
2-Butanone	U	5.6	U	5	U	5.3	U	5.6	U	5.5		4.9	U	6.2	UJ	5.2	U
2-Hexanone	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
4-Methyl-2-pentanone	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Acetone	U	22	U	20	U	21	U	16	J	33		6.1	J	25	UJ	21	U
Benzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Bromochloromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Bromodichloromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Bromoform	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Bromomethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Carbon Disulfide	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Carbon Tetrachloride	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chloroform	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chloromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
cis-1,3-Dichloropropene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Cyclohexane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Dibromochloromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Dichlorodifluoromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Ethylbenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Isopropylbenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
M,p-xylene	U	11	U	10	U	11	U	11	U	11	U	9.9	U	12	UJ	10	U
Methyl Acetate	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Methyl Tert-butyl Ether (mtbe)	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Methylcyclohexane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Methylene Chloride	B	2.4	B	5.1	B	7.2	B	3.3	B	3.5	B	5.5	B	4	B	6.8	B
O-xylene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Styrene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Tetrachloroethene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Toluene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
trans-1,3-Dichloropropene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Trichloroethene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Trichlorofluoromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Vinyl Acetate		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Xylene (Total)		NA		NA		NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	U	2.1	U	2	U	2	U	4.1		5.5	J	2	U	11	U	2.1	U
4,4'-DDE	U	2.1	U	2	U	2	U	15		18		0.72	J	11	U	2.1	U
4,4'-DDT	U	2.1	U	2	U	2	U	1.5	J	2.1	U	0.39	J	20		2.1	U
Aldrin	U	2.1	U	2	U	2	U	1.9	J	6.5	J	2	U	11	U	2.1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03TP10-0405-01**		**03TP11-0304-01**		**03TP11-0405-02**		**03TP12-0304-02**		**03TP12-0405-01**		**03TP13-0203-01**		**03TP14-0203-01**		**03TP15-0405-01**	
Sample Date:		**5/3/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/7/2007**	
Duplicate:																	
Alpha-BHC	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Alpha-Chlordane	J	0.26	J	1.4	J	2	U	24		91		2	U	330	J	2.1	U
Aroclor-1016	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1221	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1232	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1242	U	20	U	20	U	20	U	37		110		20	U	21	U	20	U
Aroclor-1248	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1254	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1260	U	20	U	20	U	20	U	21	U	53		20	U	21	U	20	U
Aroclor-1262	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1268	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Beta-BHC	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Delta-BHC	U	2.1	U	2	U	2	U	1.4	J	2.7		2	U	11	U	2.1	U
Dieldrin	U	2.1	U	0.58	J	2	U	15		140		0.24	J	400		0.28	J
Endosulfan I	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	1.1	J
Endosulfan II	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	0.7	J
Endosulfan Sulfate	U	2.1	U	2	U	2	U	2.1	U	0.62	J	2	U	11	U	2.1	U
Endrin	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Endrin Aldehyde	U	2.1	U	2	U	2	U	2.1	U	2	J	2	U	11	U	2.1	U
Endrin Ketone	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Gamma-BHC (Lindane)	U	2.1	U	2	U	2	U	6.9		2.8		2	U	4.5	J	2.1	U
Gamma-Chlordane	U	2.1	U	1.1	J	2	U	20	J	57	J	2	U	230		2.1	U
Heptachlor	U	2.1	U	2	U	2	U	0.53	J	2.8	J	2	U	11	U	2.1	U
Heptachlor Epoxide	U	2.1	U	2	U	2	U	3.7	J	5.4	J	2	U	12	J	2.1	U
Methoxychlor	U	4	U	3.9	U	3.9	U	4.1	U	2.1	J	3.9	U	21	U	4	U
Toxaphene	U	82	U	80	U	80	U	83	U	81	U	79	U	420	U	82	U
DIOXINS/FURANS																	
1,2,3,4,6,7,8-HpCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03TP17-0304-01		03TP18-0203-01		03TP18-0203-01-D		03TP19-0304-02		03TP19-0607-01		03TP20-0708-01		03TP23-0304-01		03TP24-0304-01	
Sample Date:	**5/7/2007**		**5/8/2007**		**5/8/2007**		**1/12/2009**		**1/12/2009**		**1/12/2009**		**1/13/2009**		**1/13/2009**	
Duplicate:			**03TP18-0203-01-D**		**03TP18-0203-01**											
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	23100		25200		28300		74700		23800		24700		20000		33900	
Antimony	0.39	UL	0.39	UJ	4	J	70.6	L	31	L	10.7	J	1.3	B	19.2	J
Arsenic	3.9		3.8		2	L	17.1		8.4		6.5		5.7		8.7	
Barium	88.9		162		155		859		475		346		115		347	
Beryllium	0.94		0.98	L	0.67	L	0.71	B	0.81	B	1.4	K	0.8	B	0.89	B
Cadmium	0.084	UR	2.7	J	13.7	J	237		300		48.7		0.08	UR	24.3	L
Calcium	519		777	J	1300	J	27300		16500		12200		953		6240	
Chromium	10.8		14.7	J	25.2	J	148	J	71.4	J	56.3	J	21.9	J	84.9	J
Cobalt	9.7		9.1		8.4		20		13.7		10.3		7		8.3	
Copper	21.5	K	90.5	J	421	J	6340		1380		567		23.2		415	
Cyanide	0.6	U	0.61	U	0.62	U	1.2		0.64		0.45		0.1	U	2.4	
Iron	16000		21500	J	87100	J	193000		40200		40700		26000		49300	
Lead	8.7		688		450		2570	J	2380	J	1210	J	10.8	J	555	J
Magnesium	973		877		767		5560	J	3190	J	2830	J	2120	J	2390	J
Manganese	701		738		926		2610		1680		817		388		765	
Mercury	0.049		0.078	J	0.19	J	1.8		0.081		7.1		0.054		0.4	
Nickel	11.1		20.1	J	33.8	J	161	J	144	J	85.4	J	15.5	J	67.8	J
Potassium	337		368		249		1740		1700		1230		825		840	
Selenium	0.32	U	0.32	UL	0.65	UR	0.35	UR	0.26	UR	0.24	UR	0.26	UR	0.3	UR
Silver	0.036	U	1.1	J	3.7	J	23.5		33.3		60.2		0.07	U	29.8	
Sodium	18.9	UR	26.2	L	39	UR	734	K	1020	K	411	R	148	R	292	R
Thallium	0.55	UR	0.55	UR	1.1	UR	48.5	K	9.7	K	9.2	K	4.9	R	9.8	R
Vanadium	22.4		19.5		17.9		43.4		31.7		37.7		38.7		44.3	
Zinc	22.3		151	J	954	J	4610		2350		1710		127		1750	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	400	U	400	U	410	U	290	U	200	U	940	U	200	U	240	U
1,2,4,5-Tetrachlorobenzene	400	U	400	U	410	U	290	U	36	J	190	U	200	U	240	U
1-Methylnaphthalene	NA		NA		NA		6	J	8.1	J	14000	U	0.84	J	5	J
2,2'-Oxybis(1-chloropropane)	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
2,3,4,6-Tetrachlorophenol	400	U	400	U	410	U	290	U	200	U	190	U	200	U	240	U
2,4,5-Trichlorophenol	400	U	400	U	410	U	410	U	290	U	1300	U	290	U	340	U
2,4,6-Trichlorophenol	400	U	400	U	410	U	420	U	300	U	1400	U	300	U	350	U
2,4-Dichlorophenol	400	U	400	U	410	U	420	U	300	U	1400	U	300	U	350	U
2,4-Dimethylphenol	400	U	400	U	410	U	310	U	220	U	1000	U	220	U	250	U
2,4-Dinitrophenol	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
2,4-Dinitrotoluene	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
2,6-Dinitrotoluene	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
2-Chloronaphthalene	400	U	400	U	410	U	470	U	340	U	1600	U	340	U	390	U
2-Chlorophenol	400	U	400	U	410	U	560	U	400	U	1800	U	400	U	460	U
2-Methylnaphthalene	400	U	400	U	410	U	15		16		1100	J	1.3	J	6.1	J
2-Methylphenol	400	U	400	U	410	U	490	U	350	U	1600	U	350	U	410	U
2-Nitroaniline	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
2-Nitrophenol	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
3,3'-Dichlorobenzidine	1900	U	1900	U	2000	UJ	420	U	300	U	1400	U	300	U	350	U
3-Nitroaniline	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
4,6-Dinitro-2-methylphenol	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
4-Bromophenyl Phenyl Ether	400	U	400	U	410	U	320	U	230	U	1100	U	230	U	270	U
4-Chloro-3-methylphenol	400	U	400	U	410	U	420	U	300	U	1400	U	300	U	350	U
4-Chloroaniline	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
4-Chlorophenyl Phenyl Ether	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
4-Methylphenol	400	U	400	U	410	U	560	U	400	U	1800	U	400	U	460	U
4-Nitroaniline	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP17-0304-01**		**03TP18-0203-01**		**03TP18-0203-01-D**		**03TP19-0304-02**		**03TP19-0607-01**		**03TP20-0708-01**		**03TP23-0304-01**		**03TP24-0304-01**	
Sample Date:	**5/7/2007**		**5/8/2007**		**5/8/2007**		**1/12/2009**		**1/12/2009**		**1/12/2009**		**1/13/2009**		**1/13/2009**	
Duplicate:			**03TP18-0203-01-D**		**03TP18-0203-01**											
4-Nitrophenol	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
Acenaphthene	400	U	400	U	410	U	10	J	3.7	J	6400	J	10	U	22	
Acenaphthylene	400	U	400	U	410	U	4.2	J	1.9	J	27	J	0.64	J	12	
Acetophenone	400	U	400	U	410	U	420	U	300	U	1400	U	300	U	350	U
Anthracene	400	U	400	U	410	U	83		12		19000		1.2	J	230	J
Atrazine	400	U	400	U	410	U	290	U	200	U	940	U	200	U	240	U
Benz(a)anthracene	400	U	400	U	410	UJ	790		47		15000		6.5	J	2100	
Benzaldehyde	400	U	400	U	410	U	63	J	48	J	940	U	200	U	38	J
Benzo(a)pyrene	400	U	400	U	410	U	760		33		7900	J	6.4	J	2200	
Benzo(b)fluoranthene	400	U	400	U	410	U	1000		76		9900	J	8.8	J	2800	
Benzo(g,h,i)perylene	400	U	400	U	410	U	510		44		2900	J	4.4	J	1400	
Benzo(k)fluoranthene	400	U	400	U	410	U	630		51		6600	J	5	J	1700	
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	400	U	400	U	410	U	410	U	290	U	1300	U	290	U	340	U
Bis(2-chloroethyl)ether	400	U	400	U	410	U	470	U	340	U	1600	U	340	U	390	U
Bis(2-ethylhexyl)phthalate	400	U	400	U	410	UJ	400		280	U	570	J	790		270	J
Butylbenzylphthalate	400	U	400	U	410	UJ	290	U	200	U	940	U	200	U	240	U
Caprolactam	400	U	400	U	410	U	290	UL	200	UL	940	UL	200	UL	240	UL
Carbazole	400	U	400	U	410	U	330		200	U	11000		200	U	240	U
Chrysene	400	U	400	U	410	UJ	780		74		23000		8.2	J	2300	
Di-n-butylphthalate	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
Di-n-octylphthalate	400	U	400	U	410	U	370	U	270	U	1200	U	270	U	310	U
Dibenz(a,h)anthracene	400	U	400	U	410	U	170	J	12		1100	J	1.3	J	450	J
Dibenzofuran	400	U	400	U	410	U	420	U	300	U	8200		300	U	350	U
Diethylphthalate	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
Dimethylphthalate	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
Fluoranthene	400	U	400	U	410	U	1300		58		56000		14		3500	
Fluorene	400	U	400	U	410	U	10	J	4.7	J	8200	J	10	U	26	J
Hexachlorobenzene	400	U	400	U	410	U	370	U	270	U	1200	U	270	U	310	U
Hexachlorobutadiene	400	U	400	U	410	U	490	U	350	U	1600	U	350	U	410	U
Hexachlorocyclopentadiene	1900	U	1900	U	2000	U	370	U	270	U	1200	U	270	U	310	U
Hexachloroethane	400	U	400	U	410	U	290	U	200	U	940	U	200	U	240	U
Indeno(1,2,3-cd)pyrene	400	U	400	U	410	U	650		42		3600	J	4.9	J	1800	
Isophorone	400	U	400	U	410	U	460	U	330	U	1500	U	330	U	380	U
N-Nitroso-di-n-propylamine	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
N-Nitrosodiphenylamine (1)	400	U	400	U	410	U	360	U	250	U	1200	U	250	U	300	U
Naphthalene	400	U	400	U	410	U	50		27		14000		1.1	B	9.2	J
Nitrobenzene	400	U	400	U	410	U	410	U	290	U	1300	U	290	U	340	U
Pentachlorophenol	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
Phenanthrene	400	U	400	U	410	U	320	D	54		62000		5.8	J	1100	
Phenol	400	U	400	U	410	U	290	U	200	U	940	U	200	U	240	U
Pyrene	50	J	400	U	410	UJ	1000		67		38000		12		3000	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1,2,2-Tetrachloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1,2-Trichloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1-Dichloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1-Dichloroethene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2,3-Trichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	71	J	7.1	U	8.7	U
1,2,4-Trichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	250	J	7.1	U	8.7	U
1,2-Dibromo-3-chloropropane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP17-0304-01**		**03TP18-0203-01**		**03TP18-0203-01-D**		**03TP19-0304-02**		**03TP19-0607-01**		**03TP20-0708-01**		**03TP23-0304-01**		**03TP24-0304-01**	
Sample Date:	**5/7/2007**		**5/8/2007**		**5/8/2007**		**1/12/2009**		**1/12/2009**		**1/12/2009**		**1/13/2009**		**1/13/2009**	
Duplicate:			**03TP18-0203-01-D**		**03TP18-0203-01**											
1,2-Dibromoethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichloroethene (cis)	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichloropropane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,3-Dichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,4-Dichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
2-Butanone	5.4	U	5.5	U	5.5	UJ	26	U	24		680	U	22		22	U
2-Hexanone	5.4	U	5.5	U	5.5	UJ	26	U	13	U	680	U	18	U	22	U
4-Methyl-2-pentanone	5.4	U	5.5	U	5.5	UJ	26	U	13	U	680	U	18	U	22	U
Acetone	22	U	22	U	22	UJ	49	J	120	J	680	UR	160	J	140	J
Benzene	5.4	U	5.5	U	5.5	UJ	4.2	J	15		270	U	7.1	U	46	
Bromochloromethane	5.4	U	5.5	U	5.5	UJ	NA		NA		NA		NA		NA	
Bromodichloromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Bromoform	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Bromomethane	5.4	U	5.5	U	5.5	UJ	10	U	8.2		270	U	7.1	U	8.7	U
Carbon Disulfide	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	2.9	J
Carbon Tetrachloride	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Chlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Chloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Chloroform	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Chloromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
cis-1,3-Dichloropropene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Cyclohexane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Dibromochloromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Dichlorodifluoromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	4.8	J
Ethylbenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	880		7.1	U	8.7	U
Isopropylbenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
M,p-xylene	11	U	11	U	11	UJ	21	U	11	U	6100		14	U	17	U
Methyl Acetate	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Methyl Tert-butyl Ether (mtbe)	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Methylcyclohexane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Methylene Chloride	3.4	B	2.4	B	2.1	B	10	U	5.3	U	270	U	7.1	U	8.7	U
O-xylene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	4000		7.1	U	8.7	U
Styrene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	3300		7.1	U	8.7	U
Tetrachloroethene	5.4	U	5.5	U	5.5	UJ	9.2	J	4.8	J	270	U	7.1	U	32	
Toluene	5.4	U	5.5	U	5.5	UJ	3.8	B	5.6	B	590		1.4	B	17	
trans-1,3-Dichloropropene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Trichloroethene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	2.7	J
Trichlorofluoromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Xylene (Total)	NA		NA		NA		10	U	5.3	U	10000		7.1	U	8.7	U
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	2	U	0.85	J	2.1	U	29	J	20	U	8.6	J	0.83	J	93	U
4,4'-DDE	2	U	0.39	J	0.47	J	49	B	20	U	29	B	1.5	B	93	U
4,4'-DDT	2	U	2.1	U	2.1	U	110		20	U	25	J	1.9	J	93	U
Aldrin	2	U	2.1	U	2.1	U	14	U	19	R	19	U	2	U	48	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03TP17-0304-01		03TP18-0203-01		03TP18-0203-01-D		03TP19-0304-02		03TP19-0607-01		03TP20-0708-01		03TP23-0304-01		03TP24-0304-01	
Sample Date:	**5/7/2007**		**5/8/2007**		**5/8/2007**		**1/12/2009**		**1/12/2009**		**1/12/2009**		**1/13/2009**		**1/13/2009**	
Duplicate:			**03TP18-0203-01-D**		**03TP18-0203-01**											
Alpha-BHC	2	U	2.1	U	0.7	J	7	J	10	U	19	U	2	U	48	U
Alpha-Chlordane	2	U	1.5	J	2.1		8.6	J	10	U	19	U	1.1	J	48	U
Aroclor-1016	20	U	20	U	21	U	200	U	140	U	270	U	29	U	680	U
Aroclor-1221	20	U	20	U	21	U	290	U	200	U	380	U	41	U	960	U
Aroclor-1232	20	U	20	U	21	U	140	U	100	U	190	U	20	U	480	U
Aroclor-1242	20	U	20	U	21	U	140	U	100	U	190	U	20	U	480	U
Aroclor-1248	20	U	20	U	21	U	140	U	100	U	190	U	20	U	480	U
Aroclor-1254	20	U	20	U	21	U	140	U	100	U	190	U	20	U	4000	
Aroclor-1260	20	U	20		21		140	U	100	U	340		20	U	480	U
Aroclor-1262	20	U	20	U	21	U	NA		NA		NA		NA		NA	
Aroclor-1268	20	U	20	U	21	U	NA		NA		NA		NA		NA	
Beta-BHC	2	U	2.1	U	2.1	U	51	R	5.1	U	9.5	U	1	U	24	U
Delta-BHC	2	U	2.1	U	2.1	U	14	U	10	U	19	U	2	U	48	U
Dieldrin	4		41		35		35		20	U	86		12		93	U
Endosulfan I	2	U	2.1	U	2.1	U	14	U	9.9	J	4.7	J	2	U	48	U
Endosulfan II	2	U	2.1	U	2.1	U	28	U	20	U	37	U	4	U	93	U
Endosulfan Sulfate	2	U	0.76	J	0.67	J	28	U	20	U	37	U	4	U	93	U
Endrin	2	U	2.1	U	2.1	U	4.6	J	20	U	37	U	4	U	93	U
Endrin Aldehyde	2	U	2.1	U	0.64	J	17	R	25	J	37	U	4	U	93	U
Endrin Ketone	2	U	2.1	U	0.56	J	30	R	20	U	37	U	4	U	93	U
Gamma-BHC (Lindane)	2	U	2.1	U	2.1	U	14	U	10	U	19	U	2	U	48	U
Gamma-Chlordane	2	U	1.6	J	2	J	8.6	J	69	R	12	J	1.2	J	48	U
Heptachlor	2	U	2.1	U	2.1	U	7.1	R	6.2	J	5.9	J	2	U	48	U
Heptachlor Epoxide	2	U	2.1	U	2.1	U	5.4	J	10	U	15	J	0.85	J	48	U
Methoxychlor	4	U	4	U	4.1	U	140	U	130	J	190	U	20	U	480	U
Toxaphene	81	U	81	U	83	U	700	U	500	U	920	U	100	U	2300	U
DIOXINS/FURANS																
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP25-0506-01**		**03TP25-0607-02**		**03TP25-0607-02-D**		**03TP26-0506-01**		**03TP27-0304-01**		**03TP27-0304-01-D**		**03TP27-0304-02**		**03TP28-0203-01**	
Sample Date:	**1/13/2009**		**1/13/2009**		**1/13/2009**		**1/14/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**	
Duplicate:			**03TP25-0607-02-D**		**03TP25-0607-02**				**03TP27-0304-01-D**		**03TP27-0304-01**					
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	32100		25000		23900		31300		38700		33800		45600		23800	
Antimony	2	J	11.9	L	12.3	J	19.4	J	220	L	281	L	121	L	1.2	B
Arsenic	3.6		5.7		5.9		9.4		49.9	J	14.9	J	11.7		5.2	
Barium	232		385		476		350		539		492		624		88.7	
Beryllium	1.7	K	0.77	B	0.83	B	1.7	K	1.1	B	0.92	B	0.9	B	0.96	K
Cadmium	0.08	UR	4.7	L	5.6	L	31.3	L	133		150		66.5		0.08	UR
Calcium	909		6020		7890		4510		55600		71900		19200		962	
Chromium	16.2	J	24.3	J	33.5	J	68.5	J	295	J	215	J	137	J	41.9	J
Cobalt	11.1		7.9		8.6		11.1		28.5	J	121	J	12.6		7.9	
Copper	63.2		8800		9660		872		4730	J	2820	J	2170		29.2	
Cyanide	0.69		0.39		0.25		0.98		2.3	J	3.9	J	1		0.09	U
Iron	22300		26600		33800		63500		129000	J	236000	J	127000		24400	
Lead	38.2	J	1530	J	1510	J	625	J	2780	J	4410	J	2120	J	13.4	J
Magnesium	899	J	3010	J	3720	J	1910	J	3740	J	3990	J	7840	J	1400	J
Manganese	1340		1380	J	718	J	1180		1410		1650		2130		646	
Mercury	0.028		0.14		0.14		3.1		0.77		0.87		6.7		0.069	
Nickel	20.2	J	19.6	J	51.8	J	83.1	J	183	J	295	J	281	J	13.4	J
Potassium	507		741		1060		940		2250		1860		1020		654	
Selenium	0.26	UR	0.26	UR	0.28	UR	0.28	UR	0.39	UR	0.37	UR	0.33	UR	0.26	UR
Silver	0.07	U	2.3		3.6		19.6		16.2		12.4		34.7		0.07	U
Sodium	319	K	277	R	373	R	491	R	1830		1390	K	679	K	165	R
Thallium	4.5	K	5.5	K	7	K	13.1	K	29.8	J	61.1	J	30.3	K	4.9	K
Vanadium	26.7		33.7		37.8		87.4		752	J	366	J	33.7		34.7	
Zinc	336		1050	J	1770	J	1580		13700	J	6570	J	5450		37	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
1,2,4,5-Tetrachlorobenzene	210	U	220	U	220	U	220	U	310	U	310	U	260	U	200	U
1-Methylnaphthalene	8.6	J	450		560		3	B	3.8	B	4.2	B	3.4	B	9.8	U
2,2'-Oxybis(1-chloropropane)	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
2,3,4,6-Tetrachlorophenol	210	U	220	U	220	U	220	U	310	U	310	U	260	U	200	U
2,4,5-Trichlorophenol	300	U	310	U	1200	U	320	U	440	U	440	U	360	U	280	U
2,4,6-Trichlorophenol	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
2,4-Dichlorophenol	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
2,4-Dimethylphenol	230	U	230	U	920	U	240	U	330	U	330	U	270	U	210	U
2,4-Dinitrophenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
2,4-Dinitrotoluene	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
2,6-Dinitrotoluene	290	U	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
2-Chloronaphthalene	350	U	360	U	1400	U	370	U	520	U	520	U	420	U	330	U
2-Chlorophenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
2-Methylnaphthalene	23		170		320		5.8	B	9.3	B	8.8	B	6.7	B	0.74	B
2-Methylphenol	360	U	370	U	1500	U	380	U	540	U	540	U	440	U	340	U
2-Nitroaniline	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
2-Nitrophenol	290	U	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
3,3'-Dichlorobenzidine	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
3-Nitroaniline	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
4,6-Dinitro-2-methylphenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
4-Bromophenyl Phenyl Ether	240	U	240	U	970	U	250	U	350	U	350	U	290	U	220	U
4-Chloro-3-methylphenol	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
4-Chloroaniline	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
4-Chlorophenyl Phenyl Ether	290	U	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
4-Methylphenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
4-Nitroaniline	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP25-0506-01**		**03TP25-0607-02**		**03TP25-0607-02-D**		**03TP26-0506-01**		**03TP27-0304-01**		**03TP27-0304-01-D**		**03TP27-0304-02**		**03TP28-0203-01**	
Sample Date:	**1/13/2009**		**1/13/2009**		**1/13/2009**		**1/14/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**	
Duplicate:			**03TP25-0607-02-D**		**03TP25-0607-02**				**03TP27-0304-01-D**		**03TP27-0304-01**					
4-Nitrophenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
Acenaphthene	10	U	17		24		3.6	B	15	U	15	U	0.99	B	1.1	B
Acenaphthylene	0.67	J	10	J	16		3.3	B	1.3	B	1.8	B	1.8	B	1.8	B
Acetophenone	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
Anthracene	0.82	J	4.1	J	5.7	J	5.3	B	1.8	B	2.9	B	2.7	B	3.9	B
Atrazine	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Benz(a)anthracene	4.3	J	19		23		40		12	B	11	B	13	B	9.1	B
Benzaldehyde	210	U	220	U	870	U	58	J	83	J	82	J	75	J	200	U
Benzo(a)pyrene	6.2	J	15		11	U	41		8.3	B	7.5	B	14	B	16	B
Benzo(b)fluoranthene	7.4	J	18		11	U	52		18	B	14	B	26	B	21	
Benzo(g,h,i)perylene	15		23		28		38		17	B	17	B	15	B	22	
Benzo(k)fluoranthene	5	J	17		11	U	41		16	B	9.9	B	13	B	15	B
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	300	U	310	U	1200	U	320	U	440	U	440	U	360	U	280	U
Bis(2-chloroethyl)ether	350	U	360	U	1400	U	370	U	520	U	520	U	420	U	330	U
Bis(2-ethylhexyl)phthalate	12000		1400	J	3000	J	150	J	680		660		210	J	270	U
Butylbenzylphthalate	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Caprolactam	210	UL	220	UL	870	UL	220	UL	310	UL	310	UL	260	UL	200	UL
Carbazole	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Chrysene	13		28		32		50		55		22	B	23	B	17	B
Di-n-butylphthalate	170	J	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
Di-n-octylphthalate	280	U	280	U	1100	U	290	U	410	U	410	U	330	U	260	U
Dibenz(a,h)anthracene	1.8	J	4.2	J	11	U	9.2	B	3.8	B	3.2	B	4.5	B	4.2	B
Dibenzofuran	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
Diethylphthalate	290	U	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
Dimethylphthalate	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
Fluoranthene	12		37		48		120		13	B	16	B	33	B	46	
Fluorene	10	U	20	J	32		1.7	B	15	U	15	U	1.5	B	1.9	B
Hexachlorobenzene	280	U	280	U	1100	U	290	U	410	U	410	U	330	U	260	U
Hexachlorobutadiene	360	U	370	U	1500	U	380	U	540	U	540	U	440	U	340	U
Hexachlorocyclopentadiene	280	U	280	U	1100	U	290	U	410	U	410	U	330	U	260	U
Hexachloroethane	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Indeno(1,2,3-cd)pyrene	6.3	J	16		18		40		8.9	B	8.5	B	16	B	20	
Isophorone	340	U	350	U	1400	U	360	U	500	U	500	U	410	U	320	U
N-Nitroso-di-n-propylamine	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
N-Nitrosodiphenylamine (1)	260	U	270	U	1100	U	280	U	390	U	390	U	320	U	250	U
Naphthalene	86		320		450		5	B	7.3	B	8.8	B	8.3	B	0.72	B
Nitrobenzene	300	U	310	U	1200	U	320	U	440	U	440	U	360	U	280	U
Pentachlorophenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
Phenanthrene	7.5	J	34		48		23	B	19	B	18	B	26	B	15	B
Phenol	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Pyrene	19		59		100	J	90		20	B	17	B	25	B	32	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1,2,2-Tetrachloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1,2-Trichloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1-Dichloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1-Dichloroethene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2,3-Trichlorobenzene	5700		320	U	310	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2,4-Trichlorobenzene	5700	U	320	U	310	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dibromo-3-chloropropane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP25-0506-01**		**03TP25-0607-02**		**03TP25-0607-02-D**		**03TP26-0506-01**		**03TP27-0304-01**		**03TP27-0304-01-D**		**03TP27-0304-02**		**03TP28-0203-01**	
Sample Date:	**1/13/2009**		**1/13/2009**		**1/13/2009**		**1/14/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**	
Duplicate:			**03TP25-0607-02-D**		**03TP25-0607-02**				**03TP27-0304-01-D**		**03TP27-0304-01**					
1,2-Dibromoethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichlorobenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichloroethene (cis)	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichloropropane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,3-Dichlorobenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,4-Dichlorobenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
2-Butanone	14000	U	810	U	760	U	15	U	24	U	24	U	21	U	12	U
2-Hexanone	14000	U	810	U	760	U	15	U	24	U	24	U	21	U	12	U
4-Methyl-2-pentanone	14000	U	810	U	760	U	15	U	24	U	24	U	21	U	12	U
Acetone	14000	UR	540	J	760	UR	37	J	100	J	110	J	130	J	55	J
Benzene	5700	U	78	J	76	J	22		12		7.3	J	2.2	J	4.7	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Bromoform	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Bromomethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Carbon Disulfide	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Carbon Tetrachloride	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Chlorobenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Chloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Chloroform	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Chloromethane	5700	U	320	U	310	U	16		9.7	U	9.7	U	8.3	U	4.7	U
cis-1,3-Dichloropropene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Cyclohexane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Dibromochloromethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Dichlorodifluoromethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Ethylbenzene	7000		550		380		6	U	9.7	U	9.7	U	8.3	U	4.7	U
Isopropylbenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
M,p-xylene	18000		1600		960		12	U	19	U	19	U	17	U	9.5	U
Methyl Acetate	5700	U	320	U	450	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Methyl Tert-butyl Ether (mtbe)	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Methylcyclohexane	3500	J	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Methylene Chloride	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
O-xylene	2200	J	350		260	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Styrene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Tetrachloroethene	5700	U	210	J	130	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Toluene	150000		4300		2700		8.9	B	10	B	4.4	B	2.7	B	4.7	U
trans-1,3-Dichloropropene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Trichloroethene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Trichlorofluoromethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Xylene (Total)	20000		2000		1200		6	U	9.7	U	9.7	U	8.3	U	4.7	U
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	4.1	U	21	U	21	U	7.2	J	12	J	13	J	16	J	3.9	U
4,4'-DDE	1.5	B	4.4	B	21	U	13	B	15	J	11	B	8	B	1.1	B
4,4'-DDT	1.3	J	7.7	J	21	U	220		21		23	J	21	J	4.9	
Aldrin	0.53	J	1.5	J	11	U	22	U	3.1	J	3.7	J	1.4	J	2	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP25-0506-01**		**03TP25-0607-02**		**03TP25-0607-02-D**		**03TP26-0506-01**		**03TP27-0304-01**		**03TP27-0304-01-D**		**03TP27-0304-02**		**03TP28-0203-01**	
Sample Date:	**1/13/2009**		**1/13/2009**		**1/13/2009**		**1/14/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**	
Duplicate:			**03TP25-0607-02-D**		**03TP25-0607-02**				**03TP27-0304-01-D**		**03TP27-0304-01**					
Alpha-BHC	0.8	J	16		5.9	J	22	U	3.1	U	3.1	U	6.4	R	2	U
Alpha-Chlordane	0.61	J	11	U	11	U	22	U	12	J	13	J	12	R	2	U
Aroclor-1016	30	U	150	U	150	U	320	U	44	U	44	U	36	U	28	U
Aroclor-1221	43	U	220	U	220	U	450	U	63	U	63	U	52	U	40	U
Aroclor-1232	21	U	110	U	110	U	220	U	31	U	31	U	26	U	20	U
Aroclor-1242	21	U	110	U	110	U	220	U	31	U	31	U	26	U	20	U
Aroclor-1248	21	U	110	U	110	U	560		31	U	31	U	26	U	92	
Aroclor-1254	21	U	110	U	110	U	220	U	31	U	31	U	26	U	20	U
Aroclor-1260	21	U	110	U	110	U	220	U	31	U	31	U	26	U	20	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	1.8	J	21	R	14	J	11	U	12	R	1.6	U	8.2	R	1	U
Delta-BHC	2.1	U	9.1	R	11	U	22	U	3.1	U	3.1	U	2.6	U	2	U
Dieldrin	10		59		46		120		31	J	36	J	21	J	18	J
Endosulfan I	2.1	U	11	U	11	U	22	U	3.1	U	1.5	J	0.69	J	2	U
Endosulfan II	4.1	U	21	U	21	U	43	U	6.1	U	6.1	U	2.3	R	3.9	U
Endosulfan Sulfate	4.1	U	21	U	21	U	43	U	12	R	6.1	U	7.8	R	3.9	U
Endrin	4.1	U	21	U	21	U	43	U	6.1	U	6.2	J	2.3	J	3.9	U
Endrin Aldehyde	4.1	U	21	U	4.1	J	7.2	J	17	R	9.3	J	12	R	3.9	U
Endrin Ketone	4.1	U	21	U	21	U	43	U	24	J	14	R	5.6	J	3.9	U
Gamma-BHC (Lindane)	2.1	U	11	U	11	U	22	U	3.1	U	3.1	U	2.6	U	2	U
Gamma-Chlordane	0.36	J	11	U	3.8	J	22	U	23	R	25	R	20	R	2	U
Heptachlor	2.1	U	6	J	2.3	J	22	U	12	R	7.1	R	4.2	R	2	U
Heptachlor Epoxide	2.1	U	11	U	11	U	22	U	4.2	J	6.1	J	4.5	J	2	U
Methoxychlor	21	U	110	U	110	U	220	U	15	J	31	U	15	J	20	U
Toxaphene	100	U	530	U	530	U	1100	U	150	U	150	U	130	U	98	U
DIOXINS/FURANS																
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP29-0304-01**		**03TP30-0506-01**		**03TP30-0506-01-D**	
Sample Date:	**1/14/2009**		**1/14/2009**		**1/14/2009**	
Duplicate:			**03TP30-0506-01-D**		**03TP30-0506-01**	
INORGANICS	**mg/kg**		**mg/kg**			
Aluminum	17100		23600		NA	
Antimony	1.4	B	36.3	L	NA	
Arsenic	4.7		9.6		NA	
Barium	45.2		503		NA	
Beryllium	0.76	B	0.78	B	NA	
Cadmium	0.08	UR	41.3		NA	
Calcium	632		31700		NA	
Chromium	19	J	348	J	NA	
Cobalt	15.8		11.9		NA	
Copper	24.9		785		NA	
Cyanide	0.1	U	1.1		NA	
Iron	21700		57100		NA	
Lead	11.9	J	1500	J	NA	
Magnesium	1770	J	4470	J	NA	
Manganese	1030		1170		NA	
Mercury	0.017	U	0.27		NA	
Nickel	12.4	J	60.5	J	NA	
Potassium	897		1360		NA	
Selenium	0.26	UR	0.29	UR	NA	
Silver	0.07	U	16.5		NA	
Sodium	158	R	522	R	NA	
Thallium	4.2	R	13.3	K	NA	
Vanadium	33.9		34.9		NA	
Zinc	28.4		2140		NA	
SEMIVOLATILES	**ug/kg**		**ug/kg**			
1,1'-Biphenyl	200	U	240	U	NA	
1,2,4,5-Tetrachlorobenzene	200	U	240	U	NA	
1-Methylnaphthalene	9.9	U	5.7	B	NA	
2,2'-Oxybis(1-chloropropane)	310	U	360	U	NA	
2,3,4,6-Tetrachlorophenol	200	U	240	U	NA	
2,4,5-Trichlorophenol	290	U	330	U	NA	
2,4,6-Trichlorophenol	300	U	350	U	NA	
2,4-Dichlorophenol	300	U	350	U	NA	
2,4-Dimethylphenol	210	U	250	U	NA	
2,4-Dinitrophenol	390	U	460	U	NA	
2,4-Dinitrotoluene	310	U	360	U	NA	
2,6-Dinitrotoluene	270	U	320	U	NA	
2-Chloronaphthalene	330	U	390	U	NA	
2-Chlorophenol	390	U	460	U	NA	
2-Methylnaphthalene	9.9	U	13	B	NA	
2-Methylphenol	350	U	400	U	NA	
2-Nitroaniline	390	U	460	U	NA	
2-Nitrophenol	270	U	320	U	NA	
3,3'-Dichlorobenzidine	300	U	350	U	NA	
3-Nitroaniline	390	U	460	U	NA	
4,6-Dinitro-2-methylphenol	390	U	460	U	NA	
4-Bromophenyl Phenyl Ether	230	U	260	U	NA	
4-Chloro-3-methylphenol	300	U	350	U	NA	
4-Chloroaniline	310	U	360	U	NA	
4-Chlorophenyl Phenyl Ether	270	U	320	U	NA	
4-Methylphenol	390	U	460	U	NA	
4-Nitroaniline	390	U	460	U	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP29-0304-01**		**03TP30-0506-01**		**03TP30-0506-01-D**	
Sample Date:	**1/14/2009**		**1/14/2009**		**1/14/2009**	
Duplicate:			**03TP30-0506-01-D**		**03TP30-0506-01**	
4-Nitrophenol	390	U	460	U	NA	
Acenaphthene	9.9	U	1.2	B	NA	
Acenaphthylene	9.9	U	3.7	B	NA	
Acetophenone	300	U	350	U	NA	
Anthracene	9.9	U	6.4	B	NA	
Atrazine	200	U	240	U	NA	
Benz(a)anthracene	9.9	U	25	B	NA	
Benzaldehyde	200	U	43	J	NA	
Benzo(a)pyrene	9.9	U	24		NA	
Benzo(b)fluoranthene	9.9	U	36		NA	
Benzo(g,h,i)perylene	9.9	U	23		NA	
Benzo(k)fluoranthene	9.9	U	21	B	NA	
Benzoic Acid	NA		NA		NA	
Benzyl Alcohol	NA		NA		NA	
Bis(2-chloroethoxy)methane	290	U	330	U	NA	
Bis(2-chloroethyl)ether	330	U	390	U	NA	
Bis(2-ethylhexyl)phthalate	270	U	250	J	NA	
Butylbenzylphthalate	200	U	240	U	NA	
Caprolactam	200	UL	240	UL	NA	
Carbazole	200	U	240	U	NA	
Chrysene	9.9	U	37		NA	
Di-n-butylphthalate	270	U	320	U	NA	
Di-n-octylphthalate	260	U	310	U	NA	
Dibenz(a,h)anthracene	9.9	U	7.7	B	NA	
Dibenzofuran	300	U	350	U	NA	
Diethylphthalate	270	U	320	U	NA	
Dimethylphthalate	310	U	360	U	NA	
Fluoranthene	9.9	U	53		NA	
Fluorene	9.9	U	1.2	B	NA	
Hexachlorobenzene	260	U	310	U	NA	
Hexachlorobutadiene	350	U	400	U	NA	
Hexachlorocyclopentadiene	260	U	310	U	NA	
Hexachloroethane	200	U	240	U	NA	
Indeno(1,2,3-cd)pyrene	9.9	U	25		NA	
Isophorone	320	U	380	U	NA	
N-Nitroso-di-n-propylamine	310	U	360	U	NA	
N-Nitrosodiphenylamine (1)	250	U	290	U	NA	
Naphthalene	0.34	B	15		NA	
Nitrobenzene	290	U	330	U	NA	
Pentachlorophenol	390	U	460	U	NA	
Phenanthrene	9.9	U	33		NA	
Phenol	200	U	240	U	NA	
Pyrene	9.9	U	42		NA	
VOLATILES	**ug/kg**		**ug/kg**			
1,1,1-Trichloroethane	4.9	U	6.7	U	NA	
1,1,2,2-Tetrachloroethane	4.9	U	6.7	U	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	4.9	U	6.7	U	NA	
1,1,2-Trichloroethane	4.9	U	6.7	U	NA	
1,1-Dichloroethane	4.9	U	6.7	U	NA	
1,1-Dichloroethene	4.9	U	6.7	U	NA	
1,2,3-Trichlorobenzene	4.9	U	5.5	B	NA	
1,2,4-Trichlorobenzene	4.9	U	6.7	U	NA	
1,2-Dibromo-3-chloropropane	4.9	U	6.7	U	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP29-0304-01**		**03TP30-0506-01**		**03TP30-0506-01-D**	
Sample Date:	**1/14/2009**		**1/14/2009**		**1/14/2009**	
Duplicate:			**03TP30-0506-01-D**		**03TP30-0506-01**	
1,2-Dibromoethane	4.9	U	6.7	U	NA	
1,2-Dichlorobenzene	4.9	U	6.7	U	NA	
1,2-Dichloroethane	4.9	U	6.7	U	NA	
1,2-Dichloroethene (cis)	4.9	U	6.7	U	NA	
1,2-Dichloroethene (Total)	NA		NA		NA	
1,2-Dichloroethene (trans)	4.9	U	6.7	U	NA	
1,2-Dichloropropane	4.9	U	6.7	U	NA	
1,3-Dichlorobenzene	4.9	U	6.7	U	NA	
1,4-Dichlorobenzene	4.9	U	6.7	U	NA	
2-Butanone	12	U	17	U	NA	
2-Hexanone	12	U	17	U	NA	
4-Methyl-2-pentanone	12	U	17	U	NA	
Acetone	24	J	28	J	NA	
Benzene	4.9	U	2.3	J	NA	
Bromochloromethane	NA		NA		NA	
Bromodichloromethane	4.9	U	6.7	U	NA	
Bromoform	4.9	U	6.7	U	NA	
Bromomethane	4.9	U	6.7	U	NA	
Carbon Disulfide	4.9	U	6.7	U	NA	
Carbon Tetrachloride	4.9	U	6.7	U	NA	
Chlorobenzene	4.9	U	6.7	U	NA	
Chloroethane	4.9	U	6.7	U	NA	
Chloroform	4.9	U	6.7	U	NA	
Chloromethane	4.9	U	6.7	U	NA	
cis-1,3-Dichloropropene	4.9	U	6.7	U	NA	
Cyclohexane	4.9	U	6.7	U	NA	
Dibromochloromethane	4.9	U	6.7	U	NA	
Dichlorodifluoromethane	4.9	U	6.7	U	NA	
Ethylbenzene	4.9	U	6.7	U	NA	
Isopropylbenzene	4.9	U	6.7	U	NA	
M,p-xylene	9.7	U	13	U	NA	
Methyl Acetate	4.9	U	6.7	U	NA	
Methyl Tert-butyl Ether (mtbe)	4.9	U	6.7	U	NA	
Methylcyclohexane	4.9	U	6.7	U	NA	
Methylene Chloride	4.9	U	6.7	U	NA	
O-xylene	4.9	U	6.7	U	NA	
Styrene	4.9	U	6.7	U	NA	
Tetrachloroethene	4.9	U	6.7	U	NA	
Toluene	4.9	U	2.3	B	NA	
trans-1,3-Dichloropropene	4.9	U	6.7	U	NA	
Trichloroethene	4.9	U	6.7	U	NA	
Trichlorofluoromethane	4.9	U	6.7	U	NA	
Vinyl Acetate	NA		NA		NA	
Vinyl Chloride	4.9	U	6.7	U	NA	
Xylene (Total)	4.9	U	6.7	U	NA	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**			
4,4'-DDD	3.9	U	4.8	J	NA	
4,4'-DDE	3.9	U	10	B	NA	
4,4'-DDT	3.9	U	12	J	NA	
Aldrin	2	U	12	U	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP29-0304-01**		**03TP30-0506-01**		**03TP30-0506-01-D**	
Sample Date:	**1/14/2009**		**1/14/2009**		**1/14/2009**	
Duplicate:			**03TP30-0506-01-D**		**03TP30-0506-01**	
Alpha-BHC	2	U	12	U	NA	
Alpha-Chlordane	2.9	R	11	J	NA	
Aroclor-1016	29	U	170	U	NA	
Aroclor-1221	40	U	240	U	NA	
Aroclor-1232	20	U	120	U	NA	
Aroclor-1242	20	U	120	U	NA	
Aroclor-1248	20	U	120	U	NA	
Aroclor-1254	20	U	120	U	NA	
Aroclor-1260	20	U	96	J	NA	
Aroclor-1262	NA		NA		NA	
Aroclor-1268	NA		NA		NA	
Beta-BHC	1	U	5.9	U	NA	
Delta-BHC	2	U	12	U	NA	
Dieldrin	3.9	U	100		NA	
Endosulfan I	2	U	1.2	J	NA	
Endosulfan II	3.9	U	23	U	NA	
Endosulfan Sulfate	3.9	U	23	U	NA	
Endrin	3.9	U	23	U	NA	
Endrin Aldehyde	3.9	U	23	U	NA	
Endrin Ketone	3.9	U	23	U	NA	
Gamma-BHC (Lindane)	2	U	12	U	NA	
Gamma-Chlordane	1.7	J	9.4	J	NA	
Heptachlor	2	U	12	U	NA	
Heptachlor Epoxide	2	U	3	J	NA	
Methoxychlor	20	U	120	U	NA	
Toxaphene	99	U	580	U	NA	
DIOXINS/FURANS			**ng/kg**		**ng/kg**	
1,2,3,4,6,7,8-HpCDD	NA		651		424	
1,2,3,4,6,7,8-HpCDF	NA		840		674	
1,2,3,4,7,8,9-HpCDF	NA		60.8		63.7	
1,2,3,4,7,8-HxCDD	NA		38.2		24.9	
1,2,3,4,7,8-HxCDF	NA		246	IEMP	216	IEMP
1,2,3,6,7,8-HxCDD	NA		67.8		46.3	
1,2,3,6,7,8-HxCDF	NA		214	IEMP	156	IEMP
1,2,3,7,8,9-HxCDD	NA		55.3		39.2	
1,2,3,7,8,9-HxCDF	NA		53.6		37.7	
1,2,3,7,8-PeCDD	NA		42.8		34.8	
1,2,3,7,8-PeCDF	NA		139	IEMP	98.2	IEMP
2,3,4,6,7,8-HxCDF	NA		293		193	
2,3,4,7,8-PeCDF	NA		256		188	
2,3,7,8-TCDD	NA		17.5		15.2	
2,3,7,8-TCDF	NA		146		104	
OCDD	NA		5490	J	4130	
OCDF	NA		393	J	1660	J
Total 2,3,7,8-TCDD Equiv.	NA		270		204	
Total HpCDD	NA		1350		871	
Total HpCDF	NA		1210		967	
Total HxCDD	NA		1310		804	
Total HxCDF	NA		2320	IEMP	1570	IEMP
Total PeCDD	NA		1000	J	665	J
Total PeCDF	NA		2990	IEMP	2020	IEMP
Total TCDD	NA		838		612	
Total TCDF	NA		4250	IEMP	2790	J

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
D -- Result is reported from a diluted result.
EMPC -- Estimated Maximum Positive Concentration.
IEMPC -- Interference Estimated Maximum Positive Concentration.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SD-12**		**03-SD-13**		**03-SD-14**		**03-SD-15**		**03-SD-15-D**		**03-SD-16**		**03-SD-17**	
Sample Date:	**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:														
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	7810		5110		10200		7440		10700		8040		16400	
Antimony	1.2	B	0.93	B	1.3	B	0.9	B	1	B	0.64	B	2.3	B
Arsenic	5		0.9	B	3.1		1.2	B	1.8	B	1.9	B	11.1	
Barium	88		49.6		91		89.1		127		59.6		121	
Beryllium	0.77	K	0.5	B	0.84	K	0.6	B	0.81		0.72	K	1.9	K
Cadmium	0.48	L	0.06	U	0.29	L	0.41		0.34		0.05	UR	0.1	UR
Calcium	1820		1080		1100		889		950		946		2290	
Chromium	12.5		8.9		16.2		10.7		15.6		12		34.8	
Cobalt	3		2.5		4.1		2.8		4.4		4.3		11.3	
Copper	17.2		8.4		15.5		14.9		19		11.9		30.5	
Cyanide	0.17	U	0.16	U	0.15	U	0.16	U	0.17	U	0.12	U	0.26	U
Iron	14700		7090		12400		6470		8460		10000		37600	
Lead	27.4	J	12	J	37.7	J	21.3	J	29.6	J	12.4	J	95.6	J
Magnesium	1030		676		1360		838		1200		1730		2990	
Manganese	183	J	411	J	152	J	52.7	J	71.9	J	87.7	J	631	J
Mercury	0.048		0.026	U	0.061		0.062		0.052		0.038		0.052	
Nickel	7.1		5		9.8		6.6		9		7.7		18.5	
Potassium	337	J	305	J	469	J	347	J	414	J	810	J	1500	J
Selenium	1.1	K	1	K	0.69	U	1.2	K	0.92	K	0.58	U	1.2	U
Silver	0.11	U	0.1	U	0.09	U	0.1	U	0.1	U	0.08	U	0.16	U
Sodium	484	K	459	K	416	K	455	K	455	K	366	K	719	K
Thallium	0.84	UL	0.78	UL	0.73	UL	0.8	UL	0.79	UL	0.62	UL	1.3	UL
Vanadium	19.6		11.9		23.8		15.5		21.4		19		62.1	
Zinc	64.3		29		52.8		25.7		35.6		25.6		134	
MISCELLANEOUS PARAMETERS														
Total Organic Carbon	NA		NA		NA		NA		NA		NA		NA	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1-Biphenyl	290	U	280	U	270	U	280	U	290	U	220	U	460	U
1,2,4,5-Tetrachlorobenzene	290	U	280	U	270	U	280	U	290	U	220	U	460	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	440	U	430	U	410	U	430	U	450	U	330	U	700	U
2,3,4,6-Tetrachlorophenol	290	U	280	U	270	U	280	U	290	U	220	U	460	U
2,4,5-Trichlorophenol	410	U	400	U	380	U	400	U	410	U	310	U	650	U
2,4,6-Trichlorophenol	420	U	420	U	400	U	420	U	430	U	320	U	680	U
2,4-Dichlorophenol	420	U	420	U	400	U	420	U	430	U	320	U	680	U
2,4-Dimethylphenol	310	U	300	U	290	U	300	U	310	U	230	U	490	U
2,4-Dinitrophenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
2,4-Dinitrotoluene	440	U	430	U	410	U	430	U	450	U	330	U	700	U
2,6-Dinitrotoluene	390	U	380	U	370	U	380	U	400	U	290	U	620	U
2-Chloronaphthalene	470	U	470	U	440	U	470	U	480	U	360	U	760	U
2-Chlorophenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
2-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA	
2-Methylphenol	490	U	480	U	460	U	480	U	500	U	370	U	780	U
2-Nitroaniline	560	U	550	U	520	U	550	U	570	U	420	U	890	U
2-Nitrophenol	390	U	380	U	370	U	380	U	400	U	290	U	620	U
3,3'-Dichlorobenzidine	420	U	420	U	400	U	420	U	430	U	320	U	680	U
3-Nitroaniline	560	U	550	U	520	U	550	U	570	U	420	U	890	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SD-12**		**03-SD-13**		**03-SD-14**		**03-SD-15**		**03-SD-15-D**		**03-SD-16**		**03-SD-17**	
Sample Date:	**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:														
4,6-Dinitro-2-methylphenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
4-Bromophenyl Phenyl Ether	320	U	320	U	300	U	320	U	330	U	240	U	510	U
4-Chloro-3-methylphenol	420	U	420	U	400	U	420	U	430	U	320	U	680	U
4-Chloroaniline	440	U	430	U	410	U	430	U	450	U	330	U	700	U
4-Chlorophenyl Phenyl Ether	390	U	380	U	370	U	380	U	400	U	290	U	620	U
4-Methylphenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
4-Nitroaniline	560	U	550	U	520	U	550	U	570	U	420	U	890	U
4-Nitrophenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
Acenaphthene	NA		NA		NA		NA		NA		NA		NA	
Acenaphthylene	NA		NA		NA		NA		NA		NA		NA	
Acetophenone	420	U	420	U	400	U	420	U	430	U	320	U	680	U
Anthracene	NA		NA		NA		NA		NA		NA		NA	
Atrazine	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Benz(a)anthracene	NA		NA		NA		NA		NA		NA		NA	
Benzaldehyde	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Benzo(a)pyrene	NA		NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	NA		NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	NA		NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	NA		NA		NA		NA		NA		NA		NA	
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	410	U	400	U	380	U	400	U	410	U	310	U	650	U
Bis(2-chloroethyl)ether	470	U	470	U	440	U	470	U	480	U	360	U	760	U
Bis(2-ethylhexyl)phthalate	390	U	380	U	370	U	380	U	400	U	290	U	620	U
Butylbenzylphthalate	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Caprolactam	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Carbazole	230	J	79	J	240	J	280	U	290	U	220	U	460	U
Chrysene	NA		NA		NA		NA		NA		NA		NA	
Di-n-butylphthalate	390	U	380	U	370	U	380	U	400	U	290	U	620	U
Di-n-octylphthalate	370	U	370	U	350	U	370	U	380	U	280	U	590	U
Dibenz(a,h)anthracene	NA		NA		NA		NA		NA		NA		NA	
Dibenzofuran	420	U	420	U	400	U	420	U	430	U	320	U	680	U
Diethylphthalate	390	U	380	U	370	U	380	U	400	U	290	U	620	U
Dimethylphthalate	440	U	430	U	410	U	430	U	450	U	330	U	700	U
Fluoranthene	NA		NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	370	U	370	U	350	U	370	U	380	U	280	U	590	U
Hexachlorobutadiene	490	U	480	U	460	U	480	U	500	U	370	U	780	U
Hexachlorocyclopentadiene	370	UL	370	UL	350	UL	370	UL	380	UL	280	UL	590	UL
Hexachloroethane	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		NA		NA		NA	
Isophorone	460	U	450	U	430	U	450	U	470	U	350	U	730	U
N-Nitroso-di-n-propylamine	440	U	430	U	410	U	430	U	450	U	330	U	700	U
N-Nitrosodiphenylamine (1)	360	U	350	U	330	U	350	U	360	U	270	U	570	U
Naphthalene	NA		NA		NA		NA		NA		NA		NA	
Nitrobenzene	410	U	400	U	380	U	400	U	410	U	310	U	650	U
Pentachlorophenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
Phenanthrene	NA		NA		NA		NA		NA		NA		NA	
Phenol	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Pyrene	NA		NA		NA		NA		NA		NA		NA	
PAHs (SIM)	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1-Methylnaphthalene	39		9.9	B	75		3.8	B	4.5	B	2.6	B	9.7	B

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SD-12**		**03-SD-13**		**03-SD-14**		**03-SD-15**		**03-SD-15-D**		**03-SD-16**		**03-SD-17**	
Sample Date:	**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:														
2-Methylnaphthalene	37		10	B	65		4.1	B	4.6	B	3.7	B	18	B
Acenaphthene	97		16	B	200	J	12	B	9.7	B	8.4	B	10	B
Acenaphthylene	190	J	52		280	J	33		29	B	16	B	100	
Anthracene	490	J	79		700	J	70		51		30		120	
Benz(a)anthracene	910	J	170	J	1200	J	250	J	140	J	61		200	J
Benzo(a)pyrene	990	J	250	J	1400	J	270	J	190	J	75		310	J
Benzo(b)fluoranthene	2500		320	J	2000	J	340	J	230	J	80		320	
Benzo(g,h,i)perylene	570	J	180	J	970	J	170	J	130	J	52		250	J
Benzo(k)fluoranthene	800	J	230	J	1400	J	250	J	190	J	89	J	330	J
Chrysene	2300		280	J	1800	J	310	J	200	J	89	J	290	J
Dibenz(a,h)anthracene	260	J	63		380	J	50		35	B	14	B	76	
Fluoranthene	6400		630		9600		640		530		210		420	
Fluorene	170	J	29		290	J	20	B	17	B	13	B	11	B
Indeno(1,2,3-cd)pyrene	780	J	220	J	1300	J	220	J	160	J	64		290	J
Naphthalene	47		13	B	89		4.7	B	5.6	B	3	B	12	B
Phenanthrene	4300		400		7200		320	J	260	J	130	J	180	
Pyrene	4700		470		6800		480		390		150		420	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1,2,2-Tetrachloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1,2-Trichloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1,2-Trichlorotrifluoroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1-Dichloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1-Dichloroethene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2,3-Trichlorobenzene	9.3	B	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2,4-Trichlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dibromo-3-chloropropane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dibromoethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichloroethene (cis)	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichloropropane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,3-Dichlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,4-Dichlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
2-Butanone	30	U	15	J	13	J	31		22	U	14	U	20	J
2-Hexanone	30	U	26	U	23	U	23	U	22	U	14	U	29	U
4-Methyl-2-pentanone	30	U	26	U	23	U	23	U	22	U	14	U	29	U
Acetone	120		140		60		110	J	36	J	26		180	
Benzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Bromodichloromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Bromoform	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Bromomethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Carbon Disulfide	12	U	6.2	J	9.4	U	9.1	U	2.6	J	2	J	11	U
Carbon Tetrachloride	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Chlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Chloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Chloroform	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Chloromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
cis-1,3-Dichloropropene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Cyclohexane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SD-12**		**03-SD-13**		**03-SD-14**		**03-SD-15**		**03-SD-15-D**		**03-SD-16**		**03-SD-17**	
Sample Date:	**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:														
Dibromochloromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Dichlorodifluoromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Ethylbenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Isopropylbenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
M+p-xylenes	24	U	20	U	19	U	18	U	18	U	12	U	23	U
Methyl Acetate	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Methyl Cyclohexane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Methyl Tert-butyl Ether	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Methylene Chloride	3	B	2.4	B	2.6	B	2.2	B	8.8	U	1.7	B	3.1	B
O-xylene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Styrene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Tetrachloroethene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Toluene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
trans-1,3-Dichloropropene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Trichloroethene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Trichlorofluoromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Xylene (Total)	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	2.2	J	5.5	UJ	26	U	28	U	28	U	4.2	U	8.9	UJ
4,4'-DDE	15	R	3.3	J	29	J	28	U	28	U	4.2	U	6.8	J
4,4'-DDT	6.5		2.4	J	11	J	28	U	28	U	4.2	U	7.4	J
Aldrin	2.1	J	2.1	J	3.8	J	8.1	J	8.1	J	0.85	J	4.6	UJ
Alpha-BHC	2.9	U	2.8	UJ	13	U	14	U	15	U	2.2	U	4.6	UJ
Alpha-Chlordane	8.4	J	3.8	B	7.2	B	4.6	B	6.1	B	4.6	J	6.6	B
Beta-BHC	1.4	U	1.4	UJ	6.8	U	7.1	U	7.3	U	9.8	R	2.3	UJ
Delta-BHC	0.38	J	2.8	UJ	13	U	14	U	15	U	2.2	U	4.6	UJ
Dieldrin	36		17	J	43		46		47		4.4		24	J
Endosulfan I	2.4	R	2.8	UJ	13	U	14	U	15	U	2.2	U	4.6	UJ
Endosulfan II	5.6	U	5.5	UJ	26	U	28	U	15	J	4.2	U	8.9	UJ
Endosulfan Sulfate	5.6	U	5.5	UJ	26	U	28	U	28	U	4.2	U	8.9	UJ
Endrin	5.6	U	5.5	UJ	26	U	28	U	28	U	4.2	U	8.9	UJ
Endrin Aldehyde	8.9	J	5.1	R	26	R	28	U	28	U	0.94	J	3.5	J
Endrin Ketone	3.6	J	2.8	J	26	U	28	U	28	U	4.2	U	6.4	J
Gamma-BHC (Lindane)	2.9	U	2.8	UJ	13	U	14	U	15	U	2.2	U	4.6	UJ
Gamma-Chlordane	5.9	R	1.3	J	3.6	J	5.2	J	5.7	J	1.4	J	8.3	R
Heptachlor	2.9	U	0.81	J	13	U	14	U	15	U	2.2	U	0.98	J
Heptachlor Epoxide	6.1	R	2.8	UJ	13	U	14	U	15	U	1.4	R	2.9	J
Methoxychlor	11	J	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Toxaphene	140	U	140	UJ	660	U	690	U	720	U	110	U	220	UJ
Aroclor-1016	41	U	40	UJ	190	U	200	U	210	U	31	U	65	UJ
Aroclor-1221	58	U	57	UJ	270	U	280	U	290	U	44	U	92	UJ
Aroclor-1232	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Aroclor-1242	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Aroclor-1248	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Aroclor-1254	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Aroclor-1260	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**		**03SB03**		**03SB05**		**03SB06**		**03SB06-D**		**03SB07**		**03SB08**		**03SB09**		**03SB10**		**03SB11**		**03SB12**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**	
Duplicate:							**03SB06-D**		**03SB06**													
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	13600		15500		14200		9010		11400		15000		15200		14800		15700		16200		19400	
Antimony	10.4		9.3	U	10.1	U	9.8	U	9.9	U	9.7	U	9.6	U	9.8	U	10	U	8.9	U	8.9	U
Arsenic	5.9		3.9		5.2		4.6		4.9		4		4.9		4		13		4.4		4	
Barium	103		77.9		74.9		47.6		69.9		96.8		79.4		76.8		78.5		84.6		139	
Beryllium	1.4		1.2		1.3		1.1		1.1		1.3		1.3		1.3		1.3		1.2		1.2	
Cadmium	3.6		2.7		3.1		1.7		2.9		2.6		2.6		2.2		2.9		2.6		2.4	
Calcium	11100		4840		2370		86400		22500		3760		1790		1750		4760		3240		24400	
Chromium	25.6		23.3		25.6		15.7		21.6		25		24.6		24.9		25.1		26.6		21.7	
Cobalt	7.7		9.3		8.3		5.2		7.7		9.5		10.1		9.8		10		8.3		8.1	
Copper	37.6		17.6		18		10.7		13.9		26		14.8		15.1		14.7		15.1		11.2	
Cyanide	2.4	U	1.6	U	2.5	U	1.4	U	1.9	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	2.3	U
Iron	24400		23900		23100		14000		18500		24000		24700		23100		25100		24900		21000	
Lead	59.6		35.7		44.5		22.8		29.1		61.7		18.6		21.5		39.2		24.9		14.9	
Magnesium	6980		3790		2340		50200		12800		2730		2330		2160		3570		2530		5870	
Manganese	432		437		360		318		425		518		499		425		412		566		955	
Mercury	0.1		0.11	U	0.1	U	0.09	U	0.1	U	0.11	U	0.1	U	0.1	U	0.09	U	0.09	U	0.1	U
Nickel	13.4		12.5		11.7		29.9		39		12.3		10.9		11.6		12.7		12.5		10.1	
Potassium	823		883		845		570		658		923		952		779		1010		942		1130	
Selenium	0.82	U	0.76	U	0.87	U	0.77	U	0.8	U	0.87	U	0.9	U	0.93	U	0.83	U	0.88	U	0.78	U
Silver	1.4	U	1.2	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.2	U	1.2	U
Sodium	1010	U	924	U	1000	U	973	U	981	U	957	U	953	U	971	U	989	U	882	U	884	
Thallium	0.45		0.41		0.55		0.57		0.53		0.66		0.47		0.56		0.59		0.58		0.42	
Vanadium	34.9		34.9		32.8		18.6		24		34.9		33.6		35.1		36.7		37.5		30.8	
Zinc	78		48		49.9		35.2		37.5		49.5		40.5		46.9		41.4		42.6		33.9	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	390	U	3000	U	370	U	19000	U	7500	U	150	J	370	U	390	U	380	U	560	U	370	U
1,2-Dichlorobenzene	170	J	3000	U	41	J	19000	U	7500	U	330	J	39	J	390	U	380	U	82	J	370	U
1,3-Dichlorobenzene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
1,4-Dichlorobenzene	160	J	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
2,4,6-Trichlorophenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,4-Dichlorophenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,4-Dimethylphenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,4-Dinitrophenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
2,4-Dinitrotoluene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,6-Dinitrotoluene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2-Chloronaphthalene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2-Chlorophenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2-Methylnaphthalene	390	U	630	J	370	U	9500	J	4300	J	740	U	370	U	390	U	380	U	560	U	370	U
2-Methylphenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2-Nitroaniline	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
2-Nitrophenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
3,3'-Dichlorobenzidine	780	U	6000	U	750	U	38000	U	15000	U	1500	U	740	U	780	U	770	U	1100	U	740	U
3-Nitroaniline	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
4,6-Dinitro-2-methylphenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
4-Bromophenyl Phenyl Ether	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**		**03SB03**		**03SB05**		**03SB06**		**03SB06-D**		**03SB07**		**03SB08**		**03SB09**		**03SB10**		**03SB11**		**03SB12**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**	
Duplicate:							**03SB06-D**		**03SB06**													
4-Chloro-3-methylphenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
4-Chloroaniline	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
4-Chlorophenyl Phenyl Ether	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
4-Methylphenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
4-Nitroaniline	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
4-Nitrophenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
Acenaphthene	95	J	3200		110	J	33000		13000		740	U	370	U	390	U	380	U	560	U	370	U
Acenaphthylene	160	J	3000	U	38	J	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	340	J	8300		440		66000		27000		740	U	370	U	390	U	380	U	150	J	370	U
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	1600		12000		1100		65000		24000		280	J	110	J	99	J	100	J	450	J	120	J
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	1400		9300		870		48000		20000		310	J	120	J	120	J	100	J	400	J	130	J
Benzo(b)fluoranthene	1600		11000		890		58000		17000		330	J	370	U	120	J	120	J	430	J	140	J
Benzo(g,h,i)perylene	390		2400	J	280	J	13000	J	6400	J	98	J	50	J	46	J	47	J	110	J	43	J
Benzo(k)fluoranthene	1100		7400		780		31000		18000		320	J	370	U	100	J	90	J	400	J	110	J
Benzoic Acid	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
Benzyl Alcohol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Bis(2-chloroethoxy)methane	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Bis(2-chloroethyl)ether	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Bis(2-ethylhexyl)phthalate	84	J	3000	U	87	J	19000	U	7500	U	740	U	38	J	68	J	56	J	79	J	370	U
Butylbenzylphthalate	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Chrysene	1500		11000		1000		52000		21000		300	J	110	J	120	J	120	J	450	J	130	J
Di-n-butylphthalate	70	B	3000	U	89	B	19000	U	7500	U	740	U	88	B	85	B	82	B	560	U	45	B
Di-n-octylphthalate	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Dibenz(a,h)anthracene	49	J	420	J	93	J	4800	J	810	J	740	U	370	U	390	U	380	U	560	U	370	U
Dibenzofuran	140	J	3000	U	73	J	29000		11000		740	U	370	U	390	U	380	U	560	U	370	U
Diethylphthalate	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Dimethylphthalate	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Fluoranthene	3000		28000		2000		150000		62000		440	J	220	J	240	J	240	J	880		290	J
Fluorene	290	J	4900		150	J	41000		16000		740	U	370	U	390	U	380	U	560	U	370	U
Hexachlorobenzene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Hexachlorobutadiene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Hexachlorocyclopentadiene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Hexachloroethane	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Indeno(1,2,3-cd)pyrene	520		3500		370	U	19000		8600		740	U	59	J	58	J	55	J	140	J	53	J
Isophorone	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
N-Nitroso-di-n-propylamine	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
N-Nitrosodiphenylamine (1)	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Naphthalene	99	J	3000	U	370	U	13000	J	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Nitrobenzene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Pentachlorophenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
Phenanthrene	2600		34000		1700		210000		92000		190	J	140	J	150	J	170	J	600		160	J
Phenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Pyrene	3200		25000		2300		140000		48000		490	J	210	J	220	J	270	J	1000		270	J
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	2	B	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	3	B	6	U
1,1,2,2-Tetrachloroethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**		**03SB03**		**03SB05**		**03SB06**		**03SB06-D**		**03SB07**		**03SB08**		**03SB09**		**03SB10**		**03SB11**		**03SB12**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**	
Duplicate:							**03SB06-D**		**03SB06**													
1,1,2-Trichloroethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethene	6	U	6	U	2	B	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (Total)	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloropropane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	12	U	12	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
2-Hexanone	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
4-Methyl-2-pentanone	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Acetone	2	B	5	B	5	B	12	B	6	B	5	B	8	B	12	U	7	B	11	U	11	U
Benzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Bromoform	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Bromomethane	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Carbon Disulfide	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Carbon Tetrachloride	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Chlorobenzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Chloroethane	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Chloroform	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Chloromethane	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
cis-1,3-Dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibromochloromethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Ethylbenzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	5	B	3	B	2	B	2	B	6	U	2	B	2	B	1	B	1	B	6	U	6	U
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Tetrachloroethene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Toluene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
trans-1,3-Dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Trichloroethene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Acetate	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Vinyl Chloride	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Xylene (Total)	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**		**03SB03**		**03SB05**		**03SB06**		**03SB06-D**		**03SB07**		**03SB08**		**03SB09**		**03SB10**		**03SB11**		**03SB12**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**	
Duplicate:							**03SB06-D**		**03SB06**													
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
4,4'-DDE	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
4,4'-DDT	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Aldrin	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Alpha-BHC	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Alpha-Chlordane	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1016	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1221	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1232	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1242	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1248	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1254	1900	U	180	U	180	U	1800	U	1800	U	890	U	180	U	190	U	180	U	180	U	180	U
Aroclor-1260	1900	U	180	U	180	U	1800	U	1800	U	890	U	180	U	190	U	180	U	180	U	180	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Delta-BHC	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Dieldrin	580		210		140		260		220		290		91		120		95		120		27	
Endosulfan I	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	23		9	U
Endosulfan II	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Endosulfan Sulfate	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Endrin	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Gamma-BHC (Lindane)	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Gamma-Chlordane	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Heptachlor	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Heptachlor Epoxide	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Methoxychlor	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Toxaphene	1900	U	180	U	180	U	1800	U	1800	U	890	U	180	U	190	U	180	U	180	U	180	U
DIOXIN/FURANS																						
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**	**03SB03**	**03SB05**	**03SB06**	**03SB06-D**	**03SB07**	**03SB08**	**03SB09**	**03SB10**	**03SB11**	**03SB12**
Sample Date:	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**
Duplicate:				**03SB06-D**	**03SB06**						
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB13**		**03SB14**		**03SB14-D**		**03SB15**		**03SB16**		**03SS01**		**03SS01**		**03SS02**		**03SS02**		**03SS03**		**03SS03**		**03SS04**		**03SS04**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:			**03SB14-D**		**03SB14**																					
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	15100		14500		14100		16000		13900		12700		16100		14500		8200		12600		21400		14500		15200	
Antimony	8.9	U	9.1	U	9.5	U	10	U	9.6	U	7.4	B	6.5	R	6.8	UL	5.2	UJ	8.3	B	4.8	UJ	9.8	B	8.6	R
Arsenic	4.3		3.8		3.6		3.2		3.3		3.8	J	5.7		7	J	5.6		7.1	J	4.6	J	8.3	J	3	J
Barium	81.3		81.3		79.4		78.4		68.7		66		85.7		95.7		88.3		113		133		100		86.1	
Beryllium	1.2		1.2		1.3		1.3		1.3		0.71	B	0.71		0.85	B	0.73		0.67	B	0.76		0.82	B	0.75	
Cadmium	2.4		3.2		1.9		3.3		1.7		1.2	B	1.2	U	0.85	U	1.3	U	0.67	U	1.2	U	0.65	U	1.2	U
Calcium	2840		2080		2940		2270		2640		3260		624		1180		870		989		492		1080		707	
Chromium	23.8		24.3		21.1		26.3		19.9		24.4		14.5		19.7		12.5		15.8		12.6		20.3		19.9	
Cobalt	7.9		8.3		8.7		12.2		6.2		8.3		9.1		7.4		5.6		7.5		10.6		8.2		8.8	
Copper	13.8		23.5		15.2		11.1		12.4		17.3		20		12.5		10		11.6		26.2		14.2		19.1	
Cyanide	2.2	U	2.1	U	2.2	U	2	U	2.2	U	2.4	U	0.61	U	2	U	0.65	U	2	U	0.59	U	2.1	U	0.6	U
Iron	22700		23100		20700		29700		18400		21800		19400		16400		14300		15100		20100		17000		24200	
Lead	27.7		33.1		22		16.2		12		16.5		10.2		22.1		25.2		40.5		8.9		28.4		16.8	
Magnesium	2420		2260		2330		2820		1860		2400		1310		1760		1060		1550		1030		1750		1910	
Manganese	334		473		467		444		394		423	J	550		589	J	424		793	J	767		754	J	474	
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.11	U	0.12		0.12	U	0.1		0.13	U	0.09	U	0.12	U	0.09	U	0.12	U
Nickel	10.6		12.2		10.4		13.4		9.4		10.3		11		12.1		6.3		10.5		12.6		10.8		13.3	
Potassium	861		823		804		1570		593		821		454		650		390	U	536		484		593		717	
Selenium	0.85	U	0.87	U	0.86	U	0.81	U	0.81	U	1.1	U	1.2	UR	1.1	U	0.26	UR	0.81	U	1.2	UR	1	U	0.24	UR
Silver	1.2	U	1.2	U	1.3	U	1.3	U	1.3	U	1.2	UL	1.2	U	1.5	UL	1.3	U	1.2	UL	1.2	U	1.1	UL	1.2	U
Sodium	876	U	902	U	940	U	991	U	935	U	649		97.7	U	459		104	U	412		95.2	U	437		104	
Thallium	0.45		0.49		0.43	U	0.52		0.5		0.22	U	0.35	L	0.21	U	0.28	L	0.16	U	0.26	L	0.2	U	0.28	L
Vanadium	33.3		33.2		30.2		38.1		27.8		32.6		27.1		27.4		22.8		23.6		26.4		28.1		33.8	
Zinc	44.1		41.5		40.6		40.1		30		48.3	J	29.1		44.5	J	36.3		42.1	J	24.5		44.8	J	43.7	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
1,2-Dichlorobenzene	380	U	290	J	320	J	360	U	370	U	64	J	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
1,3-Dichlorobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
1,4-Dichlorobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	40	J	390	UJ	380	U	400	UJ
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
2,4,6-Trichlorophenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,4-Dichlorophenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,4-Dimethylphenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,4-Dinitrophenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	UJ	1000	UJ
2,4-Dinitrotoluene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,6-Dinitrotoluene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Chloronaphthalene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Chlorophenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Methylnaphthalene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Methylphenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Nitroaniline	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
2-Nitrophenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
3,3'-Dichlorobenzidine	770	U	1500	U	1500	U	730	U	740	U	760	U	400	UJ	740	U	430	UJ	740	U	390	UJ	760	U	400	UJ
3-Nitroaniline	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
4,6-Dinitro-2-methylphenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
4-Bromophenyl Phenyl Ether	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB13**		**03SB14**		**03SB14-D**		**03SB15**		**03SB16**		**03SS01**		**03SS01**		**03SS02**		**03SS02**		**03SS03**		**03SS03**		**03SS04**		**03SS04**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:			**03SB14-D**		**03SB14**																					
4-Chloro-3-methylphenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
4-Chloroaniline	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
4-Chlorophenyl Phenyl Ether	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
4-Methylphenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
4-Nitroaniline	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
4-Nitrophenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
Acenaphthene	380	U	740	U	130	J	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Acenaphthylene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	380	U	200		450	J	360	U	370	U	100	J	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	120	J	1200		1100		150	J	120	J	410		400	UJ	49	J	46	J	48	J	390	UJ	46	J	400	UJ
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	120	J	1700		880		170	J	120	J	450		400	UJ	54	J	50	J	62	J	390	UJ	59	J	400	UJ
Benzo(b)fluoranthene	130	J	1700		880		180	J	150	J	420		400	UJ	76	J	430	UJ	82	J	390	UJ	84	J	400	UJ
Benzo(g,h,i)perylene	54	J	840		390	J	79	J	370	U	180	J	400	UJ	370	U	430	UJ	39	J	390	UJ	380	U	400	UJ
Benzo(k)fluoranthene	100	J	1200		810		130	J	130	J	520	J	400	UJ	44	J	430	UJ	65	J	390	UJ	44	J	400	UJ
Benzoic Acid	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	NA		1800	U	NA		1800	U	NA		1800	U	NA	
Benzyl Alcohol	380	U	740	U	760	U	360	U	370	U	380	U	NA		370	U	NA		370	U	NA		380	U	NA	
Bis(2-chloroethoxy)methane	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Bis(2-chloroethyl)ether	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Bis(2-ethylhexyl)phthalate	52	J	740	U	760	U	360	U	360	J	110	J	120	B	42	J	180	B	48	J	120	B	380	U	160	B
Butylbenzylphthalate	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		400	UJ	NA		430	UJ	NA		390	UJ	NA		400	UJ
Chrysene	140	J	1300		1000		150	J	140	J	490		400	UJ	68	J	65	J	84	J	390	UJ	85	J	400	UJ
Di-n-butylphthalate	45	B	740	U	760	U	55	B	72	B	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Di-n-octylphthalate	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Dibenz(a,h)anthracene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Dibenzofuran	380	U	740	U	120	J	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Diethylphthalate	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Dimethylphthalate	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Fluoranthene	250	J	2200		2300		270	J	230	J	910		400	UJ	150	J	120	J	190	J	390	UJ	200	J	48	J
Fluorene	380	U	87	J	240	J	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Hexachlorobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Hexachlorobutadiene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Hexachlorocyclopentadiene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	UJ	430	UJ	370	U	390	UJ	380	U	400	UJ
Hexachloroethane	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Indeno(1,2,3-cd)pyrene	68	J	930		490	U	94	J	46	J	210	J	400	UJ	370	U	430	UJ	45	J	390	UJ	380	U	400	UJ
Isophorone	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
N-Nitroso-di-n-propylamine	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
N-Nitrosodiphenylamine (1)	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Naphthalene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Nitrobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Pentachlorophenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
Phenanthrene	150	J	1100		2300		130	J	130	J	490		400	UJ	82	J	71	J	120	J	390	UJ	150	J	400	UJ
Phenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Pyrene	240	J	2300		2400		330	J	240	J	930		400	UJ	110	J	100	J	130	J	390	UJ	140	J	44	J
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**				**ug/kg**				**ug/kg**				**ug/kg**			
1,1,1-Trichloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,1,2,2-Tetrachloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03SB13		03SB14		03SB14-D		03SB15		03SB16		03SS01		03SS01		03SS02		03SS02		03SS03		03SS03		03SS04		03SS04	
Sample Date:	9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997	
Duplicate:			03SB14-D		03SB14																					
1,1,2-Trichloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,1-Dichloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,1-Dichloroethene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (Total)	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloropropane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA	
2-Hexanone	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA	
4-Methyl-2-pentanone	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Acetone	11	U	11	U	11	U	6	B	11	U	11	U	NA		4	B	NA		11	U	NA		4	B	NA	
Benzene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Bromoform	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Bromomethane	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Carbon Disulfide	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Carbon Tetrachloride	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Chlorobenzene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Chloroethane	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Chloroform	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Chloromethane	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA	
cis-1,3-Dichloropropene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibromochloromethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Ethylbenzene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	6	U	5	U	6	U	5	U	2	B	2	B	NA		2	B	NA		2	B	NA		2	B	NA	
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Tetrachloroethene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Toluene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
trans-1,3-Dichloropropene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Trichloroethene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Acetate	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Vinyl Chloride	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Xylene (Total)	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB13**		**03SB14**		**03SB14-D**		**03SB15**		**03SB16**		**03SS01**		**03SS01**		**03SS02**		**03SS02**		**03SS03**		**03SS03**		**03SS04**		**03SS04**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:			**03SB14-D**		**03SB14**																					
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	18	U	89	U	18	U	17	U	19	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
4,4'-DDE	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	3.3	J
4,4'-DDT	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4.1	J
Aldrin	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Alpha-BHC	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Alpha-Chlordane	92	U	440	U	91	U	87	U	89	U	91	U	2.1	UJ	90	U	2.2	UJ	90	U	2	UJ	92	U	2	UJ
Aroclor-1016	92	U	440	U	91	U	87	U	89	U	91	U	40	UJ	90	U	43	UJ	90	U	39	UJ	92	U	40	UJ
Aroclor-1221	92	U	440	U	91	U	87	U	89	U	91	U	82	UJ	90	U	87	UJ	90	U	80	UJ	92	U	81	UJ
Aroclor-1232	92	U	440	U	91	U	87	U	89	U	91	U	40	UJ	90	U	43	UJ	90	U	39	UJ	92	U	40	UJ
Aroclor-1242	92	U	440	U	91	U	87	U	89	U	91	U	40	UJ	90	U	43	UJ	90	U	39	UJ	92	U	40	UJ
Aroclor-1248	92	U	440	U	91	U	87	U	89	U	91	U	40	UJ	90	U	43	UJ	90	U	39	UJ	92	U	40	UJ
Aroclor-1254	180	U	890	U	180	U	170	U	180	U	180	U	40	UJ	180	U	43	UJ	180	U	39	UJ	180	U	13	J
Aroclor-1260	180	U	890	U	180	U	170	U	180	U	180	U	40	UJ	180	U	43	UJ	180	U	39	UJ	180	U	40	UJ
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Delta-BHC	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Dieldrin	130		290		150		17	U	18	U	68		4.5	J	37		18	J	140		3.9	UJ	75		5.1	J
Endosulfan I	30		44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Endosulfan II	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
Endosulfan Sulfate	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
Endrin	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		4	UJ	NA		4.3	UJ	NA		3.9	UJ	NA		4	UJ
Endrin Ketone	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
Gamma-BHC (Lindane)	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Gamma-Chlordane	92	U	490	U	91	U	87	U	89	U	91	U	2.1	UJ	90	U	2.2	UJ	90	U	2	UJ	92	U	2	UJ
Heptachlor	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Heptachlor Epoxide	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	12		2	UJ	9.2	U	2	UJ
Methoxychlor	92	U	440	U	91	U	87	U	89	U	91	U	21	UJ	90	U	22	UJ	90	U	20	UJ	92	U	20	UJ
Toxaphene	180	U	890	U	180	U	170	U	180	U	180	U	210	UJ	180	U	220	UJ	180	U	200	UJ	180	U	200	UJ
DIOXIN/FURANS																									**ng/kg**	
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		86.8	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		13.1	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		1.3	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		1.4	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		8.3	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		1.8	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		2.4	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		3.1	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.3	U
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.91	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		5.2	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		3.5	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		5.2	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.3	U
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		20.9	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		15890	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		16.4	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		10.7	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		10.5	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB13**	**03SB14**	**03SB14-D**	**03SB15**	**03SB16**	**03SS01**	**03SS01**	**03SS02**	**03SS02**	**03SS03**	**03SS03**	**03SS04**	**03SS04**
Sample Date:	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**
Duplicate:		**03SB14-D**	**03SB14**										
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	184
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21.4
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	32.8
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	27.3
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.1
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	53.1
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.6
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	153

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS05**		**03SS05**		**03SS06**		**03SS06**		**03SS06-D**		**03SS07**		**03SS07**		**03SS08**		**03SS08**		**03SS09**		**03SS09**		**03SS10**		**03SS10**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:							**03SS06-D**		**03SS06**																	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	14800		11000		14700		12800		10700		14300		12100		14600		9630		14000		11700		13900		13500	
Antimony	5.5	UL	5.2	UJ	5.7	UL	5.2	UJ	5.9	R	9	B	5.6	R	9.5	B	5	UJ	9.3	B	8.2	R	7.2	B	5.4	UJ
Arsenic		R	3.9	J		R	0.96	J	5.2		6.8	J	0.74	J		R	0.37	J	7.6	J	4.8	J		R	6.6	
Barium	107		78.7		100		91.5		81.6		106		75.8		98.4		84.2		103		72.6		104		92.5	
Beryllium	0.69	B	0.62		0.71	B	0.75		0.72		0.71	B	0.73		0.66	B	0.88		0.68	B	0.65		0.67	B	0.97	
Cadmium	0.69	U	1.3	U	0.71	U	1.3	U	1.3	U	0.71	U	1.4	U	0.89	U	1.3	U	0.91	U	18.4		0.9	U	1.4	U
Calcium	1210		763		12500		856		872		980		1020		1080		913		1090		1080		1060		372	
Chromium	19		13.6		18.9		17.8		16.2		18.1		18.3		19.3		13.7		18.8		20.9		18.8		17.6	
Cobalt	7.8		8.6		8.8		8.2		7.3		8.2		9.3		8.2		7		8.1		9.9		8.5		9.8	
Copper	13		24.3		12.9		19.2		15.8		10.8		13.8		11.7		11.8		12.2		81.3		12.1		24.6	
Cyanide	2.1	U	0.65	U	2.2	U	0.64	U	0.64	U	2.4	U	0.68	U	2.1	U	0.62	U	2.3	U	2.3		2.2	U	0.66	U
Iron	17300		16400		17300		20900		19000		15800		20100		16100		14600		16500		23400		16500		18200	
Lead	27.8		70.5		21.8		28.5		23.7		25.4		35		24.6		28.8		22.2		74.8		24.4		90.5	
Magnesium	1760		1080		1980		1580		1420		1660		1710		1710		1230		1670		1450		1710		1420	
Manganese	742	J	494		670	J	563		474		749	J	485		782	J	648		710	J	509		679	J	768	
Mercury	0.11	U	0.13	U	0.09	U	0.13	U	0.13	U	0.1	U	0.14	U	0.11	U	0.13	U	0.1	U	0.12	U	0.11	U	0.14	U
Nickel	12.4		10.6		11.7		10.7		8.8		11.5		10.9		11.1		9.7		12.7		17.3		11.4		10.8	
Potassium	545		460		553		505		524		538		550		613		515		473		387		564		530	
Selenium	0.77	U	0.26	UR	0.88	UL	0.26	UR	0.26	UR	0.85	U	0.27	UR	0.86	U	1.3	UR	0.86	UL	0.24	UR	0.99	U	0.27	UR
Silver	1.2	UL	1.3	U	1.2	UL	1.3	U	1.3	U	1.2	UL	1.4	U	1.6	UL	1.3	U	1.6	UL	1.2	U	1.6	UL	1.4	U
Sodium	426		104	U	399		104	U	103	U	353		109	U	374		101	U	379		121		365		108	U
Thallium	0.15	U	0.26	UL	0.18	U	0.33	L	0.26	L	0.17	U	0.27	L	0.17	U	0.28	L	0.17	U	0.24	UL	0.2	U	0.27	UL
Vanadium	27.5		25.4		27.8		29.4		29		24.8		33.4		26.4		24		26.9		29.1		26.7		29.8	
Zinc	44.4	J	50.6		42.6	J	50.1		44.3		41.3	J	50.3		43.9	J	36.7		43.7	J	136		46.8	J	42.6	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
1,2-Dichlorobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
1,3-Dichlorobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
1,4-Dichlorobenzene	43	J	430	UJ	46	J	430	UJ	430	UJ	380	U	450	UJ	39	J	420	UJ	350	U	400	UJ	40	J	450	UJ
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
2,4,6-Trichlorophenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,4-Dichlorophenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,4-Dimethylphenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,4-Dinitrophenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	UJ	1000	UJ	1700	UJ	1000	UJ	1900	U	1100	UJ
2,4-Dinitrotoluene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,6-Dinitrotoluene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Chloronaphthalene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Chlorophenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Methylnaphthalene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Methylphenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Nitroaniline	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
2-Nitrophenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
3,3'-Dichlorobenzidine	770	U	430	UJ	730	U	430	UJ	430	UJ	760	U	450	UJ	750	U	420	UJ	700	U	400	UJ	770	U	450	UJ
3-Nitroaniline	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
4,6-Dinitro-2-methylphenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
4-Bromophenyl Phenyl Ether	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS05**		**03SS05**		**03SS06**		**03SS06**		**03SS06-D**		**03SS07**		**03SS07**		**03SS08**		**03SS08**		**03SS09**		**03SS09**		**03SS10**		**03SS10**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:							**03SS06-D**		**03SS06**																	
4-Chloro-3-methylphenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
4-Chloroaniline	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
4-Chlorophenyl Phenyl Ether	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
4-Methylphenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
4-Nitroaniline	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
4-Nitrophenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
Acenaphthene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Acenaphthylene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	42	J	450	UJ
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	380	U	430	UJ	50	J	53	J	160	J	380	U	44	J	370	U	420	UJ	42	J	100	J	93	J	33	J
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	380	U	430	UJ	57	J	64	J	180	J	380	U	52	J	370	U	420	UJ	47	J	130	J	97	J	52	J
Benzo(b)fluoranthene	46	J	430	UJ	77	J	150	J	210	J	45	J	120	J	53	J	81	J	59	J	170	J	110	J	73	J
Benzo(g,h,i)perylene	380	U	430	UJ	360	U	430	UJ	82	J	380	U	450	UJ	370	U	420	UJ	350	U	72	J	54	J	450	UJ
Benzo(k)fluoranthene	380	U	430	UJ	53	J	430	UJ	140	J	40	J	450	UJ	370	U	420	UJ	55	J	110	J	94	J	450	UJ
Benzoic Acid	1900	U	NA		1800	U	NA		NA		1800	U	NA		1800	U	NA		1700	U	NA		1900	U	NA	
Benzyl Alcohol	380	U	NA		360	U	NA		NA		380	U	NA		370	U	NA		350	U	NA		380	U	NA	
Bis(2-chloroethoxy)methane	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Bis(2-chloroethyl)ether	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Bis(2-ethylhexyl)phthalate	380	U	210	B	360	U	170	B	210	B	380	U	210	B	370	U	170	B	350	U	760	B	380	U	160	B
Butylbenzylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	330	J	380	U	450	UJ
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		430	UJ	NA		430	UJ	430	UJ	NA		450	UJ	NA		420	UJ	NA		400	UJ	NA		450	UJ
Chrysene	47	J	50	J	77	J	85	J	230	J	49	J	73	J	53	J	46	J	66	J	150	J	120	J	65	J
Di-n-butylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	370	J	450	UJ	370	U	420	UJ	350	U	60	J	380	U	450	UJ
Di-n-octylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Dibenz(a,h)anthracene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Dibenzofuran	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Diethylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Dimethylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Fluoranthene	85	J	77	J	190	J	140	J	380	J	100	J	130	J	120	J	85	J	150	J	230	J	320	J	120	J
Fluorene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Hexachlorobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Hexachlorobutadiene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Hexachlorocyclopentadiene	380	UJ	430	UJ	360	UJ	430	UJ	430	UJ	380	UJ	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Hexachloroethane	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Indeno(1,2,3-cd)pyrene	380	U	430	UJ	39	J	430	UJ	120	J	380	U	450	UJ	370	U	420	UJ	350	U	79	J	63	J	450	UJ
Isophorone	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
N-Nitroso-di-n-propylamine	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
N-Nitrosodiphenylamine (1)	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Naphthalene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Nitrobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Pentachlorophenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
Phenanthrene	60	J	50	J	150	J	79	J	220	J	68	J	76	J	75	J	59	J	83	J	110	J	230	J	90	J
Phenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Pyrene	87	J	72	J	130	J	130	J	350	J	75	J	100	J	77	J	74	J	100	J	210	J	210	J	97	J
VOLATILES	**ug/kg**				**ug/kg**						**ug/kg**				**ug/kg**				**ug/kg**				**ug/kg**			
1,1,1-Trichloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,1,2,2-Tetrachloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03SS05		03SS05		03SS06		03SS06		03SS06-D		03SS07		03SS07		03SS08		03SS08		03SS09		03SS09		03SS10		03SS10	
Sample Date:	9/5/1991		4/8/1997		9/5/1991		4/8/1997		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997	
Duplicate:							03SS06-D		03SS06																	
1,1,2-Trichloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,1-Dichloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,1-Dichloroethene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (Total)	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloropropane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
2-Hexanone	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
4-Methyl-2-pentanone	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Acetone	15	B	NA		4	B	NA		NA		12	B	NA		6	B	NA		11	U	NA		11	U	NA	
Benzene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Bromoform	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Bromomethane	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Carbon Disulfide	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Carbon Tetrachloride	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Chlorobenzene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Chloroethane	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Chloroform	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Chloromethane	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
cis-1,3-Dichloropropene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibromochloromethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Ethylbenzene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	6	U	NA		6	U	NA		NA		3	B	NA		6	U	NA		5	U	NA		6	U	NA	
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Tetrachloroethene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Toluene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
trans-1,3-Dichloropropene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Trichloroethene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Acetate	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Vinyl Chloride	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Xylene (Total)	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03SS05		03SS05		03SS06		03SS06		03SS06-D		03SS07		03SS07		03SS08		03SS08		03SS09		03SS09		03SS10		03SS10	
Sample Date:	9/5/1991		4/8/1997		9/5/1991		4/8/1997		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997	
Duplicate:							03SS06-D		03SS06																	
PESTICIDES/PCBS	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
4,4'-DDE	18	U	4.3	UJ	18	U	9	J	11	J	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
4,4'-DDT	18	U	4.3	UJ	18	U	11	J	9.5	J	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Aldrin	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Alpha-BHC	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Alpha-Chlordane	92	U	2.2	UJ	88	U	2.2	UJ	2.2	UJ	91	U	2.3	UJ	90	U	2.1	UJ	85	U	2.1	UJ	93	U	2.3	UJ
Aroclor-1016	92	U	43	UJ	88	U	43	UJ	43	UJ	91	U	45	UJ	90	U	41	UJ	85	U	40	UJ	93	U	45	UJ
Aroclor-1221	92	U	87	UJ	88	U	87	UJ	87	UJ	91	U	91	UJ	90	U	84	UJ	85	U	82	UJ	93	U	91	UJ
Aroclor-1232	92	U	43	UJ	88	U	43	UJ	43	UJ	91	U	45	UJ	90	U	41	UJ	85	U	40	UJ	93	U	45	UJ
Aroclor-1242	92	U	43	UJ	88	U	43	UJ	43	UJ	91	U	45	UJ	90	U	41	UJ	85	U	40	UJ	93	U	45	UJ
Aroclor-1248	92	U	43	UJ	88	U	43	UJ	43	UJ	91	U	45	UJ	90	U	41	UJ	85	U	40	UJ	93	U	45	UJ
Aroclor-1254	180	U	43	UJ	180	U	22	J	20	J	180	U	45	UJ	180	U	41	UJ	170	U	84	J	190	U	45	UJ
Aroclor-1260	180	U	43	UJ	180	U	43	UJ	43	UJ	180	U	45	UJ	180	U	41	UJ	170	U	40	UJ	190	U	45	UJ
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Delta-BHC	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Dieldrin	47		11	J	28		6.3	J	11	J	42		76	J	160		8.3	J	31		45	J	41		1100	R
Endosulfan I	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Endosulfan II	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Endosulfan Sulfate	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Endrin	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Endrin Aldehyde	NA		4.3	UJ	NA		4.3	UJ	4.3	UJ	NA		4.5	UJ	NA		4.1	UJ	NA		4	UJ	NA		4.5	UJ
Endrin Ketone	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Gamma-BHC (Lindane)	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Gamma-Chlordane	92	U	2.2	UJ	88	U	2.2	UJ	2.2	UJ	91	U	2.3	UJ	90	U	2.1	UJ	85	U	2.1	UJ	93	U	2.3	UJ
Heptachlor	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Heptachlor Epoxide	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	15		2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Methoxychlor	92	U	22	UJ	88	U	22	UJ	22	UJ	91	U	23	UJ	90	U	21	UJ	85	U	21	UJ	93	U	23	UJ
Toxaphene	180	U	220	UJ	180	U	220	UJ	220	UJ	180	U	230	UJ	180	U	210	UJ	170	U	210	UJ	190	U	230	UJ
DIOXIN/FURANS																	ng/kg									
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		93		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		6.8		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.6	U	NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		2.1	U	NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		2.8		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		2.4		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		0.88		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		3.5		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.1	U	NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		0.9	U	NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		0.6	U	NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.6	B	NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.2	U	NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		0.6	U	NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.2	U	NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		8510		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		8.9	U	NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		4.18		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		2.81		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS05**		**03SS05**		**03SS06**		**03SS06**		**03SS06-D**		**03SS07**		**03SS07**		**03SS08**		**03SS08**		**03SS09**		**03SS09**		**03SS10**		**03SS10**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:							**03SS06-D**		**03SS06**																	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		243		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		8.8		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		33.9		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		9.2		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		2.9	U	NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		7.6		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		0.88	B	NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		8.3		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS11**		**03SS11**		**03SS12**		**03SS12**		**03SS13**		**03SS14**		**03SS15**		**03SS16**		**03SS16-D**		**03-SS-17**		**03-SS-18**		**03-SS-19**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:															**03SS16-D**		**03SS16**							
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	13900		10400		16100		11400		13700		14100		13200		12500		14800		15000		14600		16900	
Antimony	7.2	B	9.7	R	12.8	B	5.5	UJ	11.6	B	7.1	B	8.3	B	5.7	UL	8	B	0.79	L	0.9	L	0.98	L
Arsenic	7.3	J	2.8	J	7.9	J	6.4			R		R	8.6	J		R		R	6.3		6.6		5.2	
Barium	176		114		117		95.9		95.9		112		98.5		101		113		104		110		103	
Beryllium	0.85	B	0.94		0.93	B	0.94		0.79	B	0.84	B	0.7	B	0.71	B	0.89	B	1.1	B	1.2	B	1.1	B
Cadmium	0.85	U	1.3	U	0.93	U	1.9		0.79	B	0.84	U	0.7	U	0.71	U	0.89	U	0.06	UR	0.05	UR	0.06	UR
Calcium	889		906		1750		1500		1110		927		826		1080		1140		978		1130		1370	
Chromium	22.2		20.2		24.3		19		22		18.3		17.2		16.6		19.9		21.8	J	19	J	21.7	J
Cobalt	10.6		12		9.3		7.8		8.5		8.4		7.4		7.7		7.8		7.6		6.9		7.9	
Copper	10.6		14		12.1		12.7		13.4		9.9		9.9		10.1		10.6		17.8		13.7		27.4	
Cyanide	2.2		0.66	U	2.9	U	0.69	U	2.3	U	2	U	2.5	U	2.6	U	2.4	U	0.15	U	0.23		0.14	U
Iron	17800	J	27200		19800		15000		22400		15700		14800		14500		16400		17300		16200		22000	
Lead	19.4		30.6		24.7		54.3		22.7		20.5		20		21.5		21.9		23.6		23.9		30.2	
Magnesium	1620		2560		1990		1380		1720		1660		1550		15600		1780		1790		1700		1930	
Manganese	1780		510		834	J	683		678	J	688	J	686	J	678	J	854	J	662	L	665	L	563	L
Mercury	0.09	U	0.13	U	0.1	U	0.14	U	0.11	U	0.1	U	0.11	U	0.11	U	0.09	U	0.11		0.14		0.13	
Nickel	11.2		11.7		13.1		10.2		13.2		11.1		9.9		8.9		11.3		11.1		11.1		12.2	
Potassium	426		2130		603		416	U	637		462		436		463		581		795	J	756	J	909	J
Selenium	0.8	U	0.27	UR	1.2	U	0.28	UR	0.87	U	0.79	U	0.93	U	0.96	U	1	U	0.69	UR	0.62	UR	0.69	UR
Silver	1.5	UL	1.3	U	1.6	UL	1.4	U	1.4	UL	1.5	UL	1.2	UL	1.2	UL	1.6	UL	0.09	U	0.08	U	0.5	K
Sodium	370		131		441		117		476		350		309		306		355		359	K	301	K	357	K
Thallium	0.16	U	0.3	L	0.24	U	0.28	UL	0.17	U	0.16	U	0.19	U	0.19	U	0.2	U	0.73	U	0.71	R	0.73	U
Vanadium	28.1		32.1		33.6		25.5		30.1		24.8		24.1		24.2		27		31.4		29.5		35.1	
Zinc	40	J	46.1		47.6	J	174		52.1	J	42.5	J	34.5	J	39.3	J	44.5	J	41.6		43.8		56.5	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
1,2,4-Trichlorobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	NA		NA		NA	
1,2-Dichlorobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	NA		NA		NA	
1,3-Dichlorobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	NA		NA		NA	
1,4-Dichlorobenzene	45	J	440	UJ	56	J	460	UJ	57	J	56	J	59	J	68	J	380	UJ	NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		13	U	0.74	J	13	U
2,2'-Oxybis(1-chloropropane)	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
2,4,5-Trichlorophenol	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	360	U	340	U	380	U
2,4,6-Trichlorophenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	380	U	360	U	400	U
2,4-Dichlorophenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	380	U	360	U	400	U
2,4-Dimethylphenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	270	U	260	U	290	U
2,4-Dinitrophenol	1800	U	1100	UJ	1800	UJ	1100	UJ	1800	UJ	1800	UJ	1800	UJ	1900	U	1900	U	500	U	470	U	520	U
2,4-Dinitrotoluene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
2,6-Dinitrotoluene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
2-Chloronaphthalene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	420	U	400	U	440	U
2-Chlorophenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	500	U	470	U	520	U
2-Methylnaphthalene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	13	U	1	J	13	U
2-Methylphenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	440	U	410	U	460	U
2-Nitroaniline	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
2-Nitrophenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
3,3'-Dichlorobenzidine	740	U	440	UJ	750	U	460	UJ	750	U	740	U	730	U	780	U	770	U	380	U	360	U	400	U
3-Nitroaniline	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
4,6-Dinitro-2-methylphenol	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
4-Bromophenyl Phenyl Ether	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	290	U	270	U	300	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS11**		**03SS11**		**03SS12**		**03SS12**		**03SS13**		**03SS14**		**03SS15**		**03SS16**		**03SS16-D**		**03-SS-17**		**03-SS-18**		**03-SS-19**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:															**03SS16-D**		**03SS16**							
4-Chloro-3-methylphenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	380	U	360	U	400	U
4-Chloroaniline	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
4-Chlorophenyl Phenyl Ether	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
4-Methylphenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	500	U	470	U	520	U
4-Nitroaniline	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
4-Nitrophenol	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
Acenaphthene	370	U	78	J	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	13	U	1.1	J	13	U
Acenaphthylene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	3.2	J	3.2	J	2.2	J
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		380	U	360	U	400	U
Anthracene	370	U	110	J	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	3.9	J	5	J	3.1	J
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
Benz(a)anthracene	370	U	750	J	370	U	100	J	39	J	370	U	48	J	390	U	380	U	17		22		16	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
Benzo(a)pyrene	370	U	1100	J	370	U	150	J	49	J	370	U	43	J	390	U	380	U	19		26		18	
Benzo(b)fluoranthene	370	U	1400	J	49	J	170	J	68	J	370	U	54	J	45	J	380	UJ	22		36		20	
Benzo(g,h,i)perylene	370	U	540	J	370	U	76	J	370	U	370	U	370	U	390	U	380	U	13		18		12	J
Benzo(k)fluoranthene	370	U	490	J	39	J	140	J	56	J	370	U	47	J	390	U	380	U	19		24		21	
Benzoic Acid	1800	U	NA		1800	U	NA		1800	U	1800	U	1800	U	1900	U	1900	U	NA		NA		NA	
Benzyl Alcohol	370	U	NA		370	U	NA		370	U	370	U	370	U	390	U	380	U	NA		NA		NA	
Bis(2-chloroethoxy)methane	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	360	U	340	U	380	U
Bis(2-chloroethyl)ether	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	420	U	400	U	440	U
Bis(2-ethylhexyl)phthalate	370	U	170	B	370	U	220	B	44	J	370	U	370	U	47	J	41	J	350	U	330	U	370	U
Butylbenzylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	260	U	240	U	270	U
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
Carbazole	NA		79	J	NA		460	UJ	NA		NA		NA		NA		NA		210	J	240	U	270	U
Chrysene	370	U	920	J	49	J	180	J	68	J	370	U	65	J	43	J	380	UJ	22		29		21	
Di-n-butylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
Di-n-octylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	330	U	310	U	350	U
Dibenz(a,h)anthracene	370	U	150	J	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	3.6	J	5.7	J	3.6	J
Dibenzofuran	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	380	U	360	U	400	U
Diethylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
Dimethylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
Fluoranthene	65	J	840	J	110	J	370	J	160	J	70	J	140	J	95	J	70	J	50		67		47	
Fluorene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	1.1	J	1.5	J	1.2	J
Hexachlorobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	330	U	310	U	350	U
Hexachlorobutadiene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	440	U	410	U	460	U
Hexachlorocyclopentadiene	370	UJ	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	330	U	310	U	350	U
Hexachloroethane	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	260	U	240	U	270	U
Indeno(1,2,3-cd)pyrene	370	U	600	J	370	U	88	J	370	U	370	U	370	U	390	U	380	U	16		22		15	
Isophorone	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	410	U	390	U	430	U
N-Nitroso-di-n-propylamine	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
N-Nitrosodiphenylamine (1)	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	320	U	300	U	330	U
Naphthalene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	0.87	B	1.1	B	1.1	B
Nitrobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	360	U	340	U	380	U
Pentachlorophenol	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
Phenanthrene	38	J	430	J	68	J	280	J	110	J	42	J	44	J	58	J	44	J	20		28		22	
Phenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	260	U	240	U	270	U
Pyrene	47	J	820	J	75	J	300	J	110	J	48	J	99	J	65	J	50	J	39		52		37	
VOLATILES	**ug/kg**				**ug/kg**				**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,1,2,2-Tetrachloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03SS11		03SS11		03SS12		03SS12		03SS13		03SS14		03SS15		03SS16		03SS16-D		03-SS-17		03-SS-18		03-SS-19	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:															**03SS16-D**		**03SS16**							
1,1,2-Trichloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,1-Dichloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,1-Dichloroethene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dichloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dichloroethene (Total)	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	NA		NA		NA	
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dichloropropane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
2-Butanone	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	19	U	12	J	7.3	J
2-Hexanone	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	19	U	19	U	20	U
4-Methyl-2-pentanone	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	19	U	19	U	20	U
Acetone	11	U	NA		11	U	NA		11	U	11	U	11	U	10	B	8	B	100		120		170	
Benzene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Bromoform	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Bromomethane	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	7.6	U	7.8	U	7.9	U
Carbon Disulfide	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Carbon Tetrachloride	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Chlorobenzene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Chloroethane	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	7.6	U	7.8	U	7.9	U
Chloroform	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Chloromethane	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	7.6	U	7.8	U	7.9	U
cis-1,3-Dichloropropene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Dibromochloromethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Ethylbenzene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		15	U	16	U	16	U
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Methylene Chloride	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	2.1	B	1.7	B	2.5	B
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Styrene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Tetrachloroethene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Toluene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	15		2.8	J
trans-1,3-Dichloropropene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Trichloroethene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Vinyl Acetate	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	NA		NA		NA	
Vinyl Chloride	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	7.6	U	7.8	U	7.9	U
Xylene (Total)	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS11**		**03SS11**		**03SS12**		**03SS12**		**03SS13**		**03SS14**		**03SS15**		**03SS16**		**03SS16-D**		**03-SS-17**		**03-SS-18**		**03-SS-19**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:															**03SS16-D**		**03SS16**							
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	45		13	L
4,4'-DDE	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	2.5	J
4,4'-DDT	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	2.7	J	24	U	8.1	L
Aldrin	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Alpha-BHC	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Alpha-Chlordane	90	U	2.3	UJ	90	U	2.4	UJ	91	U	89	U	89	U	94	U	93	U	2.1	B	2.9	J	0.96	B
Aroclor-1016	90	U	44	UJ	90	U	46	UJ	91	U	89	U	89	U	94	U	93	U	36	UL	170	U	38	UL
Aroclor-1221	90	U	89	UJ	90	U	93	UJ	91	U	89	U	89	U	94	U	93	U	52	UL	240	U	54	UL
Aroclor-1232	90	U	44	UJ	90	U	46	UJ	91	U	89	U	89	U	94	U	93	U	26	UL	120	U	27	UL
Aroclor-1242	90	U	44	UJ	90	U	46	UJ	91	U	89	U	89	U	94	U	93	U	26	UL	120	U	27	UL
Aroclor-1248	90	U	44	UJ	90	U	46	UJ	91	U	89	U	89	U	94	U	93	U	26	UL	120	U	27	UL
Aroclor-1254	180	U	44	UJ	180	U	46	UJ	180	U	180	U	180	U	190	U	190	U	26	UL	120	U	27	UL
Aroclor-1260	180	U	44	UJ	180	U	46	UJ	180	U	180	U	180	U	190	U	190	U	26	UL	120	U	27	UL
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	1.3	UL	6.1	U	2.8	R
Delta-BHC	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Dieldrin	18	U	230	J	25		620	J	73		18	U	18	U	19	U	19	U	1.6	J	6.9	J	6	L
Endosulfan I	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	7	J	2.7	UL
Endosulfan II	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	5.2	UL
Endosulfan Sulfate	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	5.2	UL
Endrin	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	5.2	UL
Endrin Aldehyde	NA		4.4	UJ	NA		4.6	UJ	NA		NA		NA		NA		NA		0.7	J	24	U	5.2	UL
Endrin Ketone	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	5.2	UL
Gamma-BHC (Lindane)	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Gamma-Chlordane	90	U	2.3	UJ	90	U	2.4	UJ	91	U	89	U	89	U	94	U	93	U	2.6	UL	2.2	B	1.3	B
Heptachlor	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Heptachlor Epoxide	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	1.5	J	2.5	J
Methoxychlor	90	U	23	UJ	90	U	24	UJ	91	U	89	U	89	U	94	U	93	U	26	UL	120	U	27	UL
Toxaphene	180	U	230	UJ	180	U	240	UJ	180	U	180	U	180	U	190	U	190	U	130	UL	590	U	130	UL
DIOXIN/FURANS																								
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS11**	**03SS11**	**03SS12**	**03SS12**	**03SS13**	**03SS14**	**03SS15**	**03SS16**	**03SS16-D**	**03-SS-17**	**03-SS-18**	**03-SS-19**
Sample Date:	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**9/5/1991**	**9/5/1991**	**9/5/1991**	**9/5/1991**	**12/17/2008**	**12/17/2008**	**12/17/2008**
Duplicate:								**03SS16-D**	**03SS16**			
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SS-20**		**03-SS-21**		**03-SS-21-D**		**03-SS-22**		**03-SS-23**		**03-SS-24**		**03-SS-24-D**		**03-SS-25**		**03-SS-26**		**03-SS-27**		**03-SS-28**	
Sample Date:	**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:			**03-SS-21-D**		**03-SS-21**						**03-SS-24-D**		**03-SS-24**									
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	16900		17200		15100		19700		18100		17200		17400		24200		16000		17700		17500	
Antimony	1.2	L	1.3	L	1.1	L	0.98	L	1.7	L	0.87	L	0.64	L	0.78	L	0.99	L	1.5	L	0.9	L
Arsenic	4.4		5.1		4.4		6.6		1.7		2.3		2.3		5.8		3.1		4		6.9	
Barium	110		121		113		120		232		161		169		87.1		138		122		102	
Beryllium	1	B	0.95	B	0.94	B	1.2	B	2	K	1	B	1.2	K	0.97	B	1.1	B	0.89	B	1.2	B
Cadmium	0.05	UR	1.8	L	1.4	L	0.06	UR	0.91	L	0.51	J	0.22	J	0.05	UR	0.05	UR	0.05	UR	0.06	UR
Calcium	1090		1770		1790		1870		1180		922		944		635		1340		1020		1120	
Chromium	20.5	J	26.8	J	21.7	J	24.8	J	11.4	J	14.2	J	12.5	J	24.7	J	13.6	J	16.5	J	22.4	J
Cobalt	8.6		8.8		7.8		8.8		10.7		9		9.4		9.4		8.7		8.9		8	
Copper	33.9		69.9		57.8		15.8		87.2		51.3		55.4		22.2		43.6		170		18.5	
Cyanide	0.15	U	0.19		0.13	U	0.16	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.14	U	0.44	
Iron	22400		24100		22000		26600		19500		15700		16700		28100		17100		18900		22400	
Lead	34.1		76.9		71		21.8		54.6		29.2		26.6		14.7		34.6		49.3		40.7	
Magnesium	1880		2020		1820		2670		966		814		1110		2100		1100		1230		2170	
Manganese	591	L	528	L	501	L	674	L	1260	L	1140	L	1200	L	409	L	974	L	715	L	602	L
Mercury	0.18		0.34		0.31		0.038		0.77		0.16		0.15		0.049		0.16		0.19		0.13	
Nickel	13.1		18.7		15.4		13.5		15.8		11.4		12.2		14.3		11.4		12.2		13.3	
Potassium	1010	J	966	J	919	J	867	J	409	J	695	J	1060	J	845	J	565	J	646	J	842	J
Selenium	0.63	UR	0.64	UR	0.62	UR	0.76	UR	0.59	UR	0.61	UR	0.61	UR	0.59	UR	0.62	UR	0.61	UR	0.66	UR
Silver	1.5	K	1.4	K	1.3	K	0.1	U	0.46	K	0.08	U	0.36	K	0.08	U	0.08	U	1.1		0.09	U
Sodium	314	K	320	K	306	K	403	K	412	K	319	K	313	K	269	K	319	K	326	K	316	K
Thallium	1.8	J	0.68	U	0.66	U	1.8	R	0.83	R	0.81	R	0.65	U	1.8	R	1	R	1.8	J	0.76	R
Vanadium	35.6		36.4		33.1		43.3		18.4		21.8		21.4		45.7		23.8		29.1		40.4	
Zinc	58.6		163		144		45.9		466		45.6		45.5		31.4		55		74		55.8	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
1,2,4,5-Tetrachlorobenzene	230	U	270	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	1.7	J	3.2	J	2.3	J	13	U	1.5	J	11	U	0.8	J	11	U	1.6	J	3.5	J	2.9	J
2,2'-Oxybis(1-chloropropane)	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
2,3,4,6-Tetrachlorophenol	230	U	270	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
2,4,5-Trichlorophenol	320	U	330	U	320	U	390	U	320	U	320	U	310	U	310	U	330	U	330	U	360	U
2,4,6-Trichlorophenol	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
2,4-Dichlorophenol	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
2,4-Dimethylphenol	240	U	250	U	240	U	290	U	240	U	240	U	230	U	230	U	250	U	250	U	270	U
2,4-Dinitrophenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
2,4-Dinitrotoluene	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
2,6-Dinitrotoluene	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
2-Chloronaphthalene	380	U	390	U	370	U	450	U	370	U	380	U	360	U	360	U	380	U	390	U	420	U
2-Chlorophenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
2-Methylnaphthalene	3.2	J	5.3	J	3.2	J	13	U	2.8	J	1.1	J	1.6	J	11	U	2.8	J	8.3	J	4.5	J
2-Methylphenol	390	U	400	U	380	U	470	U	380	U	390	U	380	U	380	U	400	U	400	U	440	U
2-Nitroaniline	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
2-Nitrophenol	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
3,3'-Dichlorobenzidine	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
3-Nitroaniline	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
4,6-Dinitro-2-methylphenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
4-Bromophenyl Phenyl Ether	260	U	260	U	250	U	310	U	250	U	260	U	250	U	250	U	260	U	260	U	290	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SS-20**		**03-SS-21**		**03-SS-21-D**		**03-SS-22**		**03-SS-23**		**03-SS-24**		**03-SS-24-D**		**03-SS-25**		**03-SS-26**		**03-SS-27**		**03-SS-28**	
Sample Date:	**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:			**03-SS-21-D**		**03-SS-21**						**03-SS-24-D**		**03-SS-24**									
4-Chloro-3-methylphenol	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
4-Chloroaniline	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
4-Chlorophenyl Phenyl Ether	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
4-Methylphenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
4-Nitroaniline	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
4-Nitrophenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
Acenaphthene	0.99	J	13		4	J	13	U	1.6	J	11	U	11	U	11	U	11	U	1.4	J	2.2	J
Acenaphthylene	2.3	J	5.8	J	3.5	J	1.4	J	1.3	J	1	J	0.97	J	1	J	2.5	J	3.9	J	6.4	J
Acetophenone	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
Anthracene	3.9	J	39		13		1.7	J	6.1	J	1.2	J	1.3	J	1.1	J	4.1	J	6.2	J	9.1	J
Atrazine	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Benz(a)anthracene	20		110		67		8.8	J	22		5.6	J	6.3	J	4.2	J	21		26		41	
Benzaldehyde	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Benzo(a)pyrene	25		100		74		12	J	22		6.7	J	7.9	J	5.1	J	23		30		51	
Benzo(b)fluoranthene	37		110		87		15		31		10	J	10	J	7.2	J	31		46		79	
Benzo(g,h,i)perylene	19		56		54		8.3	J	16		5.6	J	6.8	J	3.7	J	17		22	J	39	
Benzo(k)fluoranthene	22		92		67		12	J	20		6.1	J	9	J	5.2	J	22		26		49	
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	320	U	330	U	320	U	390	U	320	U	320	U	310	U	310	U	330	U	330	U	360	U
Bis(2-chloroethyl)ether	380	U	390	U	370	U	450	U	370	U	380	U	360	U	360	U	380	U	390	U	420	U
Bis(2-ethylhexyl)phthalate	310	U	320	U	270	J	370	U	300	U	310	U	120	J	300	U	320	U	540		350	U
Butylbenzylphthalate	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Caprolactam	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Carbazole	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Chrysene	31		120		86		13	J	27		8.4	J	9.7	J	6.6	J	28		41		63	
Di-n-butylphthalate	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
Di-n-octylphthalate	300	U	310	U	290	U	350	U	290	U	300	U	290	U	290	U	300	U	310	U	330	U
Dibenz(a,h)anthracene	5.9	J	20		17		2.2	B	5.4	J	1.7	B	1.8	B	1.1	B	4.7	J	7	J	11	J
Dibenzofuran	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
Diethylphthalate	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
Dimethylphthalate	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
Fluoranthene	55		270		200		26		52		15		17		15		52		68		170	
Fluorene	1.2	J	14	J	4.4	J	13	U	2	J	11	U	11	U	11	U	1	J	1.5	J	3	J
Hexachlorobenzene	300	U	310	U	290	U	350	U	290	U	300	U	290	U	290	U	300	U	310	U	330	U
Hexachlorobutadiene	390	U	400	U	380	U	470	U	380	U	390	U	380	U	380	U	400	U	400	U	440	U
Hexachlorocyclopentadiene	300	U	310	U	290	U	350	U	290	U	300	U	290	U	290	U	300	U	310	U	330	U
Hexachloroethane	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Indeno(1,2,3-cd)pyrene	22		70		62		9.8	J	18		6.4	J	7.5	J	4.4	J	20		25		44	
Isophorone	360	U	380	U	360	U	440	U	360	U	360	U	350	U	350	U	370	U	380	U	410	U
N-Nitroso-di-n-propylamine	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
N-Nitrosodiphenylamine (1)	280	U	290	U	280	U	340	U	280	U	280	U	270	U	270	U	290	U	290	U	320	U
Naphthalene	2.1	B	5.2	J	3.1	J	0.74	B	2.3	B	1.2	B	1.8	B	0.74	B	2.6	B	5.3	J	3.8	B
Nitrobenzene	320	U	330	U	320	U	390	U	320	U	320	U	310	U	310	U	330	U	330	U	360	U
Pentachlorophenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
Phenanthrene	22		200	J	80	J	9.8	J	28		5.6	J	6.5	J	7.1	J	16		29		61	
Phenol	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Pyrene	44		210		160		21		39		12		14		11		41		54		130	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,1,2,2-Tetrachloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,1,2-Trichloro-1,2,2-trifluoroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	03-SS-20		03-SS-21		03-SS-21-D		03-SS-22		03-SS-23		03-SS-24		03-SS-24-D		03-SS-25		03-SS-26		03-SS-27		03-SS-28	
Sample Date:	12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008	
Duplicate:			03-SS-21-D		03-SS-21						03-SS-24-D		03-SS-24									
1,1,2-Trichloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,1-Dichloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,1-Dichloroethene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2,3-Trichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2,4-Trichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dibromo-3-chloropropane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dibromoethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichloroethene (cis)	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichloropropane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,3-Dichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,4-Dichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
2-Butanone	9	J	13	J	6.6	J	9.9	J	9.2	J	17	U	14	U	4	J	14	J	15	J	14	J
2-Hexanone	16	U	17	U	16	U	20	U	16	U	17	U	14	U	15	U	19	U	17	U	19	U
4-Methyl-2-pentanone	16	U	17	U	16	U	20	U	16	U	17	U	14	U	15	U	19	U	17	U	19	U
Acetone	120		200		180		170		120		190		190		89		270		170		160	
Benzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Bromoform	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Bromomethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Carbon Disulfide	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Carbon Tetrachloride	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Chlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Chloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Chloroform	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Chloromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
cis-1,3-Dichloropropene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Cyclohexane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Dibromochloromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Dichlorodifluoromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Ethylbenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Isopropylbenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
M,p-xylene	13	U	14	U	13	U	16	U	13	U	14	U	11	U	12	U	15	U	13	U	16	U
Methyl Acetate	6.5	U	5.5	J	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Methyl Tert-butyl Ether (mtbe)	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Methylcyclohexane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Methylene Chloride	1.7	B	1.5	B	1.5	B	2.1	B	1.6	B	1.7	B	1.6	B	1.7	B	1.7	B	6.7	U	1.9	B
O-xylene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Styrene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Tetrachloroethene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Toluene	3.1	J	4.2	J	6.5	U	1.7	J	4.1	J	6.8	U	5.7	U	5.9	U	2.5	J	3.9	J	7.8	U
trans-1,3-Dichloropropene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Trichloroethene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Trichlorofluoromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Xylene (Total)	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SS-20**		**03-SS-21**		**03-SS-21-D**		**03-SS-22**		**03-SS-23**		**03-SS-24**		**03-SS-24-D**		**03-SS-25**		**03-SS-26**		**03-SS-27**		**03-SS-28**	
Sample Date:	**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:			**03-SS-21-D**		**03-SS-21**						**03-SS-24-D**		**03-SS-24**									
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	4.5	J	4.2	J	6.4	J	16	L	30	J	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL	49	U
4,4'-DDE	47		100		100		5.3	UL	17	J	4.4	UJ	4.3	U	4.3	UJ	0.57	J	3	J	49	U
4,4'-DDT	37		110	J	230	J	5.3	UL	140		4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.3	J	49	U
Aldrin	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL	25	U
Alpha-BHC	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	7.5	R	2.2	UJ	2.3	UL	2.4	UL	25	U
Alpha-Chlordane	11	U	12	U	22	U	1.2	B	22	U	0.65	B	1.8	B	1.5	B	2.7	R	4.6	J	25	U
Aroclor-1016	160	U	170	U	320	U	39	UL	320	U	32	UJ	31	U	31	UJ	33	UL	33	UL	360	U
Aroclor-1221	230	U	240	U	450	U	55	UL	450	U	45	UJ	44	U	44	UJ	47	UL	47	UL	510	U
Aroclor-1232	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Aroclor-1242	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Aroclor-1248	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Aroclor-1254	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Aroclor-1260	110	U	120	U	220	U	27	UL	220	U	12	J	14	J	22	UJ	36	L	24	UL	250	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	5.8	U	5.9	U	11	U	1.4	UL	11	U	0.98	J	4.5	R	1.1	UJ	0.8	J	12	R	13	U
Delta-BHC	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL	25	U
Dieldrin	8	J	22	J	20	J	5.3	J	43	U	2.9	J	3.6	J	24	J	2.8	J	22		280	
Endosulfan I	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	0.25	J	0.58	J	25	U
Endosulfan II	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	0.8	J	49	U
Endosulfan Sulfate	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL	49	U
Endrin	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL	49	U
Endrin Aldehyde	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	2.3	J	49	U
Endrin Ketone	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL	49	U
Gamma-BHC (Lindane)	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL	25	U
Gamma-Chlordane	11	U	12	U	2.3	B	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	1.3	B	2.6	B	25	U
Heptachlor	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL	25	U
Heptachlor Epoxide	11	U	12	U	1.6	J	2.7	UL	22	U	2.3	UJ	0.55	J	2.2	UJ	2.3	UL	1.7	R	25	U
Methoxychlor	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Toxaphene	560	U	580	U	1100	U	130	UL	1100	U	110	UJ	110	U	110	UJ	110	UL	120	UL	1200	U
DIOXIN/FURANS																						
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SS-20**		**03-SS-21**		**03-SS-21-D**		**03-SS-22**		**03-SS-23**		**03-SS-24**		**03-SS-24-D**		**03-SS-25**		**03-SS-26**		**03-SS-27**		**03-SS-28**	
Sample Date:	**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:			**03-SS-21-D**		**03-SS-21**						**03-SS-24-D**		**03-SS-24**									
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	11100		24500		24000		24000		15700		16400		19600		18000	
Antimony	0.38	UL	0.38	UL	0.37	UL	0.37	UL	1	L	1.6	L	0.2	UL	0.26	L
Arsenic	4.1		2.9		2.5		2.5		5.1	L	5.8	L	4.7	L	4.4	L
Barium	74.9		124		102		102		117		142		88.9		128	
Beryllium	1		0.79		0.74		0.74		0.94	K	0.96	K	0.83	K	0.91	K
Cadmium	0.083	U	0.082	UR	0.081	UR	0.081	UR	1.8	L	7.4		0.03	UR	0.11	B
Calcium	2050		433		434		434		5340	J	3770	J	868	J	1060	J
Chromium	14.4	K	6.4		6.8		6.8		27.9		26.1		28.5		20.7	
Cobalt	6.1		9		7.8		7.8		6.9	J	7.5	J	7.7	J	8.1	J
Copper	13.8		35.3	K	36.8	K	36.8	K	67.4	K	120	K	19.7	K	51.7	K
Cyanide	0.6	U	0.11		0.2		0.2		0.21	UJ	0.21	UJ	0.21	UJ	0.21	UJ
Iron	14600		14500		13800		13800		20400	J	22700	J	24400	J	22900	J
Lead	19		3.2		3.5		3.5		74.9	J	111	J	20.7	J	57.7	J
Magnesium	1860		553		564		564		3020	J	2570	J	1890	J	1700	J
Manganese	383		941		819		819		534		631		394		525	
Mercury	0.097	L	0.038		0.039		0.039		0.22	K	0.14	K	0.053	K	0.15	K
Nickel	9.2		11.1		10		10		14	J	27.2	J	12.7	J	14.2	J
Potassium	497		245		261		261		955		979		982		1080	
Selenium	0.31	UL	0.31	U	0.3	U	0.3	U	0.34	UR	0.36	L	0.33	UR	0.33	UR
Silver	0.11	B	0.035	U	0.035	U	0.035	U	1.1		2.8		0.49		1.8	
Sodium	34	L	18.4	UR	26.2	L	26.2	L	170	B	224	K	156	B	168	R
Thallium	0.55	UL	0.54	UR	0.53	UR	0.53	UR	0.44	UL	0.45	UL	0.42	UL	0.42	UL
Vanadium	23.6		16.7		16.5		16.5		32		31.7		40.9		34	
Zinc	34.6		17.8		16.9		16.9		120		297		42		59	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
1,2,4,5-Tetrachlorobenzene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,3,4,6-Tetrachlorophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4,5-Trichlorophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4,6-Trichlorophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4-Dichlorophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4-Dimethylphenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4-Dinitrophenol	96000	U	1900	U	1900	U	1900	U	830	U	850	U	800	U	800	U
2,4-Dinitrotoluene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,6-Dinitrotoluene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2-Chloronaphthalene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2-Chlorophenol	20000	U	390	U	380	U	380	U	410	U	420	U	400	U	400	U
2-Methylnaphthalene	20000	U	390	U	380	U	380	U	260	U	4.3	J	10	U	8.2	J
2-Methylphenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2-Nitroaniline	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
2-Nitrophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
3,3'-Dichlorobenzidine	96000	U	1900	U	1900	U	1900	U	210	U	220	U	210	U	210	U
3-Nitroaniline	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
4,6-Dinitro-2-methylphenol	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
4-Bromophenyl Phenyl Ether	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
4-Chloro-3-methylphenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
4-Chloroaniline	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
4-Chlorophenyl Phenyl Ether	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
4-Methylphenol	20000	U	390	U	380	U	380	U	410	U	420	U	400	U	400	U
4-Nitroaniline	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
4-Nitrophenol	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
Acenaphthene	2200	J	390	U	380	U	380	U	29	J	7.9	J	1.2	J	7	J
Acenaphthylene	20000	U	390	U	380	U	380	U	30	J	5.4	J	3.1	J	5.4	J
Acetophenone	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Anthracene	11000	J	390	U	380	U	380	U	61	J	43		4.3	J	23	
Atrazine	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Benz(a)anthracene	15000	J	390	U	380	U	380	U	260		110		19		78	J
Benzaldehyde	20000	U	390	U	380	U	380	U	29	J	220	U	210	U	210	U
Benzo(a)pyrene	8800	J	390	U	380	U	380	U	260		110		23		16	
Benzo(b)fluoranthene	8600	J	390	U	380	U	380	U	260		100	J	27		100	J
Benzo(g,h,i)perylene	6800	J	390	U	380	U	380	U	170	J	57	J	17		67	
Benzo(k)fluoranthene	4400	J	390	U	380	U	380	U	250	J	110		26		89	J
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Bis(2-chloroethyl)ether	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Bis(2-ethylhexyl)phthalate	20000	U	390	U	380	U	380	U	170	J	220	U	210	U	210	U
Butylbenzylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Caprolactam	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Carbazole	3200	J	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Chrysene	13000	J	390	U	380	U	380	U	280		110		26		110	
Di-n-butylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Di-n-octylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Dibenz(a,h)anthracene	20000	U	390	U	380	U	380	U	46	J	31		4.5	J	26	
Dibenzofuran	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Diethylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Dimethylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Fluoranthene	31000		390	U	380	U	380	U	560		190		64		220	
Fluorene	2600	J	390	U	380	U	380	U	34	J	13		2.6	J	11	
Hexachlorobenzene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Hexachlorobutadiene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Hexachlorocyclopentadiene	96000	U	1900	U	1900	U	1900	U	210	U	220	U	210	U	210	U
Hexachloroethane	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Indeno(1,2,3-cd)pyrene	7400	J	390	U	380	U	380	U	190	J	75	J	21		61	J
Isophorone	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
N-Nitroso-di-n-propylamine	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
N-Nitrosodiphenylamine (1)	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Naphthalene	20000	U	390	U	380	U	380	U	260	U	9.4	B	1.6	B	8.4	B
Nitrobenzene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Pentachlorophenol	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
Phenanthrene	37000		390	U	380	U	380	U	310		160		36		140	
Phenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Pyrene	33000		390	U	380	U	380	U	560		160		49		170	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,1,2,2-Tetrachloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
1,1,2-Trichloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,1-Dichloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,1-Dichloroethene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2,3-Trichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2,4-Trichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dibromo-3-chloropropane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dibromoethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichloroethene (cis)	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichloropropane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,3-Dichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,4-Dichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
2-Butanone	5	U	5.2	U	5.6	U	5.6	U	6.2	B	8	B	4.6	B	5.8	B
2-Hexanone	5	U	5.2	U	5.6	U	5.6	U	15	U	16	U	14	U	14	U
4-Methyl-2-pentanone	5	U	5.2	U	5.6	U	5.6	U	15	U	16	U	14	U	14	U
Acetone	20	U	21	U	22	U	22	U	77	B	130	J	68	B	70	B
Benzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	1.4	J	5.5	U	5.5	U
Bromochloromethane	5	U	5.2	U	5.6	U	5.6	U	NA		NA		NA		NA	
Bromodichloromethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Bromoform	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Bromomethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Carbon Disulfide	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Carbon Tetrachloride	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Chlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Chloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Chloroform	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Chloromethane	5	U	5.2	U	5.6	U	5.6	U	2.1	J	3.6	J	5.5	U	5.5	U
cis-1,3-Dichloropropene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Cyclohexane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Dibromochloromethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Dichlorodifluoromethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Ethylbenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Isopropylbenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
M,p-xylene	9.9	U	10	U	11	U	11	U	12	U	13	U	11	U	11	U
Methyl Acetate	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Methyl Tert-butyl Ether (mtbe)	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Methylcyclohexane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Methylene Chloride	3.5	B	3	B	4	B	4	B	5.8	U	6.4	U	5.5	U	5.5	U
O-xylene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Styrene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Tetrachloroethene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Toluene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
trans-1,3-Dichloropropene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Trichloroethene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Trichlorofluoromethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Xylene (Total)	NA		NA		NA		NA		5.8	U	6.4	U	5.5	U	5.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	2	U	2	U	2	U	2	U	2.2	J	30		4	U	14	J
4,4'-DDE	0.68	J	2	U	2	U	2	U	14		11	J	2.2	J	130	
4,4'-DDT	1.1	J	2	U	2	U	2	U	30	J	22		2.2	J	110	J
Aldrin	0.69	J	0.27	J	0.69	J	0.69	J	2.1	U	2.2	U	2.1	U	1.6	J
Alpha-BHC	2	U	2	U	2	U	2	U	0.98	J	2.2	U	2.1	U	0.86	J
Alpha-Chlordane	23	J	2	U	2	U	2	U	11	J	5.1	J	0.53	J	1.2	J
Aroclor-1016	20	U	20	U	19	U	19	U	30	U	31	U	29	U	29	U
Aroclor-1221	20	U	20	U	19	U	19	U	43	U	44	U	41	U	41	U
Aroclor-1232	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1242	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1248	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1254	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1260	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1262	20	U	20	U	19	U	19	U	NA		NA		NA		NA	
Aroclor-1268	20	U	20	U	19	U	19	U	NA		NA		NA		NA	
Beta-BHC	2	U	2	U	2	U	2	U	5.3	U	1.1	U	1	U	1	U
Delta-BHC	2	U	2	U	2	U	2	U	2.1	U	2.2	U	2.1	U	2.1	U
Dieldrin	100		25	J	5.6	J	5.6	J	34		25		8.2		32	
Endosulfan I	2	U	2	U	2	U	2	U	2.1	U	2.2	U	2.1	U	2.1	U
Endosulfan II	2	U	0.49	J	2	U	2	U	21	U	1.6	J	4	U	4	U
Endosulfan Sulfate	2	U	2	U	2	U	2	U	4.1	U	4.2	U	4	U	3.2	J
Endrin	2	U	2	U	2	U	2	U	4.1	U	31	R	4	U	20	U
Endrin Aldehyde	2	U	2	U	2	U	2	U	7.1	J	8	J	1	J	6.3	J
Endrin Ketone	0.29	J	2	U	2	U	2	U	4.6	J	0.93	J	4	U	4.4	J
Gamma-BHC (Lindane)	1.1	J	2	U	2	U	2	U	2.1	U	2.2	U	2.1	U	2.1	U
Gamma-Chlordane	16	J	2	U	2	U	2	U	15		6.6	J	2.1	U	1.3	J
Heptachlor	2	U	2	U	2	U	2	U	3.9		2.2	U	2.1	U	0.71	J
Heptachlor Epoxide	1.4	J	2	U	2	U	2	U	13		4.1	J	2.1	U	1.9	J
Methoxychlor	3.9	U	3.9	U	3.8	U	3.8	U	21	U	5	J	21	U	21	U
Toxaphene	80	U	79	U	78	U	78	U	100	U	110	U	100	U	100	U
DIOXIN/FURANS																
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	19700		20800		17600		22500		15200		24000		20200		24600	
Antimony	1	L	0.87	L	0.22	UL	1.4	L	0.31	L	0.21	UL	0.23	L	0.21	UL
Arsenic	6.2	L	5.7	L	4.2	L	5	L	3.8	L	4.2	L	3.4	L	4.2	L
Barium	135		125		124		246		113		77.7		137		99.4	
Beryllium	0.76	R	0.78	K	1	K	0.78	K	0.85	K	0.77	K	0.99	K	0.82	K
Cadmium	5.3	L	3.8	L	0.03	UR	3.9	L	0.19	B	0.03	UR	0.03	U	0.03	UR
Calcium	2710	J	2600	J	885	J	12300	J	1240	J	518	J	1020	J	508	J
Chromium	35.8		30.7		20		28.8		19.6		19.4		18		20.1	
Cobalt	10.4	J	9.2	J	6.5	J	9.6	J	8	J	7.9	J	9.3	J	10	J
Copper	151	K	163	K	11.4	K	182	K	33	K	24.4	K	51	K	33.1	K
Cyanide	0.21	UJ	0.21	UJ	0.21	UJ	0.21	UJ	0.22	UJ	0.2	UJ	0.22	UJ	0.21	UJ
Iron	70900	J	40200	J	18600	J	26700	J	18200	J	19800	J	18200	J	21800	J
Lead	379	J	228	J	12.8	J	128	J	43.8	J	13.1	J	40.3	J	18.5	J
Magnesium	2110	J	2060	J	1700	J	2120	J	1640	J	1360	J	1240	J	1390	J
Manganese	574		484		786		956		724		360		830		554	
Mercury	0.14	K	0.18	K	0.021	J	0.65	K	0.022	J	0.037	K	0.17	K	0.038	K
Nickel	26.9	J	27.8	J	11.8	J	30.2	J	12.2	J	12.8	J	13.3	J	13.7	J
Potassium	1120		1060		644		1400		783		643		689		726	
Selenium	0.33	UR	0.35	UR	0.35	UR	0.33	UR	0.36	UR	0.34	UR	0.35	UR	0.33	UR
Silver	26.3	J	1.6	J	0.04	U	1.7		0.04	U	0.04	U	0.3	B	0.04	U
Sodium	189	R	192	R	158	B	167	R	157	B	145	B	180	K	146	B
Thallium	0.42	UL	0.44	UL	0.45	UL	0.42	UL	0.46	UL	0.43	UL	0.45	UL	0.43	UL
Vanadium	43.4		40.9		31.3		22.7		28.4		32.3		25.7		34.9	
Zinc	282		231		33.4		239		46.3		28.6		51		41.9	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
1,2,4,5-Tetrachlorobenzene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,3,4,6-Tetrachlorophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4,5-Trichlorophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4,6-Trichlorophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4-Dichlorophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4-Dimethylphenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4-Dinitrophenol	810	U	800	U	800	U	800	U	830	U	790	U	850	U	800	U
2,4-Dinitrotoluene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,6-Dinitrotoluene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2-Chloronaphthalene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2-Chlorophenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
2-Methylnaphthalene	200	U	1.3	J	0.93	J	1.3	J	2.5	J	9.9	U	2.8	J	1.4	J
2-Methylphenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2-Nitroaniline	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
2-Nitrophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
3,3'-Dichlorobenzidine	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
3-Nitroaniline	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
4,6-Dinitro-2-methylphenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
4-Bromophenyl Phenyl Ether	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
4-Chloro-3-methylphenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
4-Chloroaniline	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
4-Chlorophenyl Phenyl Ether	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
4-Methylphenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
4-Nitroaniline	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
4-Nitrophenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
Acenaphthene	15	J	1.8	J	0.8	J	0.86	J	3	J	9.9	U	1.2	J	1.2	J
Acenaphthylene	200	U	10	J	1.2	J	0.86	J	2.1	J	1.2	J	1.6	J	1.3	J
Acetophenone	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Anthracene	28	J	19		1.4	J	1.3	J	14		0.86	J	1.6	J	1.2	J
Atrazine	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Benz(a)anthracene	270		180		11		9.6	J	130		7.5	J	11		10	J
Benzaldehyde	210	U	210	U	210	U	210	U	210	U	200	U	77	J	210	U
Benzo(a)pyrene	280		200		14		13		130		9.7	J	16		14	
Benzo(b)fluoranthene	310		250		18		16		130		11		22		16	
Benzo(g,h,i)perylene	180	J	160		11		13		67	J	7.9	J	14		9.9	J
Benzo(k)fluoranthene	290		230		13		18		120		10		16		15	
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Bis(2-chloroethyl)ether	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Bis(2-ethylhexyl)phthalate	210	U	210	U	690		120	J	300		96	J	140	J	210	U
Butylbenzylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Caprolactam	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Carbazole	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Chrysene	280		200		15		15		130		11		20		17	
Di-n-butylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Di-n-octylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Dibenz(a,h)anthracene	51	J	43		2.5	J	2.8	J	35	J	1.7	J	2.9	J	2.2	J
Dibenzofuran	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Diethylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Dimethylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Fluoranthene	370		200		30		24		240		24		28		36	
Fluorene	16	J	2	J	0.91	J	0.73	J	4.6	J	0.75	J	1.3	J	1.6	J
Hexachlorobenzene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Hexachlorobutadiene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Hexachlorocyclopentadiene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Hexachloroethane	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Indeno(1,2,3-cd)pyrene	210		190		12		15		88	J	8.2	J	15		11	
Isophorone	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
N-Nitroso-di-n-propylamine	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
N-Nitrosodiphenylamine (1)	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Naphthalene	200	U	2.3	B	1.4	B	2.1	B	10	B	1	B	4	B	1.8	B
Nitrobenzene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Pentachlorophenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
Phenanthrene	140	J	51		14		10	J	73		11		15		22	
Phenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Pyrene	380		220		29		22		210		23		27		34	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,1,2,2-Tetrachloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
1,1,2-Trichloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,1-Dichloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,1-Dichloroethene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2,3-Trichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2,4-Trichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dibromo-3-chloropropane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dibromoethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichloroethene (cis)	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichloropropane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,3-Dichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,4-Dichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
2-Butanone	7.6	B	8.2	B	15		12	J	10	J	12	U	20		7.3	B
2-Hexanone	13	U	14	U	15	U	14	U	15	U	12	U	16	U	13	U
4-Methyl-2-pentanone	13	U	14	U	15	U	14	U	15	U	12	U	16	U	13	U
Acetone	110	J	120	J	160	J	110	J	120	J	75	B	230	J	110	J
Benzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Bromoform	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Bromomethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Carbon Disulfide	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Carbon Tetrachloride	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Chlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Chloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Chloroform	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Chloromethane	5.4	U	2.4	J	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
cis-1,3-Dichloropropene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Cyclohexane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Dibromochloromethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Dichlorodifluoromethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Ethylbenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Isopropylbenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
M,p-xylene	11	U	11	U	12	U	11	U	12	U	9.6	U	13	U	11	U
Methyl Acetate	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Methyl Tert-butyl Ether (mtbe)	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Methylcyclohexane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Methylene Chloride	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
O-xylene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Styrene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Tetrachloroethene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Toluene	5.4	U	5.5	U	5.9	U	2.2	J	5.8	U	4.8	U	6.3	U	5.3	U
trans-1,3-Dichloropropene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Trichloroethene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Trichlorofluoromethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Xylene (Total)	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	6.3	J	5.4	J	1.9	J	29	J	4.1	U	3.9	U	1.2	J	4	U
4,4'-DDE	210		140		4	UJ	12	J	4.1	U	3.9	U	3.2	J	1.2	J
4,4'-DDT	450		300		4	UJ	130	J	5.1	R	3.9	U	8.9	J	1.4	J
Aldrin	0.57	J	0.68	J	2.1	UJ	2.1	UJ	2.1	U	2	U	0.33	J	2.1	U
Alpha-BHC	2.1	U	2.1	U	2.1	UJ	2.1	UJ	5.6		2	U	2.2	U	2.1	U
Alpha-Chlordane	1.7	J	2.2	J	2.5	R	2.1	UJ	2.1	U	2	U	2.2	U	0.61	J
Aroclor-1016	30	U	29	U	29	UJ	29	UJ	30	U	29	U	31	U	29	U
Aroclor-1221	42	U	41	U	41	UJ	41	UJ	43	U	40	U	44	U	41	U
Aroclor-1232	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1242	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1248	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1254	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1260	62	J	150	J	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	21	U	21	U	1	UJ	1	UJ	1.1	U	1	U	1.1	U	1	U
Delta-BHC	2.1	U	2.1	U	2.1	UJ	2.1	UJ	2.1	U	2	U	2.2	U	2.1	U
Dieldrin	85	J	79	J	3.1	J	3.3	J	4.3		81		11		110	
Endosulfan I	2.1	U	2.1	U	2.1	UJ	2.1	UJ	0.58	J	2	U	2.2	U	2.1	U
Endosulfan II	7.4	J	16	J	4	UJ	4	UJ	4.1	U	3.9	U	0.73	J	4	U
Endosulfan Sulfate	4.1	U	4	U	4	UJ	4	UJ	1.3	J	3.9	U	4.2	U	4	U
Endrin	5.6	J	16	J	4	UJ	4	UJ	4.1	U	3.9	U	0.61	J	4	U
Endrin Aldehyde	4.1	U	4	U	0.61	J	2.2	J	1.6	J	3.9	U	3.7	J	0.94	J
Endrin Ketone	4.1	U	4	U	4	UJ	4	UJ	9.6	J	3.9	U	4.2	U	4	U
Gamma-BHC (Lindane)	2.1	U	2.1	U	2.1	UJ	2.1	UJ	2.1	U	2	U	2.2	U	2.1	U
Gamma-Chlordane	17	J	33	J	2.1	UJ	2.1	UJ	2.1	U	2	U	0.58	J	2.1	U
Heptachlor	2.1	U	2.1	U	2.1	UJ	2.1	UJ	2.1	U	2	U	2.2	U	2.1	U
Heptachlor Epoxide	9.8	J	20	J	2.1	UJ	21	U	0.57	J	2	U	2.2	U	2.1	U
Methoxychlor	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Toxaphene	100	U	100	U	100	UJ	100	UJ	100	U	99	U	110	U	100	U
DIOXIN/FURANS																
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
INORGANICS	**mg/kg**		**mg/kg**	
Aluminum	23900		18500	
Antimony	0.22	L	0.22	UL
Arsenic	3.8	L	4.6	L
Barium	103		79	
Beryllium	0.79	K	0.7	K
Cadmium	0.03	UR	0.03	UR
Calcium	522	J	629	J
Chromium	20.4		24.2	
Cobalt	9.9	J	7.7	J
Copper	34.3	K	16.8	K
Cyanide	0.2	UJ	0.21	UJ
Iron	21200	J	24700	J
Lead	19.2	J	14.7	J
Magnesium	1320	J	2130	J
Manganese	602		334	
Mercury	0.047	K	0.033	J
Nickel	13.7	J	12.5	J
Potassium	680		1100	
Selenium	0.33	UR	0.35	UR
Silver	0.04	U	0.04	U
Sodium	155	B	158	B
Thallium	0.42	UL	0.45	UL
Vanadium	33.9		39.8	
Zinc	42.5		34.3	
SEMIVOLATILES	**ug/kg**		**ug/kg**	
1,1'-Biphenyl	200	U	210	U
1,2,4,5-Tetrachlorobenzene	200	U	210	U
1,2,4-Trichlorobenzene	NA		NA	
1,2-Dichlorobenzene	NA		NA	
1,3-Dichlorobenzene	NA		NA	
1,4-Dichlorobenzene	NA		NA	
1-Methylnaphthalene	NA		NA	
2,2'-Oxybis(1-chloropropane)	200	U	210	U
2,3,4,6-Tetrachlorophenol	200	U	210	U
2,4,5-Trichlorophenol	200	U	210	U
2,4,6-Trichlorophenol	200	U	210	U
2,4-Dichlorophenol	200	U	210	U
2,4-Dimethylphenol	200	U	210	U
2,4-Dinitrophenol	800	U	830	U
2,4-Dinitrotoluene	200	U	210	U
2,6-Dinitrotoluene	200	U	210	U
2-Chloronaphthalene	200	U	210	U
2-Chlorophenol	400	U	410	U
2-Methylnaphthalene	2	J	1.1	J
2-Methylphenol	200	U	210	U
2-Nitroaniline	400	U	410	U
2-Nitrophenol	200	U	210	U
3,3'-Dichlorobenzidine	200	U	210	U
3-Nitroaniline	400	U	410	U
4,6-Dinitro-2-methylphenol	400	U	410	U
4-Bromophenyl Phenyl Ether	200	U	210	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
4-Chloro-3-methylphenol	200	U	210	U
4-Chloroaniline	200	U	210	U
4-Chlorophenyl Phenyl Ether	200	U	210	U
4-Methylphenol	400	U	410	U
4-Nitroaniline	400	U	410	U
4-Nitrophenol	400	U	410	U
Acenaphthene	0.88	J	10	U
Acenaphthylene	1.9	J	1.2	J
Acetophenone	200	U	210	U
Anthracene	2.1	J	0.99	J
Atrazine	200	U	210	U
Benz(a)anthracene	13		7.6	J
Benzaldehyde	200	U	210	U
Benzo(a)pyrene	14		10	J
Benzo(b)fluoranthene	21		11	
Benzo(g,h,i)perylene	10	J	8.1	J
Benzo(k)fluoranthene	12		11	
Benzoic Acid	NA		NA	
Benzyl Alcohol	NA		NA	
Bis(2-chloroethoxy)methane	200	U	210	U
Bis(2-chloroethyl)ether	200	U	210	U
Bis(2-ethylhexyl)phthalate	200	U	210	U
Butylbenzylphthalate	200	U	210	U
Caprolactam	200	U	210	U
Carbazole	200	U	210	U
Chrysene	18		12	
Di-n-butylphthalate	200	U	210	U
Di-n-octylphthalate	200	U	210	U
Dibenz(a,h)anthracene	2.2	J	1.7	J
Dibenzofuran	200	U	210	U
Diethylphthalate	200	U	210	U
Dimethylphthalate	200	U	210	U
Fluoranthene	44		23	
Fluorene	1.6	J	0.88	J
Hexachlorobenzene	200	U	210	U
Hexachlorobutadiene	200	U	210	U
Hexachlorocyclopentadiene	200	U	210	U
Hexachloroethane	200	U	210	U
Indeno(1,2,3-cd)pyrene	15		9.1	J
Isophorone	200	U	210	U
N-Nitroso-di-n-propylamine	200	U	210	U
N-Nitrosodiphenylamine (1)	200	U	210	U
Naphthalene	3.8	B	1.5	B
Nitrobenzene	200	U	210	U
Pentachlorophenol	400	U	410	U
Phenanthrene	16		11	
Phenol	200	U	210	U
Pyrene	27		22	
VOLATILES	**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5.5	U	5.3	U
1,1,2,2-Tetrachloroethane	5.5	U	5.3	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.5	U	5.3	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
1,1,2-Trichloroethane	5.5	U	5.3	U
1,1-Dichloroethane	5.5	U	5.3	U
1,1-Dichloroethene	5.5	U	5.3	U
1,2,3-Trichlorobenzene	5.5	U	5.3	U
1,2,4-Trichlorobenzene	5.5	U	5.3	U
1,2-Dibromo-3-chloropropane	5.5	U	5.3	U
1,2-Dibromoethane	5.5	U	5.3	U
1,2-Dichlorobenzene	5.5	U	5.3	U
1,2-Dichloroethane	5.5	U	5.3	U
1,2-Dichloroethene (cis)	5.5	U	5.3	U
1,2-Dichloroethene (Total)	NA		NA	
1,2-Dichloroethene (trans)	5.5	U	5.3	U
1,2-Dichloropropane	5.5	U	5.3	U
1,3-Dichlorobenzene	5.5	U	5.3	U
1,4-Dichlorobenzene	5.5	U	5.3	U
2-Butanone	13	J	6.8	B
2-Hexanone	14	U	13	U
4-Methyl-2-pentanone	14	U	13	U
Acetone	130	J	93	J
Benzene	5.5	U	5.3	U
Bromochloromethane	NA		NA	
Bromodichloromethane	5.5	U	5.3	U
Bromoform	5.5	U	5.3	U
Bromomethane	5.5	U	5.3	U
Carbon Disulfide	5.5	U	5.3	U
Carbon Tetrachloride	5.5	U	5.3	U
Chlorobenzene	5.5	U	5.3	U
Chloroethane	5.5	U	5.3	U
Chloroform	5.5	U	5.3	U
Chloromethane	5.5	U	5.3	U
cis-1,3-Dichloropropene	5.5	U	5.3	U
Cyclohexane	5.5	U	5.3	U
Dibromochloromethane	5.5	U	5.3	U
Dichlorodifluoromethane	5.5	U	5.3	U
Ethylbenzene	5.5	U	5.3	U
Isopropylbenzene	5.5	U	5.3	U
M,p-xylene	11	U	11	U
Methyl Acetate	5.5	U	5.3	U
Methyl Tert-butyl Ether (mtbe)	5.5	U	5.3	U
Methylcyclohexane	5.5	U	5.3	U
Methylene Chloride	5.5	U	5.3	U
O-xylene	5.5	U	5.3	U
Styrene	5.5	U	5.3	U
Tetrachloroethene	5.5	U	5.3	U
Toluene	5.5	U	5.3	U
trans-1,3-Dichloropropene	5.5	U	5.3	U
Trichloroethene	5.5	U	5.3	U
Trichlorofluoromethane	5.5	U	5.3	U
Vinyl Acetate	NA		NA	
Vinyl Chloride	5.5	U	5.3	U
Xylene (Total)	5.5	U	5.3	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
PESTICIDES/PCBS	**ug/kg**		**ug/kg**	
4,4'-DDD	4	U	4.1	U
4,4'-DDE	1.2	J	4.1	U
4,4'-DDT	1.4	J	4.1	U
Aldrin	2	U	2.1	U
Alpha-BHC	2	U	2.1	U
Alpha-Chlordane	1.2	J	2.1	U
Aroclor-1016	29	U	30	U
Aroclor-1221	41	U	43	U
Aroclor-1232	20	U	21	U
Aroclor-1242	20	U	21	U
Aroclor-1248	20	U	21	U
Aroclor-1254	20	U	21	U
Aroclor-1260	20	U	21	U
Aroclor-1262	NA		NA	
Aroclor-1268	NA		NA	
Beta-BHC	1	U	1.1	U
Delta-BHC	2	U	2.1	U
Dieldrin	110		14	
Endosulfan I	2	U	2.1	U
Endosulfan II	4	U	4.1	U
Endosulfan Sulfate	4	U	4.1	U
Endrin	4	U	4.1	U
Endrin Aldehyde	4	U	4.1	U
Endrin Ketone	4	U	4.1	U
Gamma-BHC (Lindane)	2	U	2.1	U
Gamma-Chlordane	2	U	2.1	U
Heptachlor	2	U	2.1	U
Heptachlor Epoxide	2	U	2.1	U
Methoxychlor	20	U	21	U
Toxaphene	100	U	100	U
DIOXIN/FURANS				
1,2,3,4,6,7,8-HpCDD	NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA	
1,2,3,7,8-PeCDD	NA		NA	
1,2,3,7,8-PeCDF	NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA	
2,3,4,7,8-PeCDF	NA		NA	
2,3,7,8-TCDD	NA		NA	
2,3,7,8-TCDF	NA		NA	
OCDD	NA		NA	
OCDF	NA		NA	
Teq Halfnd	NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
Total HpCDD	NA		NA	
Total HpCDF	NA		NA	
Total HxCDD	NA		NA	
Total HxCDF	NA		NA	
Total PeCDD	NA		NA	
Total PeCDF	NA		NA	
Total TCDD	NA		NA	
Total TCDF	NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW01**		**03SW03**		**03SW04**		**03SW05**		**03SW08**		**03SW09**		**03SW09-D**		**03SW10**		**03SW10**	**03SW10**
Sample Date:	**9/16/1991**		**9/16/1991**		**9/16/1991**		**9/23/1991**		**3/20/1997**		**3/20/1997**		**3/20/1997**		**3/19/2008**		**10/13/2008**	**4/1/2009**
Duplicate:													**03SW09**					
INORGANICS	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**			
Aluminum	1030		74	B	157	B	838		357	B	441	B	382	B	80	U	NA	NA
Antimony	45	U	64		45	U	45	U	20	U	20	U	20	U	2	U	NA	NA
Arsenic	2	U	2	U	2	U	2		1	U	1	U	1	U	6	U	NA	NA
Barium	42		99		94		15		60.8		58.8		23.3		84.1		NA	NA
Beryllium	5		5		5		3	B	1	U	1	U	1	U	1	U	NA	NA
Cadmium	4	U	4	U	4	U	4	U	5	U	5	U	5	U	1	U	NA	NA
Calcium	13100		19100		10400		8900		45600		11100		11000		16400		NA	NA
Chromium	7	U	7	U	7	U	7	U	245		5	U	5	U	1.5	B	NA	NA
Cobalt	10	U	10	U	10	U	10	U	6.3		5	U	5	U	6	U	NA	NA
Copper	9		4		5	B	7	B	20.5	K	22.5	K	29.6	K	0.8	B	NA	NA
Cyanide	12	U	12.5	U	12.5	U	10	U	8		5	U	5	U	NA		NA	NA
Iron	1360		1940		685		1490		747		618		530		430		NA	NA
Lead	9.6		1.1		1.4		1.8		83.5		1.8	K	1.4	K	0.07	J	NA	NA
Magnesium	3150		4240		3590		3030		13800		3220		3220		5800		NA	NA
Manganese	112		1550		315		67		84.7		37.8		25.2		95.6		NA	NA
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.5	U	NA	NA
Nickel	12	B	12	U	12	U	19		20	U	20	U	20	U	1.2	J	NA	NA
Potassium	2560		2670		2140	U	4060		1520		2460		2210		1730		NA	NA
Selenium	4	U	4	U	4	U	4	U	1	UL	1	U	1	U	6	U	NA	NA
Silver	6	U	6	U	6	U	6	U	5	U	5	U	5	U	0.6	B	NA	NA
Sodium	4450	U	4800		246000		4450	U	5620		1240		1280		7670		NA	NA
Thallium	2	U	2	U	2	U	2	U	1	U	1	U	1	U	1	U	NA	NA
Vanadium	4	U	4	U	4	U	6		5	U	5	U	5	U	0.8	B	NA	NA
Zinc	14	B	7	B	17	B	23		11700		22.1		14.1		3.6	J	NA	NA
SEMIVOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**			
1,1-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA	NA
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA	NA
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
1,4-Dioxane	NA		NA		NA		NA		NA		NA		NA		2.9	U	NA	NA
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA	NA
2,2'-Oxybis(1-chloropropane)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA	NA
2,4,5-Trichlorophenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA	NA
2,4,6-Trichlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2,4-Dinitrophenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA	NA
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
2-Nitroaniline	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA	NA
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA	NA
3,3'-Dichlorobenzidine	20	U	20	U	20	U	20	U	10	U	10	U	10	U	NA		NA	NA
3-Nitroaniline	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA	NA
4,6-Dinitro-2-methylphenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW01**		**03SW03**		**03SW04**		**03SW05**		**03SW08**		**03SW09**		**03SW09-D**		**03SW10**		**03SW10**		**03SW10**	
Sample Date:	**9/16/1991**		**9/16/1991**		**9/16/1991**		**9/23/1991**		**3/20/1997**		**3/20/1997**		**3/20/1997**		**3/19/2008**		**10/13/2008**		**4/1/2009**	
Duplicate:													**03SW09**							
4-Bromophenyl Phenyl Ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Chloroaniline	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Chlorophenyl Phenyl Ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Nitroaniline	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
4-Nitrophenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
Acenaphthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Acenaphthylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzoic Acid	50	U	50	U	50	U	50	U	NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	10	U	10	U	10	U	10	U	NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Bis(2-chloroethyl)ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Bis(2-ethylhexyl)phthalate	1	J	10	U	10	U	2	B	10	U	10	U	10	U	NA		NA		NA	
Butylbenzylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		10	U	10	U	10	U	NA		NA		NA	
Chrysene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Di-n-butylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Di-n-octylphthalate	10	U	10	U	10	U	3	B	10	U	10	U	10	U	NA		NA		NA	
Dibenz(a,h)anthracene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Dibenzofuran	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Diethylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Dimethylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Fluorene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachlorobutadiene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Isophorone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
N-Nitrosodiphenylamine (1)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Naphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Pentachlorophenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
Phenanthrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Phenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW01**		**03SW03**		**03SW04**		**03SW05**		**03SW08**		**03SW09**		**03SW09-D**		**03SW10**		**03SW10**		**03SW10**	
Sample Date:	**9/16/1991**		**9/16/1991**		**9/16/1991**		**9/23/1991**		**3/20/1997**		**3/20/1997**		**3/20/1997**		**3/19/2008**		**10/13/2008**		**4/1/2009**	
Duplicate:													**03SW09**							
1,1,2-Trichloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,1-Dichloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,1-Dichloroethene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		7	U	7	U	7	U
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloroethene (Total)	5	U	5	U	5	U	5	U	10	U	10	U	10	U	NA		NA		NA	
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloropropane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,4-Dioxane	NA		NA		NA		NA		NA		NA		NA		NA		320	U	NA	
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	UR	10	U	10	UR
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U	5	U	5	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U	5	U	5	U
Acetone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	UR	10	U	10	UR
Benzene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Bromodichloromethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Bromoform	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U	1	U
Carbon Disulfide	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Carbon Tetrachloride	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Chlorobenzene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U	1	U
Chloroform	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Dibromochloromethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Ethylbenzene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
M+p-xylenes	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
Methyl Cyclohexane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Methyl Tert-butyl Ether	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Methylene Chloride	2	B	3	B	3	B	4	B	10	U	7	B	10	U	1	U	1	U	1	U
O-xylene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Styrene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Tetrachloroethene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Toluene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	0.21	J	1	U	1	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Trichloroethene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Vinyl Acetate	10	U	10	U	10	U	10	U	NA		NA		NA		NA		NA		NA	
Vinyl Chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U	1	U
Xylene (Total)	5	U	5	U	5	U	5	U	10	U	10	U	10	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW01**		**03SW03**		**03SW04**		**03SW05**		**03SW08**		**03SW09**		**03SW09-D**		**03SW10**	**03SW10**	**03SW10**
Sample Date:	**9/16/1991**		**9/16/1991**		**9/16/1991**		**9/23/1991**		**3/20/1997**		**3/20/1997**		**3/20/1997**		**3/19/2008**	**10/13/2008**	**4/1/2009**
Duplicate:													**03SW09**				
PESTICIDES/PCBS	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**				
4,4'-DDD	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA	NA	NA
4,4'-DDE	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA	NA	NA
4,4'-DDT	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA	NA	NA
Aldrin	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Alpha-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Alpha-Chlordane	0.5	U	0.5	U	0.5	U	0.5	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Beta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Delta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Dieldrin	0.1	U	0.1	U	0.1	U	0.1	U	0.03	J	0.02	J	0.02	J	NA	NA	NA
Endosulfan I	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Endosulfan II	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA	NA	NA
Endosulfan Sulfate	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA	NA	NA
Endrin	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA	NA	NA
Endrin Aldehyde	NA		NA		NA		NA		0.1	U	0.1	U	0.1	U	NA	NA	NA
Endrin Ketone	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA	NA	NA
Gamma-BHC (Lindane)	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Gamma-Chlordane	0.5	U	0.5	U	0.5	U	0.5	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Heptachlor	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Heptachlor Epoxide	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA	NA	NA
Methoxychlor	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NA	NA	NA
Toxaphene	1	U	1	U	1	U	1	U	5	U	5	U	5	U	NA	NA	NA
Aroclor-1016	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	NA	NA	NA
Aroclor-1221	0.5	U	0.5	U	0.5	U	0.5	U	2	U	2	U	2	U	NA	NA	NA
Aroclor-1232	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	NA	NA	NA
Aroclor-1242	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	NA	NA	NA
Aroclor-1248	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	NA	NA	NA
Aroclor-1254	1	U	1	U	1	U	1	U	1	U	1	U	1	U	NA	NA	NA
Aroclor-1260	1	U	1	U	1	U	1	U	1	U	1	U	1	U	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW10-D**		**03SW11**		**03SW11**	**03SW11**	**03-SW-12**		**03-SW-13**		**03-SW-14**		**03-SW-15**		**03-SW-15-D**		**03-SW-16**		**03-SW-17**	
Sample Date:	**4/1/2009**		**3/19/2008**		**10/13/2008**	**4/1/2009**	**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:	**03SW10**														**03-SW-15**					
INORGANICS			**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Aluminum	NA		174		NA	NA	159	K	146	K	154	K	185	K	151	K	120	K	317	K
Antimony	NA		2	U	NA	NA	1.9	U	1.9	U	2	B	2.3	B	1.9	U	1.9	U	2.3	B
Arsenic	NA		6	U	NA	NA	2.7	U	2.7	U	2.7	U	2.7	U	2.7	U	2.7	U	2.7	U
Barium	NA		113		NA	NA	57.9		46.2		55.1		33.8		33.9		32.5		40	
Beryllium	NA		1	U	NA	NA	0.86	B	1.1	B	1.1	B	1.6	B	1.1	B	0.7	B	1.8	B
Cadmium	NA		1	U	NA	NA	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Calcium	NA		22300		NA	NA	13600		13700		13200		13900		14000		14100		13400	
Chromium	NA		1.7	B	NA	NA	0.87	U	1.1		1.3		1.1		0.87	U	1.1		0.87	U
Cobalt	NA		0.2	J	NA	NA	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U
Copper	NA		3	B	NA	NA	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U
Cyanide	NA		NA		NA	NA	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Iron	NA		1060		NA	NA	228		185		222		232		225		216		245	
Lead	NA		0.9	J	NA	NA	2.2		2.5		2.5		2.3		2	U	2.7		2.3	
Magnesium	NA		7470		NA	NA	4050		3940		3970		3750		3760		3770		3780	
Manganese	NA		197		NA	NA	46.2		41.6		39		52.7		53		33		30.9	
Mercury	NA		0.5	U	NA	NA	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	NA		2	J	NA	NA	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U
Potassium	NA		1880		NA	NA	1430	L	1520	L	1440	L	1610	L	1600	L	1610	L	1650	L
Selenium	NA		6	U	NA	NA	4.7	U	4.7	U	4.7	U	4.7	U	4.7	U	4.7	U	4.7	U
Silver	NA		0.6	B	NA	NA	0.63	U	0.63	U	0.63	U	0.63	U	0.63	U	0.63	U	0.63	U
Sodium	NA		18800		NA	NA	6350		6240		6500		5510	B	5580	B	5730	B	5790	B
Thallium	NA		1	U	NA	NA	5	UL	5	UL	5	UL	5	UL	5	UL	5	UL	5	UL
Vanadium	NA		1.4		NA	NA	1.1	B	1.1	B	1.1	B	0.96	B	1.1	B	1.4	B	1.1	B
Zinc	NA		16		NA	NA	5.1	B	4.8	B	6	B	5.5	B	6.4	B	5.7	B	11.9	L
SEMIVOLATILES			**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1-Biphenyl	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
1,2,4,5-Tetrachlorobenzene	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
1,2,4-Trichlorobenzene	NA		NA		NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,4-Dioxane	NA		3	U	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA	NA	0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
2,2'-Oxybis(1-chloropropane)	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,3,4,6-Tetrachlorophenol	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4,5-Trichlorophenol	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4,6-Trichlorophenol	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4-Dichlorophenol	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4-Dimethylphenol	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4-Dinitrophenol	NA		NA		NA	NA	11	U	10	U	10	U	11	U	11	U	10	U	10	U
2,4-Dinitrotoluene	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,6-Dinitrotoluene	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2-Chloronaphthalene	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2-Chlorophenol	NA		NA		NA	NA	11	U	10	U	10	U	11	U	11	U	10	U	10	U
2-Methylnaphthalene	NA		NA		NA	NA	0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
2-Methylphenol	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2-Nitroaniline	NA		NA		NA	NA	11	U	10	U	10	U	11	U	11	U	10	U	10	U
2-Nitrophenol	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
3,3'-Dichlorobenzidine	NA		NA		NA	NA	5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
3-Nitroaniline	NA		NA		NA	NA	11	U	10	U	10	U	11	U	11	U	10	U	10	U
4,6-Dinitro-2-methylphenol	NA		NA		NA	NA	11	U	10	U	10	U	11	U	11	U	10	U	10	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW10-D**		**03SW11**		**03SW11**		**03SW11**		**03-SW-12**		**03-SW-13**		**03-SW-14**		**03-SW-15**		**03-SW-15-D**		**03-SW-16**		**03-SW-17**	
Sample Date:	**4/1/2009**		**3/19/2008**		**10/13/2008**		**4/1/2009**		**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:	**03SW10**																**03-SW-15**					
4-Bromophenyl Phenyl Ether	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
4-Chloro-3-methylphenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
4-Chloroaniline	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
4-Chlorophenyl Phenyl Ether	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
4-Methylphenol	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
4-Nitroaniline	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
4-Nitrophenol	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
Acenaphthene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
Acenaphthylene	NA		NA		NA		NA		0.21	U	0.2	U	0.016	J	0.22	U	0.22	U	0.2	U	0.2	U
Acetophenone	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Anthracene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
Atrazine	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Benz(a)anthracene	NA		NA		NA		NA		0.21	U	0.2	U	0.027	J	0.22	U	0.22	U	0.2	U	0.2	U
Benzaldehyde	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Benzo(a)pyrene	NA		NA		NA		NA		0.21	U	0.2	U	0.047	J	0.22	U	0.018	J	0.2	U	0.013	J
Benzo(b)fluoranthene	NA		NA		NA		NA		0.016	J	0.015	J	0.097	J	0.014	J	0.021	J	0.2	U	0.016	J
Benzo(g,h,i)perylene	NA		NA		NA		NA		0.21	U	0.2	U	0.036	J	0.22	U	0.018	J	0.2	U	0.2	U
Benzo(k)fluoranthene	NA		NA		NA		NA		0.014	J	0.013	J	0.085	J	0.22	U	0.014	J	0.2	U	0.2	U
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Bis(2-chloroethyl)ether	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Bis(2-ethylhexyl)phthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Butylbenzylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Caprolactam	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Carbazole	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Chrysene	NA		NA		NA		NA		0.21	U	0.2	U	0.053	J	0.22	U	0.22	U	0.2	U	0.2	U
Di-n-butylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Di-n-octylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Dibenz(a,h)anthracene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.012	J	0.2	U	0.2	U
Dibenzofuran	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Diethylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Dimethylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Fluoranthene	NA		NA		NA		NA		0.21	U	0.2	U	0.12	J	0.22	U	0.016	J	0.2	U	0.012	J
Fluorene	NA		NA		NA		NA		0.67		0.63		0.69		0.67		0.64		0.62		0.59	
Hexachlorobenzene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Hexachlorobutadiene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Hexachlorocyclopentadiene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Hexachloroethane	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		0.011	J	0.01	J	0.042	J	0.22	U	0.017	J	0.01	J	0.012	J
Isophorone	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
N-Nitroso-di-n-propylamine	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
N-Nitrosodiphenylamine (1)	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Naphthalene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
Nitrobenzene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Pentachlorophenol	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
Phenanthrene	NA		NA		NA		NA		0.21	U	0.2	U	0.096	J	0.22	U	0.22	U	0.2	U	0.2	U
Phenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Pyrene	NA		NA		NA		NA		0.013	J	0.013	J	0.099	J	0.012	J	0.021	J	0.014	J	0.02	J
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW10-D**		**03SW11**		**03SW11**		**03SW11**		**03-SW-12**		**03-SW-13**		**03-SW-14**		**03-SW-15**		**03-SW-15-D**		**03-SW-16**		**03-SW-17**	
Sample Date:	**4/1/2009**		**3/19/2008**		**10/13/2008**		**4/1/2009**		**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:	**03SW10**																**03-SW-15**					
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene	2	U	2	U	2	U	2	U	0.18	B	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	2	U	2	U	2	U	2	U	0.18	B	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-chloropropane	7	U	7	U	7	U	7	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene (cis)	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene (trans)	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dioxane	NA		NA		320	U	NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	10	UR	10	UR	10	U	10	UR	2.5	UR	2.5	UR	2.5	UR	2.5	UR	2.5	UR	2.5	UR	2.5	UR
2-Hexanone	5	U	5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Acetone	10	UR	10	UR	10	U	10	UR	2.5	U	2.5	U	2.5	U	1.3	J	2.5	U	2.8		3.8	
Benzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
M+p-xylenes	2	U	2	U	2	U	2	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Acetate	2	U	2	U	2	U	2	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Cyclohexane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Tert-butyl Ether	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
O-xylene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichlorofluoromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Xylene (Total)	NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW10-D**		**03SW11**		**03SW11**		**03SW11**		**03-SW-12**		**03-SW-13**		**03-SW-14**		**03-SW-15**		**03-SW-15-D**		**03-SW-16**		**03-SW-17**	
Sample Date:	**4/1/2009**		**3/19/2008**		**10/13/2008**		**4/1/2009**		**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:	**03SW10**																**03-SW-15**					
PESTICIDES/PCBS									**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
4,4'-DDD	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
4,4'-DDE	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
4,4'-DDT	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Aldrin	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Alpha-BHC	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Alpha-Chlordane	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Beta-BHC	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Delta-BHC	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Dieldrin	NA		NA		NA		NA		0.0096	J	0.0096	J	0.011	J	0.008	J	0.0082	J	0.0097	J	0.011	J
Endosulfan I	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Endosulfan II	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endosulfan Sulfate	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin Aldehyde	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin Ketone	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Gamma-BHC (Lindane)	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Gamma-Chlordane	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Heptachlor	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Heptachlor Epoxide	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Methoxychlor	NA		NA		NA		NA		0.53	U	0.51	U	0.5	U	0.5	U	0.5	U	0.51	U	0.5	U
Toxaphene	NA		NA		NA		NA		2.6	U	2.6	U	2.5	U	2.5	U	2.5	U	2.6	U	2.5	U
Aroclor-1016	NA		NA		NA		NA		0.98	U	0.95	U	0.93	U	0.93	U	0.93	U	0.95	U	0.93	U
Aroclor-1221	NA		NA		NA		NA		1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor-1232	NA		NA		NA		NA		0.98	U	0.95	U	0.93	U	0.93	U	0.93	U	0.95	U	0.93	U
Aroclor-1242	NA		NA		NA		NA		0.66	U	0.64	U	0.63	U	0.63	U	0.63	U	0.64	U	0.63	U
Aroclor-1248	NA		NA		NA		NA		0.66	U	0.64	U	0.63	U	0.63	U	0.63	U	0.64	U	0.63	U
Aroclor-1254	NA		NA		NA		NA		0.66	U	0.64	U	0.63	U	0.63	U	0.63	U	0.64	U	0.63	U
Aroclor-1260	NA		NA		NA		NA		0.98	U	0.95	U	0.93	U	0.93	U	0.93	U	0.95	U	0.93	U

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SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

APPENDIX B

SOIL BORING AND MONITORING WELL INSTALLATION LOGS

SOIL BORINGS

BORING LOG S3W-2I

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. S3W-2.I
DATE 4/21/97 (5/7/97 below 13')
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury
Robert Good

Time	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
4/21/97 1105	4				Soft.	Dark yellow orange	0-4' Silty(30%) CLAY with trace sand, moist.	CL	Color varies to Light BRN PID=0
1109					Med HARD	Light gray	6' SANDSTONE slight weathering coarse to very coarse.		PID=0
11:10	8				Very HARD	Pinkish Gray	7' Sandstone, Coarse to very coarse		
1115	12				very HARD	Pinkish Gray to white	11' SANDSTONE, very coarse grained, slight weathering, quartz rich Wet		11' - water PID=0
1120 5/7/97 8:55	16				HARD	Brown	13' SAME 14' SANDstone - Fine to Coarse grained, Soft Streaks ≈ 16'		SET 6" steel casing AT 13' Water < 5 GPM
	20					Reddish Gray	19' SANDstone, Fine grained Few softer brown stained weathering streaks		
9:18	24					Reddish Gray	22' sandstone, Fine grained 24' - "DRY" Fracture		Additional water < .5 gpm Yield = 1 GPM
	28				HARD	Light Gray	25.5' weathered streak on Fracture 27' SANDstone - Less Stain		25' yield ≈ 5 GPM PID=0
0941	32				HARD	Pinkish Gray	28'-29' Conglomerate, Arkose AND Fine grained SST.		27-28' Slight increased water yield ≈ 5 GPM (total)
10:02	36					Light Pinkish Gray	30'-34' SANDstone, Fine grained trace "rusty" staining. 35' - White clay incl. in SST.		Muddy brown gw discharge PID = 0 ppm
10:23	40					Light Gray	39' SANDstone, Fine grained Some medium - coarse grained sand AND Pebbles		water ≈ 7 GPM
	44						41'-42' possible Fracture, some white to greenish/gray clay incl.		
10:38	48						43'-44' SAME with possible thin silty streaks		47' Lost some water - Fracture
	52					Reddish Brown	49' Mudstone to Siltstone micaceous. 49-54'		
10:59	56				HARD	Reddish BRN	Mudstone grading to harder Siltstone and Fine grained Sandstone some softer Shale/Mudstone		—

REMARKS

BORING NO.

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BORING LOG S3W - 2I (page 2)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. S3W - 2I
DATE 5/7/97
DRILLER Advanced Drilling INC
FIELD GEOLOGIST ~~Robin Loansbury~~ ROBERT GOOD

SAMPLE NO. / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC LENGTH	LITHO CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	56'								
11:06	60					Reddish Brown	54-59' Siltstone/Mudstone with very fine grained sand, micaceous PID = 0		Slight increased water TOTAL ≈ 8-10 GPM
11:15	64						59'-64' SAME		Possible increased water ≈ 10-12 GPM
	68				HARD	Reddish Brown	64'-68' Siltstone And fine grained sand - relative harder		
11:35	72				very HARD	Reddish BRN to Reddish Gray	68-69' Sandstone silty, micaceous, very fine And fine grained, 70' Fracture on SHALE seam.		possibly increase water to 12-15 GPM
12:02	76				hard	Reddish BRN to Reddish Gray	74-76' Silty SANDstone very fine grained, to Siltstone		75' poss. Fracture Slight water increase to 15-18 GPM
1223	80						76-78 Slightly softer AND more Red, Shaley 78'-81' As Above		
	84					Med Dark Brown Red-Brn	81'-83 SANDstone, fine grained 83'-84' Mudstone and Siltstone		water increased to 25 GPM
1238	88				med. HARD	Reddish Brown	84'-89' SILTstone AND very fine grained SANDstone, Some Shaley intervals (Redder color)		
1255	92					Reddish Gray	91' micaceous, Silty SANDstone Fine grained, with siltstone		0.0 PPM
1321	96				HARD	Reddish Gray	93.5'-94' Siltstone 94' SANDstone, very fine to fine grained, micaceous 0.0 ppm		92.5'-93' Fracture 95' Fracture water ≈ 30 GPM
13:47	100						99' As Above		
14:19	104				Hard	Light Gray	99-104 SANDstone, fine grained with some "rusty" brown		
14:57	108						104'-109' SAME AS Above		0.0 PPM
15:00	112						109'-114' SAME As Above		—

REMARKS

BORING NO.

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BORING LOG S3W-2I (page 3)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. S3W-2I
DATE 5/7/97 (5/8/97 below 119')
DRILLER Advanced Drilling INC
FIELD GEOLOGIST ~~Tosha Lounsbury~~ Robert Good

SAMPLE NO. / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	112								
5/7/97 1536	116					Very Lt Gray to Lt. Pinkish Gray	114'-116' SANDSTONE, fine grained		
1607	120					Lt. Grayish Brown	116'-119' SANDSTONE, fine grained		
5/8/97 0822						Medium Brown Reddish Brown	120' SANDSTONE, fine grained. 121' micaceous SILTSTONE And very fine grained SST.		121' Possible Fracture water ~ 35 GPM
0836	124								
	128'					Reddish Brown	124'-127' SILTSTONE And silty Sandstone, very fine grained - Few thin Shaley mudstone/claystone Layers		Possible fractures 0.0 ppm
0850	132						127'-129' As Above 130'-131' Possible Fracture		
	136					Reddish Gray	129'-134' As Above 135-136' Micaceous SILTstone Slightly Harder		
924	140				HARD	Lt Reddish Gray	136'-139' SANDStone silty Fine grained grades to Lt Brn. Fine grained SST.		0.0 ppm
10:12	144				HARD	Reddish Gray / Pinkish Gray	140'-141' Silty SANDStone, Very fine grained 142-144' SANDSTONE Fine grained		Possible small Fractures water increase to ~45 GPM
	~~148~~						144' Total Depth of Borehole		
									—

REMARKS

BORING NO.

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BORING LOG S3W-5I / 03MW05I

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W-5I
DATE 4/18/97 (4/17/97 0'-5') (4/23/97 below 27')
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

	SAMPLE NO. / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
		0								
4/17/97	1612	4				Soft	Brownish BRN	SILT with clay (20%) trace sand (<5%) soft, moist		
	1615	8				Soft	Light Brown	SILT with sand (20-40%) trace clay, loose DRY		
4/18/97	0835 0837	12				Soft Soft	Light BRN	SANDSTONE, very weathered medium grained 11' Clayey SILT with sand (5%)		PID=0
	0839	16				Soft	Light BRNish Gray	15' SANDSTONE, very weathered much silt included		PID=0
	0843	20				Medium Soft	Grayish Red	17' SILTSTONE with claystone weathered.		
	0851	24				Med. Soft Med. HARD	BRN Gray BRN Gray	20' SANDSTONE, weathered, med. grained, DRY 21' SANDSTONE, weathered, DRY		23' HARD SST Slight weathering
	0900 0910	28				HARD HARD	Grayish BRN Blackish Red	25' SANDSTONE, Slight weathering DRY (10% siltstone) 27' SANDSTONE w/siltstone (20%)		PID=0 Set 6" CASING to 27' Deep
23/97	1100	32				HARD	BRNish Gray	29' SANDSTONE, medium grained, weathered, many Lt Brown oxidation "spots", DAMP		PID=0 trace water at 30' Fracture at 31' (1")
	1118	36						33' SAME		water at 33' 0.1-0.2 GPM
	1135	40				HARD	Lt BRNish Gray	36' Sandstone, coarse grained well sorted, Slight weathering, some oxidation spots SUBANGULAR grains.		PID=0 36' water @ 0.7 39' 1GPM GPM
	1157	44				HARD	Light Brownish Gray	42' SANDSTONE, medium grained well sorted, Slight weathering, trace of iron oxide "spots"		water @ 5 GPM
	1223	48				very HARD	~~med.~~ Light Gray	47' Sandstone, medium grained well sorted, slight weathering to FRESH,		
		52								
	1250	56				very HARD	Pinkish Gray	52' SANDSTONE, medium to coarse grained, Fresh, some surface stain on cuttings PID=0		

REMARKS

BORING NO.

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BORING LOG S3W-5I (Page 2)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO.
DATE 4/23/97 (4/24/97 Below 105')
DRILLER Advanced Drilling INC (Rick EMPSON)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
1310	56						56' SAME water ≈ 6-7 GPM		Fracture zones 56; 57.5-58 59.5-62'
1322	60				very HARD	Lt Brnish Gray to Lt Gray	62' SANDstone, coarse grained well sorted, slight weathering very HARD PID=0		NO SIGNIFICANT increased water Produced ≈7 GPM
1341	64				very HARD	BRNish Gray	66' SILTstone, trace of very fine grained sand trace of Kaolinite clay.		Light RAIN
1350	68				very HARD	BRNish Gray	69' SILTstone with fine grained sand (10%) AND Kaolinite CLAY (white soft paste) 5%.		PID NOT working Properly
1402	72						74' SAME NO KAOLINITE CLAY observed		
1420	76						77' SAME 79'-80' Fracture		water from Borehole ≈ 9 GPM
1444	80				med soft very HARD	DK Red BRN Grayish Red	80' Clay stone 82' SILTstone trace CLAYstone TRACE very Fine grained SAND		Fracture 83-83.5 TOTAL WATER ≈ 11 GPM
1500	84				HARD	Grayish Red	84' SILTstone, with CLAYstone (20%) Fresh, HARD		15:00 RAIN stopped
1517	88						88' SAME - HARD to VERY HARD		Fracture 89.-89.5 WATER ≈ 11 GPM
1540	92				very HARD	Grayish Red to Blackish RED	94' SILTstone, with very fine grained sand (10%) Fresh, very HARD, PID=0		
1600 1630	96						96' Same - 99' SAME		SLOW Drilling
1652	100				very HARD	Grayish Red	102' SANDSTONE, with siltstone (30%), very fine grained, Fresh		TOTAL RATE of water ≈ 13 GPM
1/24/97 0809	104				very HARD	Light Brownish Gray	105' SANDstone with Siltstone (20%) very fine grained, well sorted, Fresh,		PID=0 water ≈ 13 GPM
0840	108						109' SAME		
	112								

REMARKS

BORING NO.

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BORING LOG S3W-5I (Page 3)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. S3W-5I
DATE 4/24/97
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	112								
0859 0909	116				Very HARD	Grayish RED	112' SILTstone, trace very fine grained sand, Fresh, very HARD 114' SAME		Fracture 111' Fracture 112'-112.5' Fracture 114'
0928	120				Very HARD	Pinkish Gray / Lt BRN Gray	117' SAME - color varies Grayish Red / Blackish Red		Water ≈ 15 GPM Fracture 116' Water ≈ 16 GPM
0935	124				Very HARD	Pinkish Gray / Lt. BRN Gray	119' SANDSTONE, Very Coarse grained Angular to Sub Angular quartz/FeldsPar sand, Fresh to Slight Weathering		Some granules > 2 mm PID = 0
0955	128				Very HARD	Pinkish Gray to White	124' Conglomeritic SANDSTONE, very coarse grained with granules & pebbles Range 1mm - 10mm 80% of grains 1.5 - 2.0 mm size		PID = 0 Some MAFIC Accss. minerals incl.
1017	132				Very HARD	Very Light Gray	129' Sandstone, coarse grained well sorted, Fresh Rock, quartz / Feldspar SST (ARKOSE)		Some PINKish Gray color variation
1044	136						133' SAME		WATER from Borehole ≈ 17 GPM
11:15	140				Very HARD	Pinkish Gray to very Light Gray	SANDstone, very coarse grained 139' well sorted, with some (5%) qtz grains > 3mm diameter FRESH ROCK		PID = 0
	144								
11:42	148				Medium Soft	Grayish Red	145' CLAYstone, trace of Siltstone.		Fracture Zone 145'-147'
11:49					Medium Soft to Medium HARD	Moderate Red to Grayish RED	149' CLAYstone		Fracture Zone 148'-150'
							Stop Borehole At total depth 150'		WATER produced Approx ≈ 20 GPM
									—

REMARKS

BORING NO.
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BORING LOG 53W-6S / 03MW06S

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. 53W-6S
DATE 4/21/97 (4/22/97 below 25')
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

	SAMPLE NO. Time	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
		0								
4/21/97	0826	4				Soft	Moderate BRN	0-3' Sl Clayey (20%) SILT trace SAND(5%) very moist to wet PID=0	ML	Some Fill stone included.
	0829					Soft	Lt BRN	4-5' Silt with Clay (10%) very moist		PID=0
	0832	8				Soft	Lt BRN	7' Sandy(20%) SILT, DRY, trace clay, sand is medium grained.	ML	PID=0
	838	12				Soft	LT BRN	9' Sandy(10%) Clayey(20%) SILT moist		PID=0
	0841	16				Medium Soft	Light BRNish GRAY	12' SANDstone, weathered medium to coarse grained, moist		PID=0 Dust color - Light Yellowish Orange
	0850	20				Medium HARD	BRNish Gray to LT. BRN-Gray	19' SANDstone slightly weathered, medium grained, moist.		PID
	0854					Medium HARD		21' SAME		
	0856	24						23' SANDstone, As Above, Slightly Less Weathered		PID=0
	0859	28				Medium HARD to HARD	BRNish Gray	25' SANDstone, medium to coarse grained, Dry, slightly weathered.		PID=0, Set 6" Steel Casing to 25'
4/22/97	1405	32				HARD	Light Brownish Gray	28' SAND Stone, medium grained well sorted, slight weathering, IRON OXIDE "SPOTS" DRY		PID=0 White cuttings DUST
	1415	36				HARD	Brownish Gray	32' SANDSTONE, COARSE grained well sorted, Angular grains, WEATHERED MANY IRON OXIDE SPOTS, DRY		PID=0 white dust.
	1440	40						37' SAME trace of water on cuttings - Reduced dust generated - 39' ≈ 0.1 GPM		PID=0 Trace WATER
		44								
	1457					Medium HARD	Gray to Red	44' Siltstone, with claystone (20-30%) moist.		PID=0
	1504	48				HARD	BRNish	47' SANDstone, medium to		
		52						coarse grained, weathered, moist		Water 0.1 GPM
	1520	56				Medium HARD	Grayish Red	53' siltstone / claystone (30-40%) Slight weathering, some shale fissile structure, moist to DRY		Dusty cuttings -

REMARKS

BORING NO.

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BORING LOG S 3W - 6S (PAGE 2)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. S 3W - 6 S
DATE 4/22/97 (4/23/97 Below 60')
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	56								
1533	60				Very HARD	Blackish Red	58' Siltstone, (No Claystone) Fresh, very HARD		Fracture AT 57' No increase water.
4/23/97 0804	64				Medium Soft to Med. Hard	Moderate Red to Grayish Red	62' Claystone, trace Siltstone, weathered, Fractured PID=0		Fracture ZONE 61-64' water ≈ 0.5 GPM
814	68				Very HARD	Grayish Red	66' Siltstone, some Claystone (10-20%) Fresh, very HARD PID=0		Fracture 68'-69' water ≈ 1.5-1.7 GPM
0824	72				very HARD	Grayish Red	70' Siltstone, trace very fine grained sandstone (no Claystone) Fresh, color varies to Pale Red.		PID=0
0835	76				very HARD		75' SAME		Fracture ZONE 72.5-75' water ≈ 2.0 GPM
0847	80						78' SAME		Fracture 78'-78.5 water ≈ 3.0 GPM
0858	84				very HARD	Grayish Red	83' SANDStone, with Siltstone (20%) very fine grained, Fresh, very HARD, PID=0		Fracture 81'-84' water ≈ 4.5 GPM
9:10			TD		Very HARD	Grayish Red	85' SANDStone, trace Siltstone (5%) SST is Very fine to Fine grained, Fresh, some MICA Flakes		Total water Approx 5.0 GPM
							Stop Borehole AT 85' Total Depth		

REMARKS

BORING NO.
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BORING LOG S3W-6I / 03 MW 06 I

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W - 6I
DATE 4/18/97 (4/21/97 Below 20')
DRILLER Advanced Drilling INC (Rick EMPSON
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. Time	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
1601	0				Soft	Moderate Brown	0-3' Clayey SILT (30% CL) with trace fine grained sand moist,		PID=0 included FILL pebbles.
	4								
1604					Soft	Light Brown	4'-5' Clayey SILT (15% CL) trace sand moist		
1611	8				Soft		7' Sandy Silt dry soft		PID=0
1617					Soft	Lt BRN	9' Sandy Clayey SILT		Incl. very weathered sandstone
1620	12				Med HARD	BRN GRAY	11' SANDSTONE, weathered		
1624					MED HARD	BRN GRAY	14' SANDSTONE, medium to coarse grained, DRY, weathered		PID=0
	16								
1630					HARD	BRNish GRAY	16' SANDSTONE, medium grained slight weathering		PID=0
1634							17' Same (Less weathered)		SET 6" STEEL
1638	20						20' Same		Casing to 20'
1/21/97 1351					HARD	Lt. BRNish GRAY	21' SANDSTONE, medium grained DRY, weathered, Brown Iron oxidation spots on Rock		PID=0
	24								
1357					Medium HARD to HARD	PALE yellowish BRN	24' SANDSTONE, medium grained well sorted, DRY.		White dusty DUST PID=0
	28								
1420					HARD	very PALE ORANGE	23' SANDSTONE, medium grained well sorted, slight weathering, DRY		PID=0
	32								31.5-32 SMALL Fracture
1440					Medium HARD to HARD	Grayish ORANGE to LT BRN	32' SANDSTONE, medium grained weathered, Feldspar rich (30%)		PID=0 very Dusty
	36								
									35.5-39 FRACTURE ZONE
	40								
1500					Medium HARD	PALE RED PURPLE	40' Same 43' SANDSTONE, fine grained, Slight weathered,		PID=0
1506	44								
1513					Medium HARD	Grayish RED	47' SILTSTONE with CLAYSTONE (20%)		
	48								
1519					HARD	BLACKish RED	49' siltstone trace very Fine grained SAND		PID=0
	52								
1526					Med. Soft to Med HARD	Grayish RED	53' Claystone with trace siltstone, moist "Shinley Structure"		PID=0 some trace water
	56								

REMARKS

BORING NO.

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BORING LOG S3W-6I page 2

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W-6I
DATE 4/21/97 (4/22/97 Below 80')
DRILLER Advanced Drilling INC (RICK EMPSON)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
1530	56 / 60						57'-58' SAME 59'-60' Fracture Zone		No Significant Water Produced 0.1 GPM
1540	64				HARD	Grayish Red	62' SILTStone, with claystone (15%) Moist, HARD,		PID = 0
1547	68				Med. HARD	Pale Red to Grayish Red	64' Clay Stone / SiltStone Moist, waxy texture		PID = 0 Fracture 64'-65'
1600	72				Very HARD	Blackish Red	67' SiltStone (NO Claystone) Dry to Slight Moist Fresh Rock		
1608	76				HARD		73' SAME, Less HARD Some Clay stone included 5-10%.		PID = 0
1625	80				Very HARD	Blackish Red	76' SILTStone, NO Claystone Slight moist Fresh 78' Same		
1/22/97 0820	84				Very HARD	Grayish Red to BLKish RED	82' SILTStone, 20% - very fine grained Sandstone, Fresh Rock		PID = 0 83'-2" FRACTURE WATER ≈ 0.5 GPM
0850	88				Very HARD	Grayish Red	85' SANDStone, very fine grained well sorted with 20% Siltstone FRESH Rock		PID = 0
0920	92				Very HARD	Light Brownish Gray	90' SANDSTONE, very fine to fine grained, well sorted FRESH Rock, Fracture Zone 92'		91' - SMALL Fracture 92-92.5' FRACTURE WATER ≈ 1.2 GPM
1000	96						95' SAME		
1030	100				HARD	LT GRN Gray to LT Gray	98' SANDStone, medium grained, well sorted, some slight weathering w/ iron oxide stain spots		Fracture Zone 98' (3") WATER ≈ 1.6 GPM
1040	104				Very HARD	Pale Red Purple to LT. Gray	102' SANDStone, Very Coarse grained, Slight weathering to Fresh some Angular quartz crystal > 3mm.		Ave diam. of SAND ≈ 1mm PID = 0
1050	108				VERY HARD	PALE PINK	105' SANDSTONE, Very Coarse grained, with some granuals > 3mm. SUB ANGULAR to ANGULAR.		WATER IN Bore ≈ 5 GPM
11:10	112				Very HARD	PINKish Gray	110' SANDStone, medium grained, well sorted, Fresh		WATER ≈ 6 GPM PID = 0

REMARKS

BORING NO.

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BORING LOG S3W-6I Page 3

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. S3W-6I
DATE 4/22/97
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	112								
11:25	116				Very HARD	Pinkish Gray	113' Conglomeratic SANDStone very course grained with 10% of grains > 3 mm (Range 1-7 mm), sub Angular		
11:40	120				Very HARD	Pale PINK to Lt. BRN Gray	117' Conglomerate, SANDy (30%) Angular to sub Angular quartz Feldspar 4-7 mm size, some 1 cm size quartz.		117-120 Fracture Zone, water is 10-12 GPM
11:52	124				Medium HARD	Grayish Red	120' SILTstone, with Claystone (10-20%) Slight weathering to Fresh.		122-124 Fracture zone water ≈ 16 GPM
11:56	128				Medium HARD	Grayish Red	124' CLAYSTONE, 20% Siltstone Blocky structure Wavy texture		PID = 0
12:10	132						128' SAME		128' Fracture
12:20	136						133' SAME		133' Fracture water ≈ 20 GPM
12:30	140				Medium Soft to Medium HARD	Grayish Red	139-140' SAME (Less Siltstone)		139 Fracture with ≈ 22 GPM
12:38	144						143-144 Fracture Zone Rock is SAME Claystone with some Shaley cleavage		143 Fracture
12:49	148				HARD	Grayish Red	148' Claystone/Siltstone (20-30%) Fresh		Fracture Zone 148'-149'
12:52	152				very HARD	Grayish Red to Blackish Red	149' SILTSTONE, Fresh, very hard (NO Claystone)		End Borehole 150'
									Total WATER is Approx. 22 GPM
									—

REMARKS

BORING NO.
PAGE 3 OF 3

* See Legend on Back

BORING LOG 03 MW ~~10~~ 07 5

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. ~~03 MW 10 5~~ 03 MW 07 5
DATE 5/29/97 (5/30/97 - below 14')
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
5/29/97 0925	0 4				Soft	Moderate Yellow Brown	0-1' Top Soil Silt/Sand w grass 1-3' SAND, with silt 5-10%, Coarse grained, loose, slight moist		PID=0
0926					Med Soft Med. HARD	Lt Gray	3-5' SANDstone, coarse grained, weathered, slight moist		PID=0
0930							6.5' SAME		PID=0
0931	8				HARD	Lt Gray	7.0 SANDstone, medium grained		PID=0
0934	12				HARD	Lt BRN Gray	9' SANDY (20%) SILTSTONE, slight weathering, HARD, DRY. Color varies to pale Red Purple		PID=0
0938	16				HARD	Lt BRN Gray	12' SANDstone, Medium grained, well sorted, slight weathering, brown oxidation spots. Stop Borehole 14'		PID=0 Set 6" Steel Casing - to 14' Deep
5/30/97 0934	20				Med Soft and HARD	Dark Reddish BRN	16' MUDstone, 60% Silt 40% clay weathered, DRY		Dry Dark Dust
0941	24				Med. HARD to HARD		20' SAME - Med Hard to HARD		Slight Moist
0947	28						25' SAME		DRY Dusty
0952	32				HARD	grayish Red	28' Siltstone with 20% clay, trace very fine grained SAND, slight weathering, HARD, Dry to Slight moist		Slower Drilling 28' DRY
10:04	36				very HARD	grayish Red to Blackish Red	33' SILTSTONE with trace of very fine SAND, Slightly weathered, very HARD Moist (NO Free flow water)		water (NO Dust) AT 31'
10:15	40						36' SAME water from Borehole ~ 1-2 GPM Fracture 39.5' - 41'		36' 1-2 GPM water Flow 40' - 3 GPM
10:24 10:35	44				Grayish Red	HARD to Med. HARD	40' - same 42' SILTSTONE to MUDstone (60% silt) Less Hard At fracture zone trace very fine grained sand.		Fracture Zone 41-45' 6-8 GPM
10:47	48				very HARD	Grayish Red	46' SILTStone, Trace clay, trace very fine grained SAND		Fractured Rock 46'-49' 12 GPM
10:56	52						50' SAME		Fracture 51'-54' 15-17 GPM
11:08	56				Medium HARD	Grayish Red	54' MUDstone to claystone (range 40-60% CLAY) CLAY/silt content Varies		Fracture 55'-57' water ~20-23 GPM

REMARKS

BORING NO.

PAGE 1 OF 2

* See Legend on Back

BORING LOG 03 MW ~~10~~ 07 5 (PAGE 2)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE – NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. ~~03 MW 10 5~~ 03MW07 S
DATE 5/30/97
DRILLER ADVANCED DRILLING INC (RICK EMPSON)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	56								
	60								
11:25	64				MED HARD TO MED SOFT	PALE REDDISH BROWN	60' Claystone, trace silt		Fracture zone 61'-63' water @ 23 GPM
11:33 11:45	68				VERY HARD	GRAYISH RED/MED LT GRAY	64' SILTSTONE, trace very fine grained sand, Fresh Rock, very HARD. 66' SANDSTONE, fine grained, well sorted, Fresh, very HARD		
12:10	72				VERY HARD	MEDIUM GRAY	70' SANDSTONE medium grained from to slightly weathered, trace of Kaolinite clay		WATER from Borehole 70' ~ 27 – 30 GPM
12:28	76						74' SAME – medium to coarse grained – SANDSTONE		WATER ~ 30 GPM
							END of Borehole AT 75'		
									–

REMARKS

BORING NO.
PAGE 2 OF 2

* See Legend on Back

BORING LOG

Page 1 of 5

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE
PROJECT NUMBER: N62472-03-D-0057
DRILLING COMPANY: EICHELBERGERS, INC.
DRILLING RIG: INGERSOLL RAND - T3W
BORING NUMBER: 03 MW08
DATE: 10/31/05
GEOLOGIST: R. G. SCHAAR
DRILLER: D. NEY

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				2'	VERY LOOSE	LT BRN	TOPSOIL W. ORGANIC CONT.	SP					0.0
					LOOSE	MED BRN	OVERBURDEN, ORGANIC	SP					
							CONTENT DECREASING		TRANSITION TO	0.0		0.0	
				9'			WITH DEPTH, INCREASING SILT		"CL"		0.0		0.0
						GRY	FRACTURED/WEATHERED						
							BEDROCK (SANDSTONE)			0.0		0.0	
A	16						W. REDUCED MINERALIZ.						
		N.A.					COARSE CUTTINGS W.				0.0	0.0	0.0
							OCC. QUARTZ ENCLOSURES			0.0			0.0
												0.0	
											0.0		
A	23									0.0			
				28'		RED	SANDSTONE W. INCREASING					0.0	
A	30						Fe CONTENT,			0.0			0.0
							QUARTZ DECREASING				0.0		
							W. DEPTH					0.0	
											0.0		
				38.5'					CASING SET @ 38.5'	0.0			
							NO LITH					0.0	0.0
							CHANGES				0.0		
A	44			~44'			COARSE FRAGS,			0.0			
							GOOD MINERALIZATION		WATER ENCOUNTERED		0.0	0.0	0.0
							Fe RICH, OCC. CLAY		@ APX. 42-44'				
A							MINERALS		LOW YIELD (~5GPM)				0.0

0 → 50

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE BORING NUMBER: 03 MW08
PROJECT NUMBER: N62472-03-D-0057 DATE: 10/31/05
DRILLING COMPANY: EICHELBERGERS, INC. GEOLOGIST: R. G. SCHAAR
DRILLING RIG: INGERSOLL RAND - T3W DRILLER: J. NEY

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	U S C S	Remarks	PID/FID Readings (ppm) Sample	Sample BZ	Borehole*	Drill Rig BZ*
						RED	INCREASING COARSE		INCREASING		0.0		0.0
							SANDSTONE, MORE		YIELD, APX. 10 GPM				
							COMPLETE MINERALIZAT.			0.0		0.0	
							OCC. CLAY MINERALS				0.0		
A	60												
							Fe INCREASE				0.0		0.0
										0.0			
A	75												
									DRASTICALLY RED.			0.0	
		N.A.		70'			TRANSITION TO		YIELD (< 5GPM)	0.0			0.0
							BETTER MINERALIZATION				0.0		0.0
							ZEOLITES + LARGE						0.0
							QUARTZ FRAGMENTS			0.0			
											0.0	0.0	0.0
A	82			82'			FRACTURE ZONE,		YIELD ~ 12-15GPM		0.0		0.0
	↓ 85						CLAY MINERALS AND		Fe-RICH WATER				
A	87						ZEOLITES ABUNDANT			0.0			
	↓						Fe RICH, FINE TO					0.0	
A	90						MOD. COARSE FRAGS,				0.0		0.0
							POOR MINERALIZATION						
						GREY	DECREASING Fe CONTENT		Fe CONTENT	0.0		0.0	
A	95						TRANS. FROM SANDSTONE		NON-EXIST.		0.0		
							TO SILTSTONE?		GREY COLOR				0.0
A	100									0.0	0.0	0.0	

50 ↑ 100

* When rock coring, enter rock brokenness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm): [ ]

Remarks: _____

Converted to Well: Yes _____ No _____ Well I.D. #: _____

BORING LOG

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE BORING NUMBER: 03MW08
PROJECT NUMBER: N62472-03-D-0057 DATE: 10/31/05
DRILLING COMPANY: EICHELBERGERS, INC. GEOLOGIST: R.G. SCHAAR
DRILLING RIG: INGERSOLL RAND - T3W DRILLER: D. NEY

Sample No. and Type or RQD	Depth (Ft.) or Run no.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm): Sample	Sampler B2	Borehole*	Drill B2
						GREY	NO CHANGES			0.0			0.0
							NOTED				0.0	0.0	
										0.0	0.0		
A	109												
A	110				109		GREY SANDSTONE FRAGS		SLIGHT OVER-				0.0
							W. FE MINERALS, GOOD		PRESSURE @			0.0	
							MINERALIZATION W. ZEOLITES		DRILL STEM @	0.0	0.0		
A	115						DARK GREY SANDSTONE		~110'				
							FRAGS; MOD. MINERALS					0.0	
		N.A.					OCC. CLAY MINERALS			0.0			0.0
				122'			HIGHLY FRACTURED		DRASTIC SLIPPAGE		0.0		
							BEDROCK (SILTSTONE?)		ON DRILL STEM			0.0	
A	125								(APX 2-3 FEET)		0.0		0.0
				127'			END OF FRACTURE		INCREASED YIELD	0.0			
A	130						ZONE APX 126'-128'		(@ 15 GPM)			0.0	
						GREYISH	Fe CONTENT INCREAS				0.0		0.0
						RED	W. DEPTH			0.0			
A	135						COARSE SANDSTONE						
							FRAGS, MOD TO GOOD				0.0		
A	140					GREY	MINERALIZATION						
							DEVOID OF Fe,			0.0			0.0
							GOOD MINERALIZATION						
A	145						COARSE FRAGS					0.0	
										0.0			
A	150												

100'
150'

* When rock coring, enter rock brokenness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE
PROJECT NUMBER: N62472-03-D-0057
DRILLING COMPANY: EICHELBERGERS, INC.
DRILLING RIG: INGERSOLL RAND - T3W
BORING NUMBER: 03 MW 08
DATE: 10/31/05
GEOLOGIST: R. G. SCHAAR
DRILLER: D. NEY

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Borehole Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole*	Driller BZ*
						GRY	COMPETENT / DENSE		DECREASED	0.0	0.0		
							BEDROCK, NO SIGN.		YIELD (5-10 GPM)			0.0	
A	155						MINERALIZATION			0.0	0.0		0.0
A	160											0.0	
													0.0
										0.0	0.0		
A	165											0.0	
		N.A.*											
A	170			170'	?		INCREASING		INCREASED YIELD	0.0	0.0		0.0
				172'			MINERALIZATION,		SLOUGHS ON				
							COARSER CUTTINGS		DRILL STEM				0.0
A	175 x2			@		30	FRACTURE ZONE?		(APX. 2 FEET)	0.2	0.0		0.0
							(@ 178') NO CLAY		INCREASED	0.2		0.1	0.0
A	180						MINERALS, GREYISH		YIELD (7-10 GPM)		0.0	0.1	
							BROWN,		SHEEN ON	0.2		0.2	0.0
							MED. COARSE		WATER @				
A	185 x2						DARK GREY FINE BR		APX. 178'-185'		0.0	0.0	0.0
A	186						FRAGS W. ABUNDANT			0.0			
A	190						ZEOLITES, MOD MINER.						
									YIELD MAINTAINS		0.0		0.0
									@ >10 GPM	0.0			
A	193						FINE SANDSTONE				0.0		
							FRAGS, POOR MINERAL					0.0	
A	200									0.1			0.0

150 ↑ 200 ↓

* When rock coring, enter rock brokeness.
** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE
PROJECT NUMBER: N62472-03-D-0057
DRILLING COMPANY: EICHELBERGERS, INC.
DRILLING RIG: INGERSOLL RAND - T3W
BORING NUMBER: 03MW08
DATE: 10/31/05
GEOLOGIST: R. G. SCHAAR
DRILLER: D. NEY

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm): Sample	Sample BZ	Borehole*	Drillair BZ**
		N.A.				GREY	SEMI-COMPETENT		YIELD MAINTAINS	0.0		0.0	0.0
							BEDROCK, MARGINAL		@ > 10 GPM		0.0		
A	205						MINERALIZATION			0.0			
							SOME ZEOLITES,				0.0	0.0	
A	210					RED	MOD. COARSE FRAGS						
							Fe RICH, INCREASING			0.0	0.0		0.0
							Fe WITH DEPTH					0.0	
							SOME Fe TRACES, PLENTY ZEOLITES				0.0		
						GREY	NOTED.			0.0			
A	220						GREYISH SILTSTONE		H_2O CLOUDY		0.0	0.0	0.0
				EOB @ 224'			FINE FRAGS, MOD		GREY YIELD		0.0		0.0
A	224						MINERALIZATION		< 10 GPM	0.0	0.0	0.0	0.0

200 ↑ ↓ 224

* When rock coring, enter rock brokenness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Willow Grove Site 3
PROJECT NUMBER: 112G02014
DRILLING COMPANY: Advanced Drilling
DRILLING RIG: CUMMINS

BORING No.: 03MW09S/03MW09D
DATE: 1/14-15/10
GEOLOGIST: JS TOMA/AVAGE
DRILLER: JOE/RICK

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0-1			1.0	LOOSE	DRK BRN	SILT W/TRACE CLAY		UPPER 2' FROZEN	—	—	0	0
	3			3.0	LOOSE	BRN	SILT W/TRACE CLAY			—	—	0	0
					LOOSE	BRN	SILT						
					M. DENSE								
				8.0 ▽					WET 8-9'	—	—	3-6	0
	9			9.0									
					DENSE	BRN	WEATHERED SILTSTONE						
						RED BRN							
	13			13.0									
					V. DENSE	BRN	SILTSTONE LESS WEATHERED		PID READING AFFECTED BY MOISTURE	—	—	9-416	0
	15.0			15.0					SET CASING				
							SILTSTONE		WATER PRODUCING ZONES 15'-35'				
									@ ~3-4 GPM				
	35			35.0									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: 1/14/10 SET 6" ID STEEL CASING TO 15' GROUTED & LET SETUP OVER NIGHT, DRILLED OPEN HOLE TO 35' ON 1/15/10
1/14/10 DRILLED & CONSTRUCTED OVERBURDEN WELL 03MW09D

Converted to Well: Yes X No ____ Well I.D. #: 03MW09S

03MW09S LOCATED ~10' SW of 03MW09

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 035B17
DATE: 3/22/016
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler-BZ	Borehole**	Driller-BZ**
						Orange/	Sandy soil,		Hand auger				
				2'		Brown	contains some silt/clay					0	
							clayey, moist						
				4'			sandy @ 3.5-4'					0	
							sandy soil		Geoprobe				
5'				6'			small, broken pieces of BR			X		0	
							sandy soil						
				8'		▼	less moist, refusal @ 8'			X		0	
		NA							Refusal @ 8'				
10'													
15'													
20'													

25

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 035B17-0406 @ 1045
035B17-DUP03 @ 1055

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0164p.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB18
DATE: 3/22/06
GEOLOGIST: K! Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
		4		2'		Dk. Brown / Red	moist w/ 10% sand, plastic		Hand auger	0.3			
				4'		Red / Brown	moist w/ some orange soil			0			
				6'		Gray / Or. Red	sandy soil w/ pieces of rock (1") sandy w/ clay less moist than 2-4'		Geoprobe	0			
				8'		Or. / Red	Sandy, dk red clay < moist than 4-6'			0			
		4ft		10'		Orange	Sandy w/ clay very uniform			0			
				12'		Orange / Red	Sandy w/ clay, moist very uniform			0			
									Refusal @ 12'				

0 (5' / 10' / 15' / 20' / 25')

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collected 03SB18-0002 @ 1140
03SB18-1012 @ 1215

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 035B19
DATE: 3/22/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler B.Z.	Borehole**	Driller B.Z.**
						Dk. Brown Reddish	Sandy w/ 0.5"-0.75" broken rock throughout clayey / plastic		Hand auger				
				2'						0			
				4'			poor recovery		Geoprobe	0			
						Gr. Br.	Sandy clayey w/ very damp zone 1" thick						
				8'					Refusal @ 8'	0			
		NA.											

5' 10' 15' 20' 25'

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole: Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 035B19-0204 @ 1420
035B19-0408 @ 1440

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0104.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 035B320
DATE: 3/22/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						Dk. Brown	moist w/ lt. brown		Hand auger				
				2'		↓	& reddish veins			0			
				4'		R./ Brown	0.5-1" rock fragments, moist						
						↓	w/ streaks of gr./ lt. purple		↓	0			
						O./	clayey w/ 2" of Dk. gray moist soil		Geoprobe				
5'				6'		Brown	& 2" of reddish brown			0			
						↓	sandy w/ veins of						
				8'		↓	reddish clay			0			
						Dk.	clayey w/ veins of rust, moist						
				10'		Gray	veins of Or./br. clayey & 1" of reddish soil			0			
10'						0.1	sandy w/ moisture						
		NR		12'		Brown	slight plasticity, uniform color			0			
									Refusal @ 12'				
15'													
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 035B20-0608 @ 1550
035B20-1012 @ 1605

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 035B21
DATE: 3/22/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				2'		Dk. Br.	moist, sandy w/ reddish veins		Hand auger	0			
				4'			becomes reddish w/ veins of purple/grey sand & moist clayey soil			0			
5'				6'		Reddish Brown	clayey soil w/ fine white sand, dk. brown		Geoprobe	0			
				8'						0			
				10'		0.1 Br.	clayey w/ fine white sand bands of sand			0			
10'		NA		12'			clayey soil w/ fine, white sand olive band @ 11.5'			0			
				14'			clayey soil w/ fine, white sand			1			
				15'			clayey soil w/ fine sand			0			
15'									Refusal @ 15'				
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 035B21-1012 @ 1700 & Dup-1 from 035B21-1012
035B21-1415 @ 1715

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0164.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB22
DATE: 3/23/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness*	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						Red.	moist, 1' compacted clay		Hand auger				
				2'		0.7 Grey	moist, 1' sandy soil			0			
				4'		0.7	moist, sandy (2-3')						
						Brown	Dk. gr. w/red veins, moist, clayey			0			
5'				6'			moist, sandy, plastic		Geoprobe				
							sandy @ 5.5-6'			0.1			
				8'		Dk. Br.	w/gr. moist, clayey soil						
							very plastic			0.2			
				10'		0.7 Br.	moist, clayey, some plasticity			0			
10'		NA					moist, sandy						
				12'						0			
									Refusal @ 12'				
15'													
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 03SB22-0406 @ 0820
03SB22-0608 0835

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 035B23
DATE: 3/23/16
GEOLOGIST: K. Goslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				2'		O./Br.	Sandy, moist w/ 20% clay		Hand auger	0			
				4'		DK. Red/Br.	moist, sandy & clayey			0			
	5'			6'		O./Br.	moist, sandy, top 6" reddish/gray		Geoprobe				
				8'		DK. O./Br.	moist, sandy w/ reddish veins			0			
		AA		10'			clayey, moist, tightly packed w/sand & grey veins			0			
	10'			12'			Sandy w/veins of red						
							Very moist -			0			
									Refusal @ 12'				
	15'												
	20'												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 035B23-0406 @ 1015
035B23-1012 @ 1035

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0109.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB24
DATE: 3/23/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				2'			gravel/asphalt not sampled		Hand auger	-			
				4'		Br.	moist w/ very fine texture, sandy			0			
	5'			6'		Dk. Gy/ Br.	veins of reddish, gray clay moist/sandy, v. moist @ 4'-4.5'		Geoprobe	0			
				8'		O./ Red	1' of v. moist, orange clayey 1' of v. moist, reddish clayey, 1" section of black gravel @ 9.5'	very consolidated		0			
	10'	NA		10'			silty, moist, reddish & plastic			0			
				11.2'			moist, dk. red clayey/silty end of cutting (10.8'-11.2') very dry, much > dry than 8'-10', plastic		Refusal @ 11.2'	0			
	15'												
	20'												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 03SB24-0406 @ 1140
03SB24-1011.2 @ 1200 & Dup-02 from 03SB24-1011.2

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0104.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB25
DATE: 3/23/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						0.1	1' very sandy, lt. brown		Hand auger				
				2'		Br.	1.5' very moist, orange soil			0			
				4'			sandy, moist w/ lt. brown sandstone pieces, dry @ 3.5-4'			0			
				6'			moist, sandy w/ veins of rust		Geoprobe	0			
				8'			clayey, v. moist 6-7.5', v. dry 7.5-8' reddish sand			0.1			
		NA		9.9'			sandy w/ reddish soil mix very dry, crumbles			0.1			
									Refusal @ 9.9'				

5' 10' 15' 20'

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 03SB25-0608 @ 1405
03SB25-0809.9 @ 1410

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0109.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB216
DATE: 3/23/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sample Bz	Borehole** Bz	Driller Bz**
						Dk. Gy	moist w/ black broken rock		Hand auger				
				2'		↓	(0.2-0.5" diam.), slight plasticity		↓	0			
						Dk. Br.	moist w/ uniform grain,						
				4'		Br.	some plasticity, rock @ 3.5'		↓	0			
5'						↓	moist, sandy, highly compacted		Geoprobe				
				6'		↓	mod. plasticity, reddish @ 5-6'			0			
						Dk. Br.	moist, sandy, less plastic than 4-6'						
				8'		↓	rust/orange @ 7-8'			0			
							moist, sandy						
		NA		10'		↓				6			
10'						V. Dk. Br.	moist, sandy w/ uniform						
				12'			grain, slightly plastic			0			
							moist sandy						
				13.5'		↓	lt. br. sand @ 13-13.5'		↓	0.1			
15'									Refusal @ 13.5'				
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

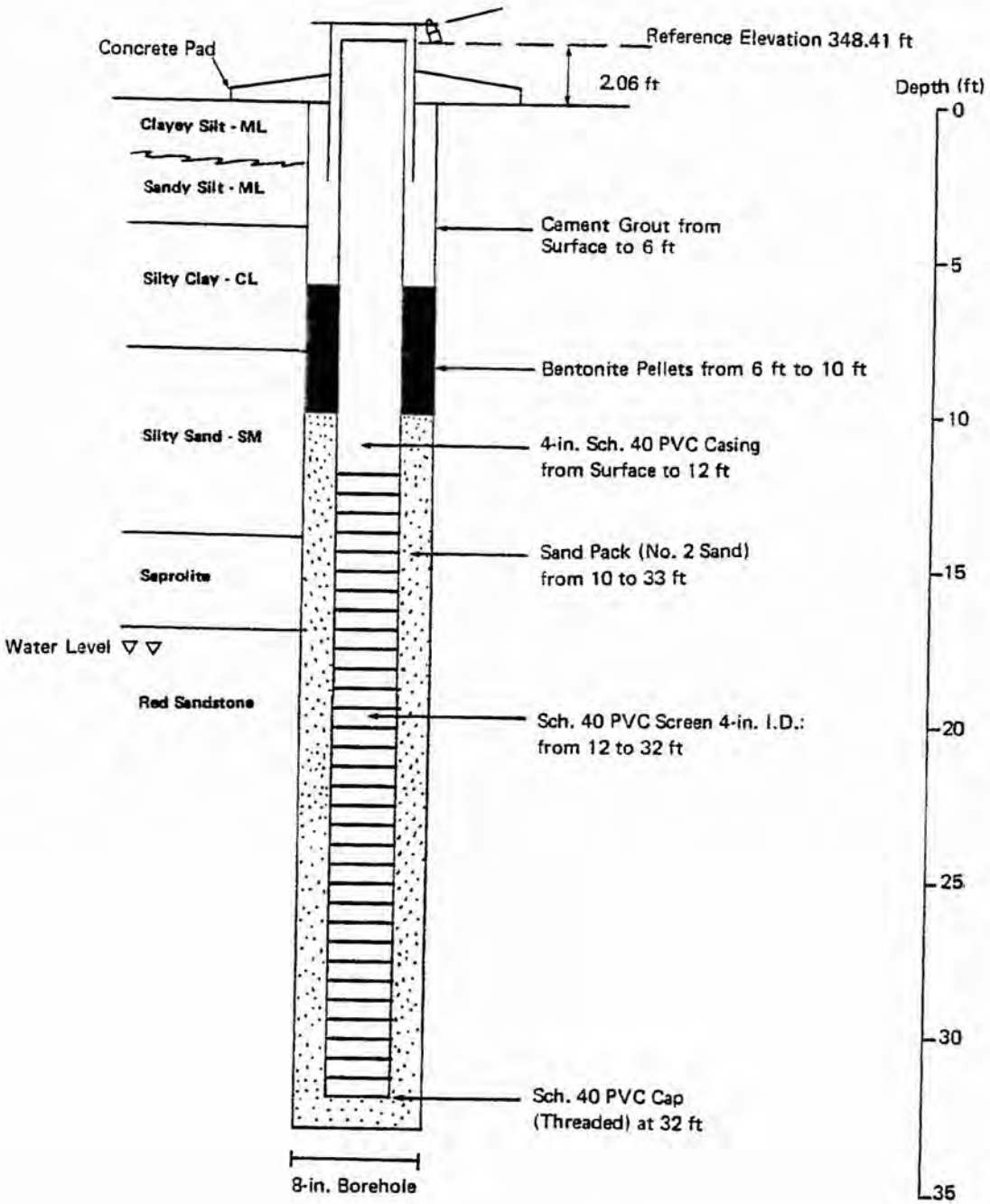
Remarks: Collected @ 03SB216-0406 @ 1520
03SB216-1213.5 @ 1540

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

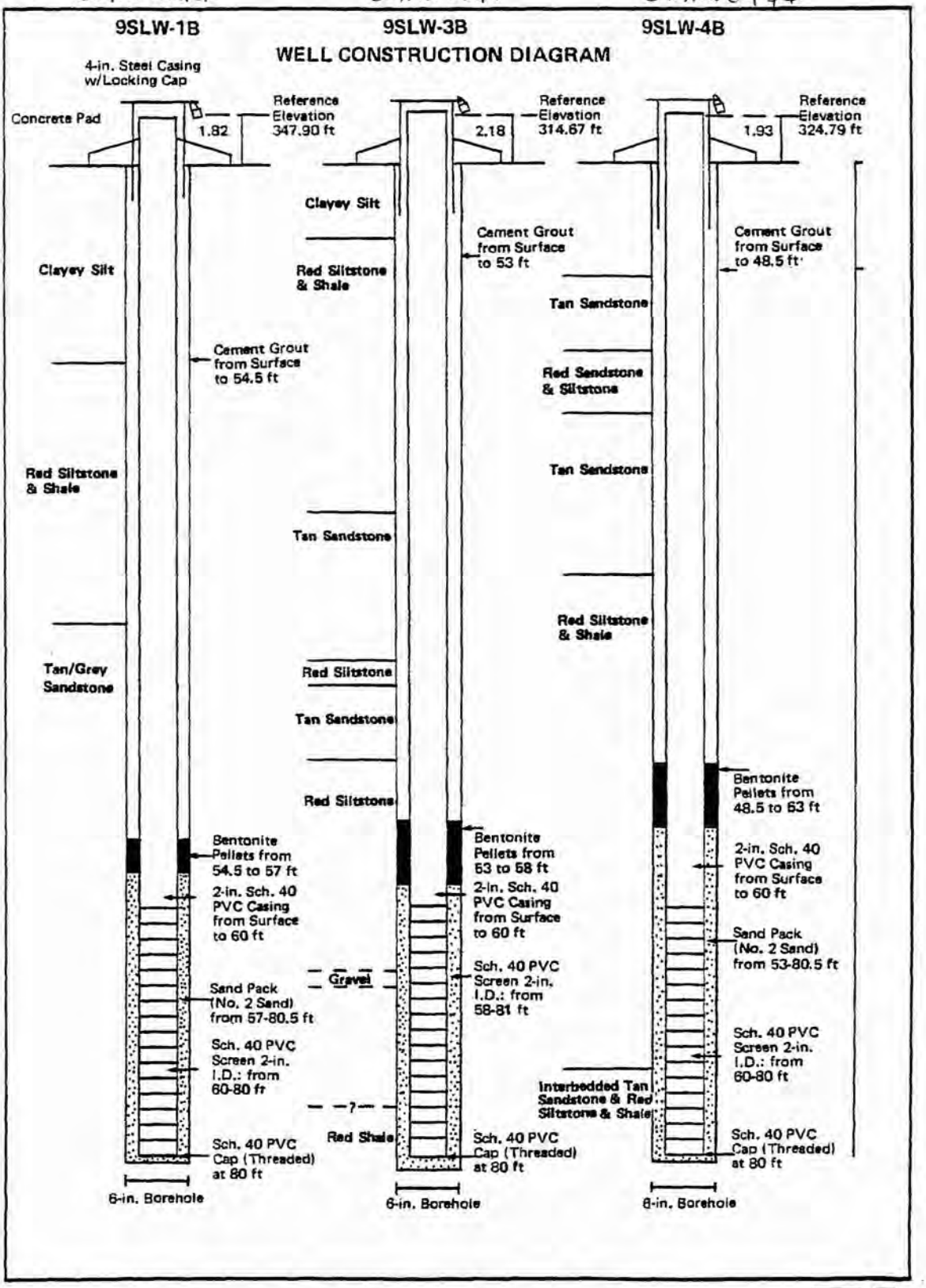
MONITORING WELLS

03MW015

9SLW-1
WELL COMPLETION DIAGRAM



03MW01SI 03MW03SI 03MW04SI



03MW01I

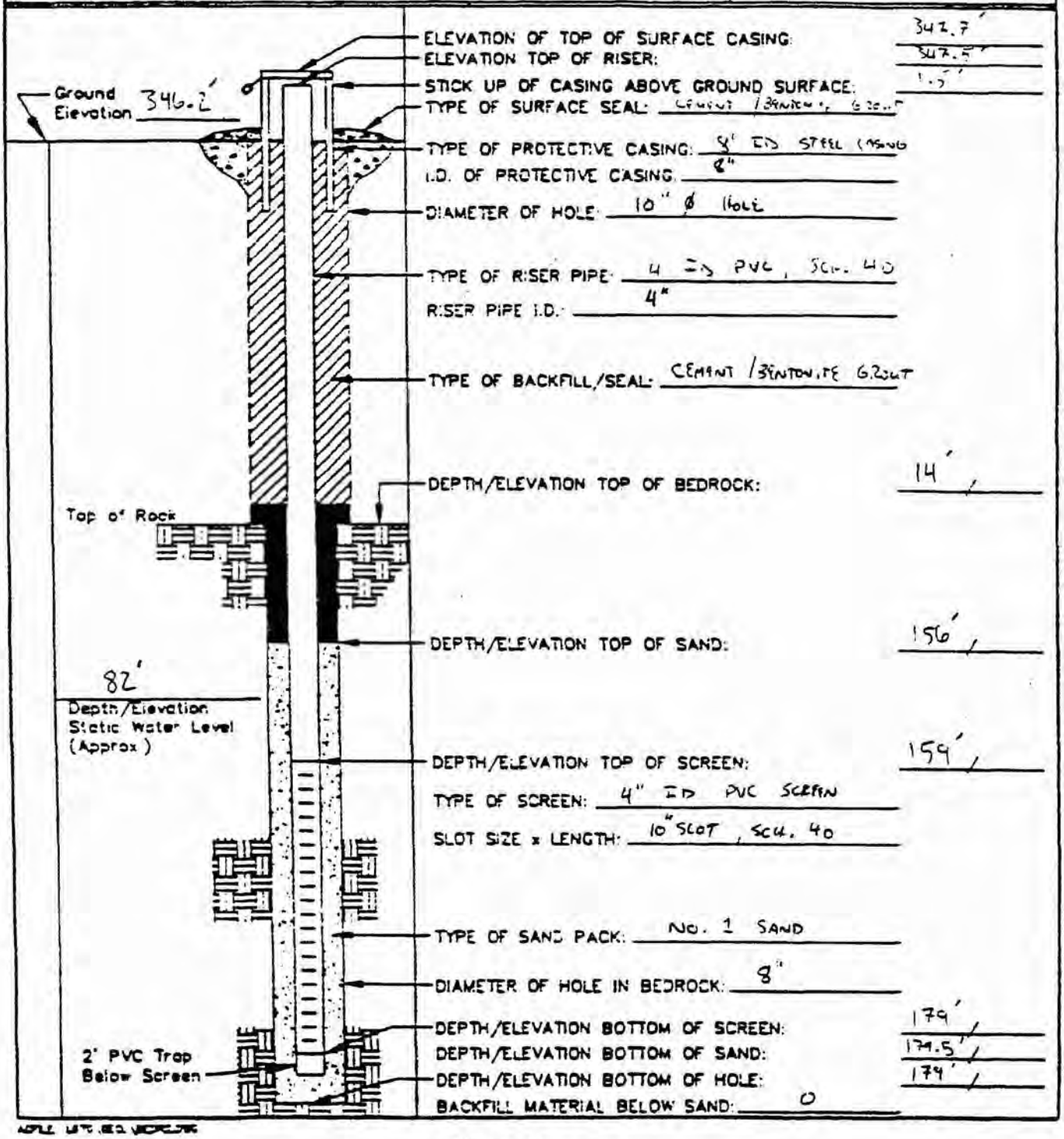
NUS CORPORATION

WELL NO.: 9 SLW-1C

BEDROCK MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: ~~555~~ WILLOW GROVE LOCATION: NINTH ST. LANDFILL
PROJECT NO.: 3552 BORING: 9/05/91 - 9/11/91
ELEVATION: 346' DATE: 9 SLW-1C
FIELD GEOLOGIST: R. Goad

DRILLER: T. STEWART
DRILLING METHOD: SOLID STEM TO 15.5' 10 1/2 HAMMER TO 21' 8 1/2 HAMMER TO 180'
DEVELOPMENT METHOD:

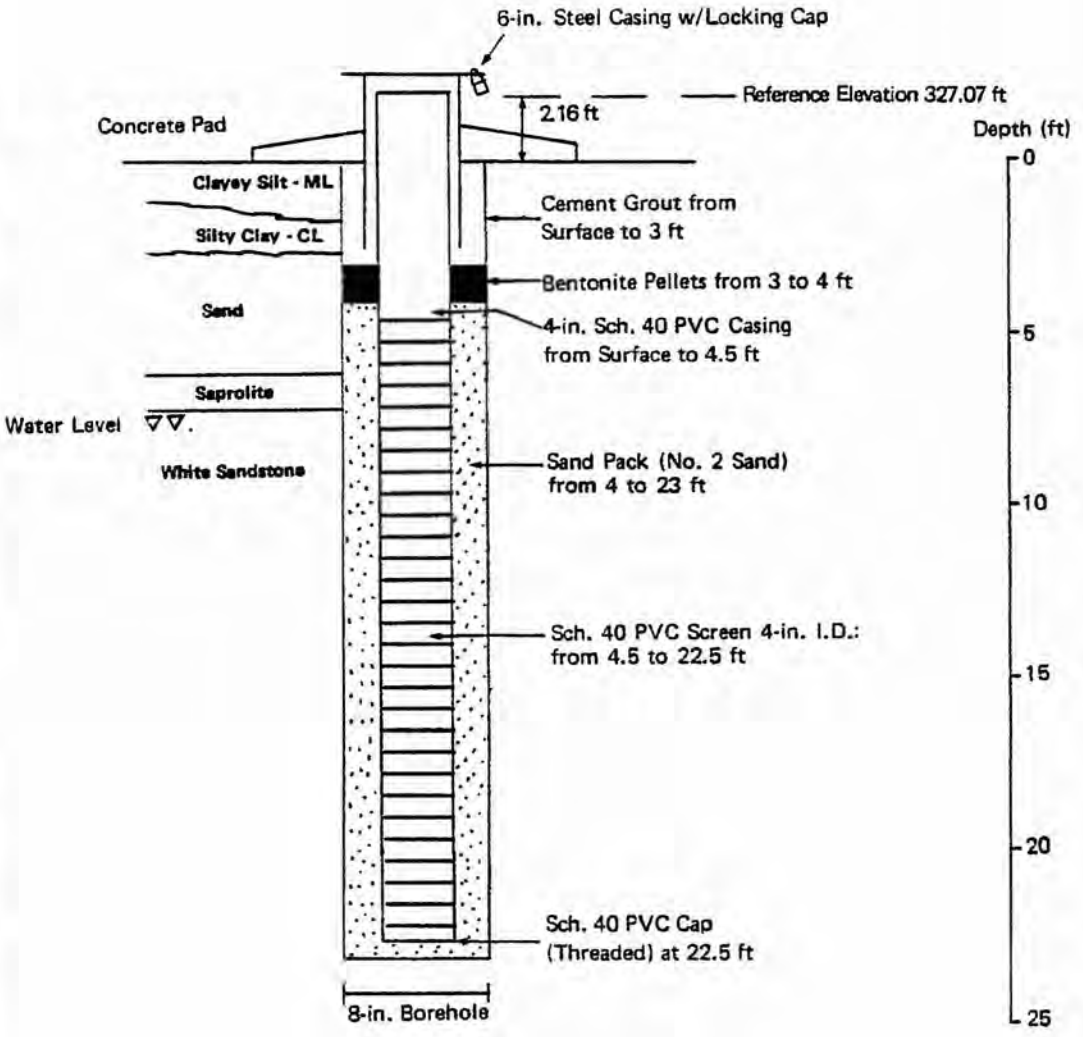


ELEVATION OF TOP OF SURFACE CASING: 347.7'
ELEVATION TOP OF RISER: 347.5'
STICK UP OF CASING ABOVE GROUND SURFACE: 1.5'
TYPE OF SURFACE SEAL: CEMENT / BENTONITE GROUT
TYPE OF PROTECTIVE CASING: 8" ID STEEL CASING
I.D. OF PROTECTIVE CASING: 8"
DIAMETER OF HOLE: 10" Ø HOLE
TYPE OF RISER PIPE: 4" ID PVC, SCH. 40
RISER PIPE I.D.: 4"
TYPE OF BACKFILL/SEAL: CEMENT / BENTONITE GROUT
DEPTH/ELEVATION TOP OF BEDROCK: 14'
DEPTH/ELEVATION TOP OF SAND: 156'
DEPTH/ELEVATION TOP OF SCREEN: 159'
TYPE OF SCREEN: 4" ID PVC SCREEN
SLOT SIZE x LENGTH: 10" SLOT, SCH. 40
TYPE OF SAND PACK: NO. 1 SAND
DIAMETER OF HOLE IN BEDROCK: 8"
DEPTH/ELEVATION BOTTOM OF SCREEN: 179'
DEPTH/ELEVATION BOTTOM OF SAND: 179.5'
DEPTH/ELEVATION BOTTOM OF HOLE: 179'
BACKFILL MATERIAL BELOW SAND: 0

B.5-1

03MW025

9SLW-2
WELL CONSTRUCTION DIAGRAM



BORING NO.: 03 MW 02 SI

BROWN & ROOT ENVIRONMENTAL

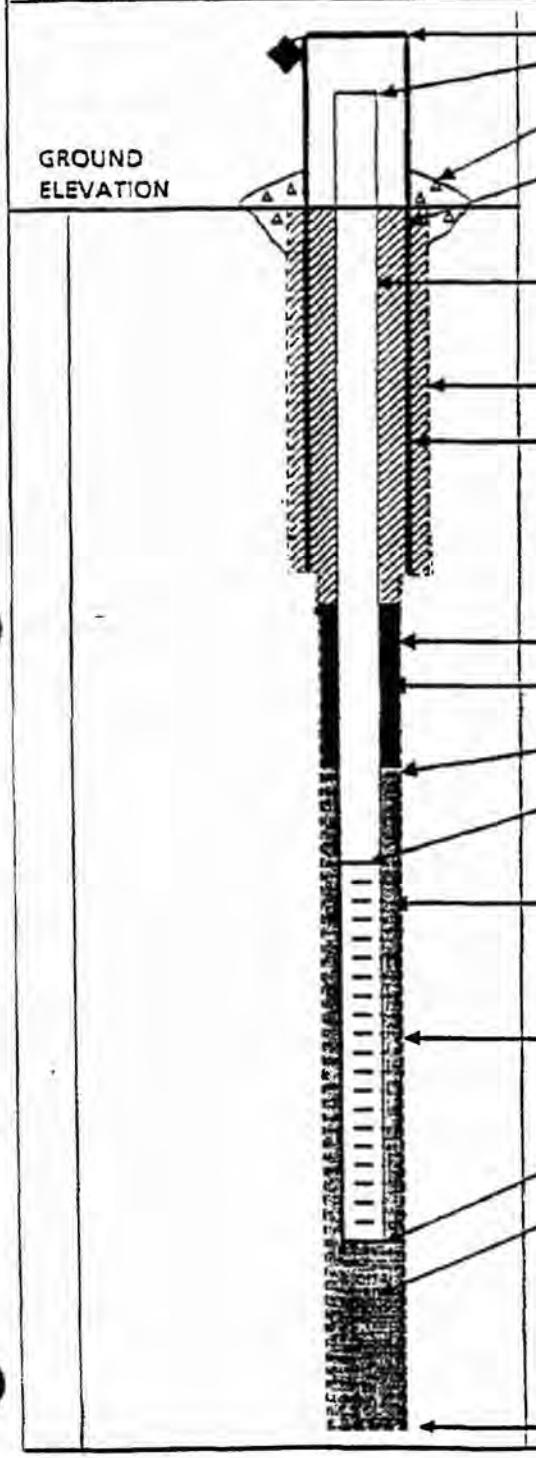
03 MW 02 SI

MONITORING WELL SHEET

PROJECT: Willow Grove - NAS
PROJECT NO.: 5H66
ELEVATION:
FIELD GEOLOGIST: Tonin Lounsbury - Vince Snickenberger

LOCATION: 9TH ST. Landfill
BORING: 03W - 2 I
DATE: 6/11/97

DRILLER: Advanced Drilling INC
DRILLING METHOD: Air Rotary
DEVELOPMENT METHOD: Submersible pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D. 03 MW 02 SI
TYPE OF RISER PIPE: SCH 40- 2" diam PVC

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 13' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 44' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 52' bgs

ELEVATION/DEPTH TOP OF SCREEN: 55' bgs
TYPE OF SCREEN: 2 inch diam. PVC SCH 40 0.02" slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 65' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 70' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: Bentonite 70'-130' 130'-144' is well 03 MW 02 I in same Borehole

ELEVATION / DEPTH OF HOLE: 144' bgs

BORING NO.: 03 MW 02 I

BROWN & ROOT ENVIRONMENTAL

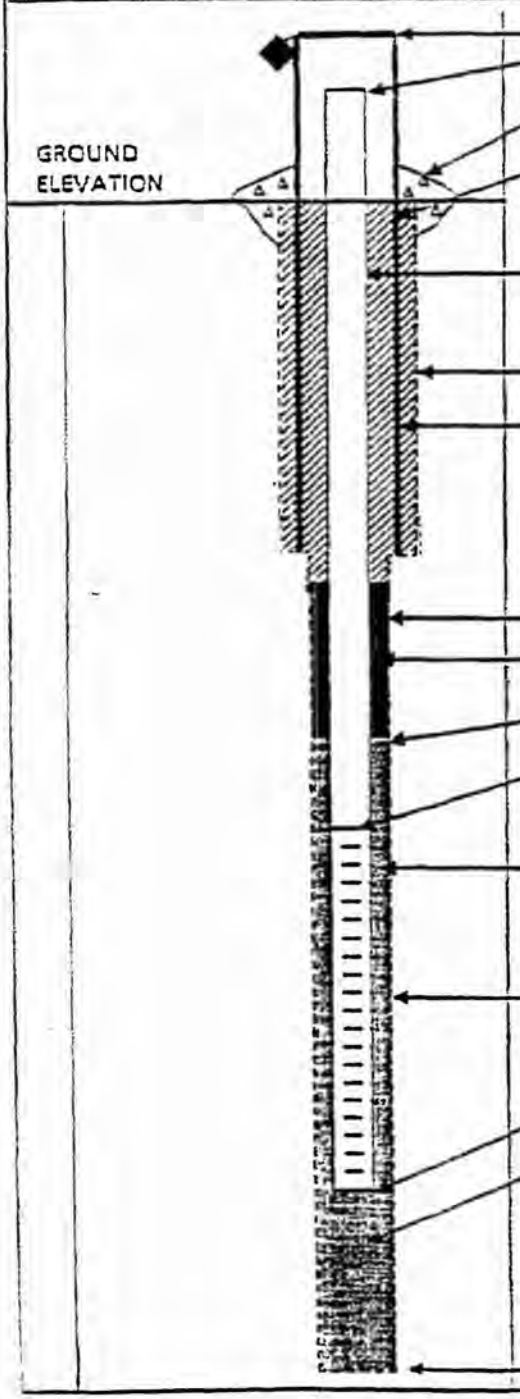
03 MW 02 I

MONITORING WELL SHEET

PROJECT Willow Grove - NAS
PROJECT NO. 5H66
ELEVATION
FIELD GEOLOGIST Tom Loudsbery - Vince Shickora

LOCATION 9th Street
BORING S3W - 2I
DATE 6/11/97

DRILLER Advanced Drilling INC
DRILLING METHOD Air Rotary
DEVELOPMENT METHOD Submersible pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D.
TYPE OF RISER PIPE: SCH 40- 2" diam PVC

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 13' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 70' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 130' bgs

ELEVATION/DEPTH TOP OF SCREEN: 134' bgs
TYPE OF SCREEN: 2 inch diam. PVC SCH 40 0.02" slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

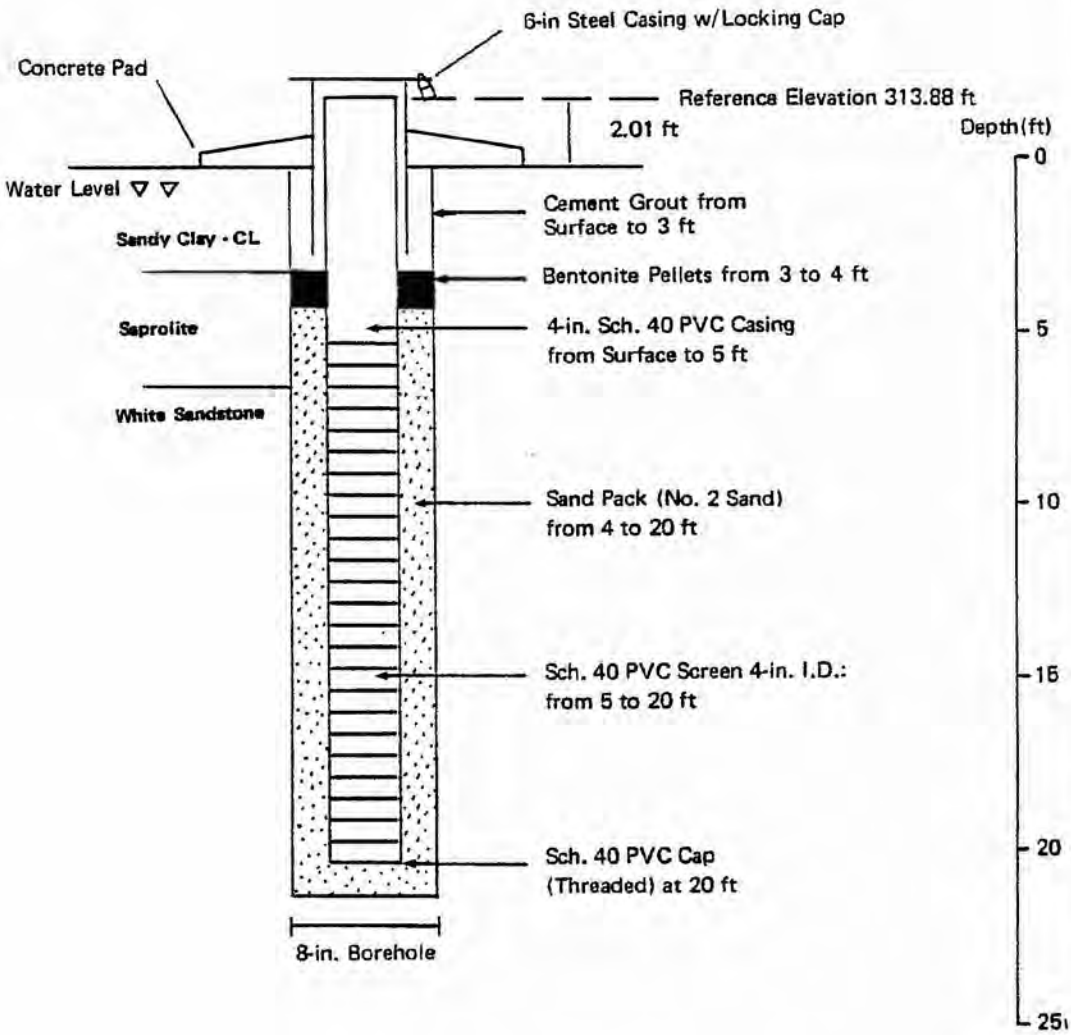
ELEVATION / DEPTH BOTTOM OF SCREEN: 144' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 144' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: SAND

ELEVATION / DEPTH OF HOLE: 144' bgs

03MW035

9SLW-3
WELL CONSTRUCTION DIAGRAM



03MW03I

NUS CORPORATION

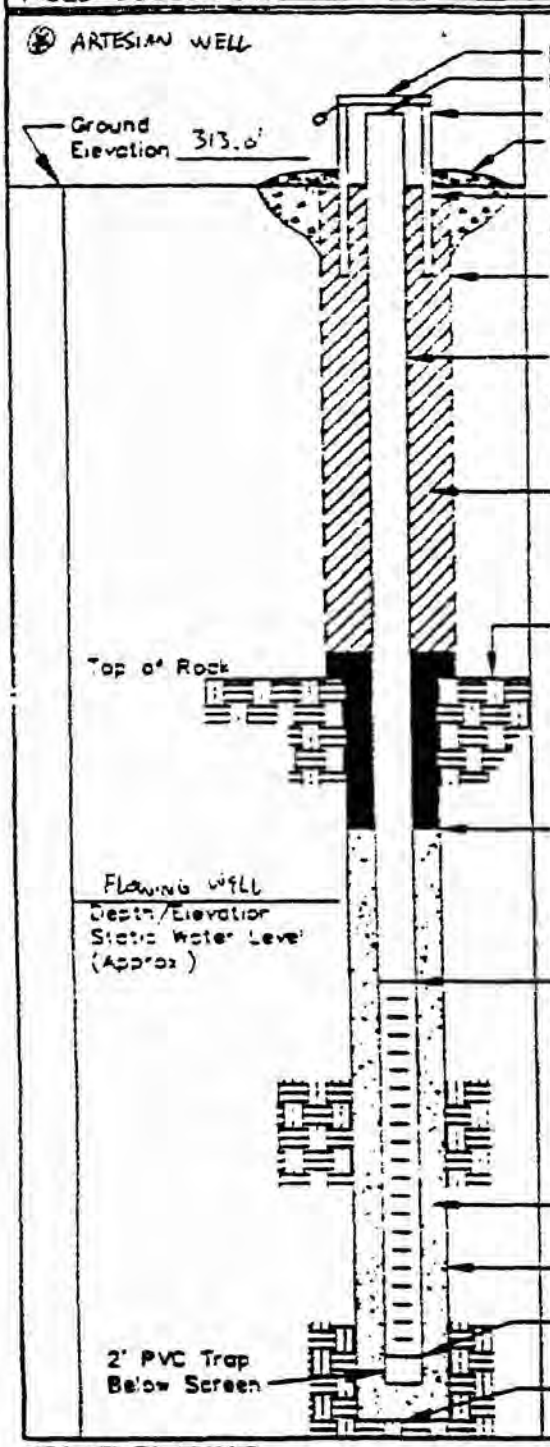
WELL NO.: 9SLW-3C

BEDROCK MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: WILLOW GROVE
PROJECT NO.: 3552
ELEVATION: 313.0'
FIELD GEOLOGIST: R. GOOD

LOCATION: NINTH ST. LANDFILL
BORING: 9SLW-3C
DATE: 9/6/91 - 9/12/91

DRILLER: T. STEWART
DRILLING METHOD: SPLIT SPOON TO 10' 10" AIR HAMMER TO 20' 8" AIR HAMMER TO 171'
DEVELOPMENT METHOD:



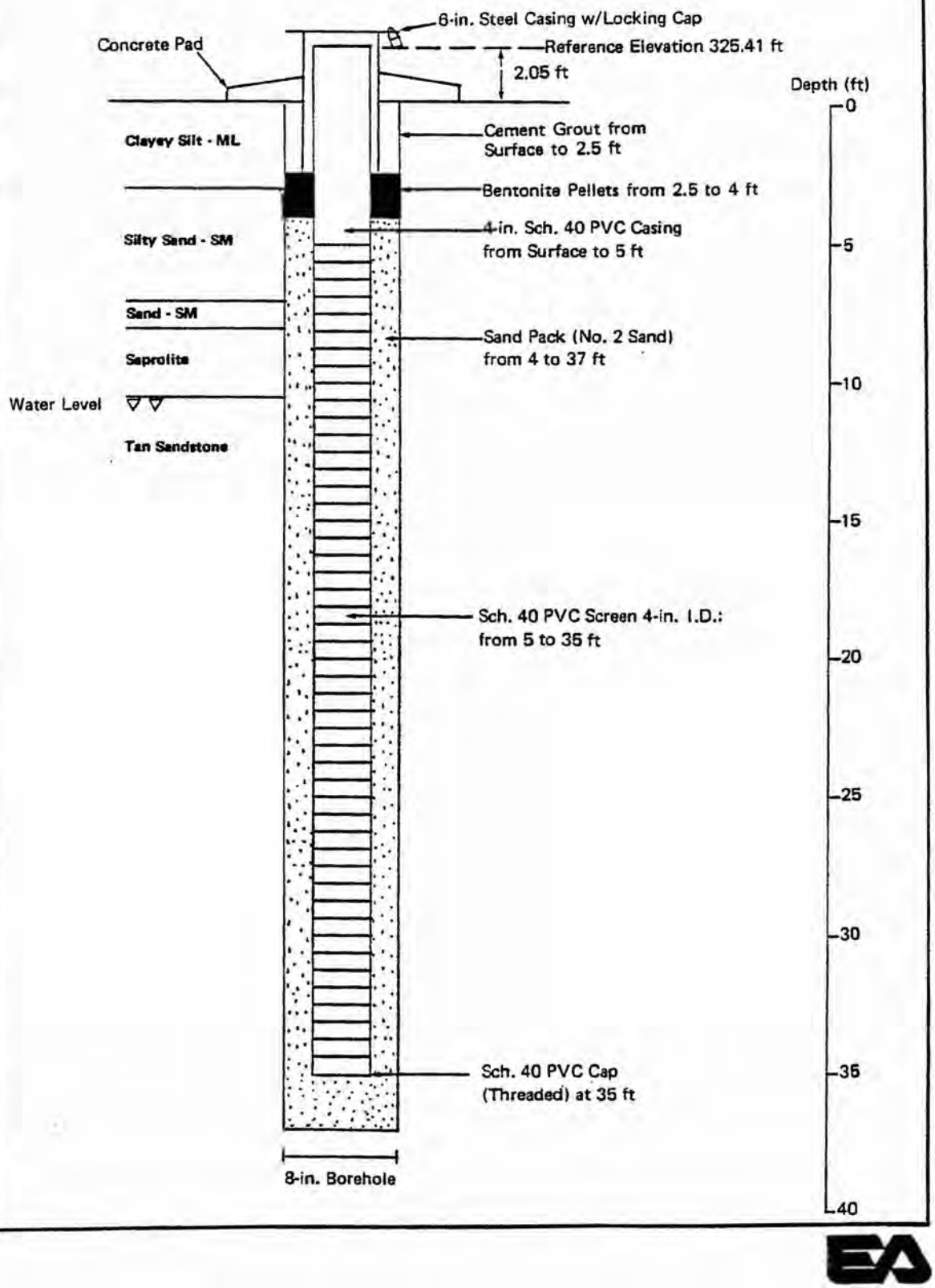
ELEVATION OF TOP OF SURFACE CASING: 316.0
ELEVATION TOP OF RISER: 315.0'
STICK UP OF CASING ABOVE GROUND SURFACE: 3.0
TYPE OF SURFACE SEAL: CEMENT / BENTONITE GROUT
TYPE OF PROTECTIVE CASING: 8" ID STEEL CSG.
I.D. OF PROTECTIVE CASING: 8"
DIAMETER OF HOLE: 10" & HOLE.
TYPE OF RISER PIPE: 4" ID PVC, SCH. 40
RISER PIPE I.D.: 4"
TYPE OF BACKFILL/SEAL: CEMENT / BENTONITE GROUT
DEPTH/ELEVATION TOP OF BEDROCK: 10.0',
DEPTH/ELEVATION TOP OF SAND: 145.0',
DEPTH/ELEVATION TOP OF SCREEN: 148.5',
TYPE OF SCREEN: 4" ID PVC.
SLOT SIZE x LENGTH: 10 SLOT, SCH. 40.
TYPE OF SAND PACK: NO. 1 SAND.
DIAMETER OF HOLE IN BEDROCK: 8" HOLE
DEPTH/ELEVATION BOTTOM OF SCREEN: 168.5'
DEPTH/ELEVATION BOTTOM OF SAND: 171.0'
DEPTH/ELEVATION BOTTOM OF HOLE: 171.0'
BACKFILL MATERIAL BELOW SAND: 0

NOTE: NOT TO SCALE

B52

03MW045

9SLW-4
WELL CONSTRUCTION DIAGRAM



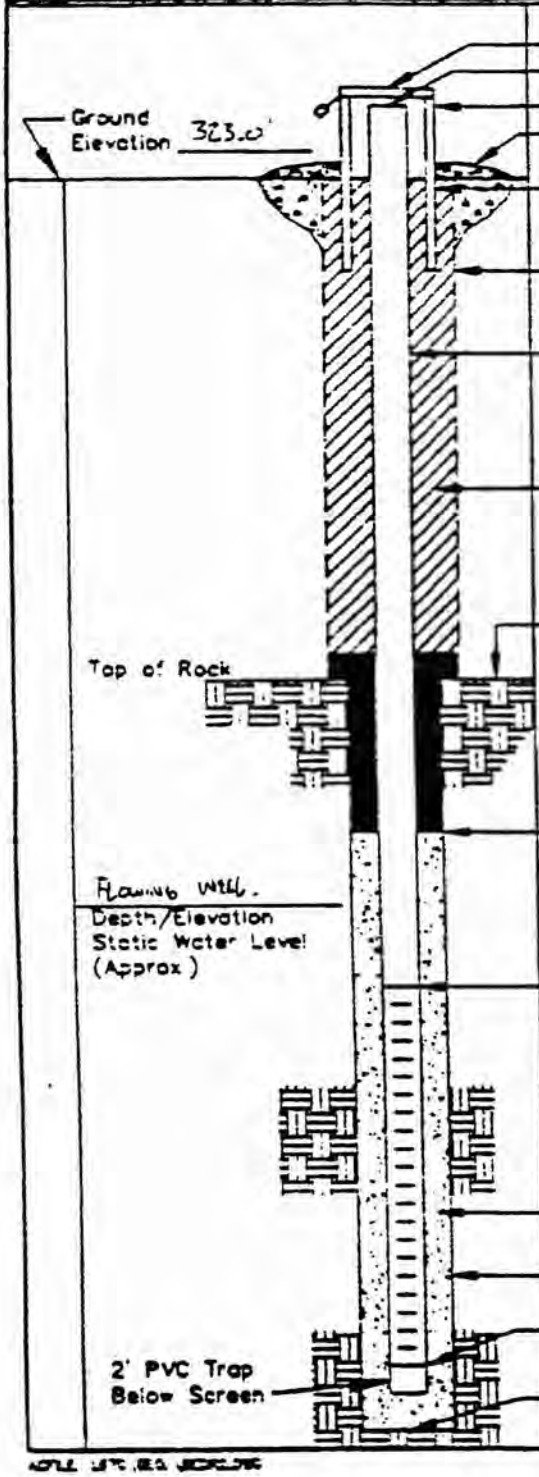
03MW04I

WELL NO.: 9SLW-4C

NUS CORPORATION

BEDROCK MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: WILLOW GROVE	LOCATION: NINTH ST. LANDFILL	DRILLER: J. ADAMS
PROJECT NO.: 3552	BORING: 9SLW-4C	DRILLING METHOD: 10" Ø AIR HAMMER TO 20'. 7 7/8" Ø AIR HAMMER TO 171'.
ELEVATION: 323.0'	DATE: 9/06/91 - 9/10/91	DEVELOPMENT METHOD:
FIELD GEOLOGIST: S. CONTI		



- ELEVATION OF TOP OF SURFACE CASING: 325.6'
- ELEVATION TOP OF RISER: 324.9'
- STICK UP OF CASING ABOVE GROUND SURFACE: 2.6'
- TYPE OF SURFACE SEAL: CEMENT / BENTONITE GROUT.
- TYPE OF PROTECTIVE CASING: 8" ID STEEL CSG
- I.D. OF PROTECTIVE CASING: 8"
- DIAMETER OF HOLE: 10" Ø HOLE.
- TYPE OF RISER PIPE: 4" ID PVC, SCH. 40.
- RISER PIPE I.D.: 4"
- TYPE OF BACKFILL/SEAL: CEMENT / BENTONITE GROUT.
- DEPTH/ELEVATION TOP OF BEDROCK: 8.0 /
- DEPTH/ELEVATION TOP OF SAND: 145.0' /
- DEPTH/ELEVATION TOP OF SCREEN: 148.0' /
- TYPE OF SCREEN: SCH. 40 PVC
- SLOT SIZE x LENGTH: 10 SLOT, 20'
- TYPE OF SAND PACK: NO. 1 SAND
- DIAMETER OF HOLE IN BEDROCK: 7 7/8"
- DEPTH/ELEVATION BOTTOM OF SCREEN: 168.0' /
- DEPTH/ELEVATION BOTTOM OF SAND: 169.0 /
- DEPTH/ELEVATION BOTTOM OF HOLE: 173.0' /
- BACKFILL MATERIAL BELOW SAND: 4.0'

NOTE: NOT TO BE SCALE

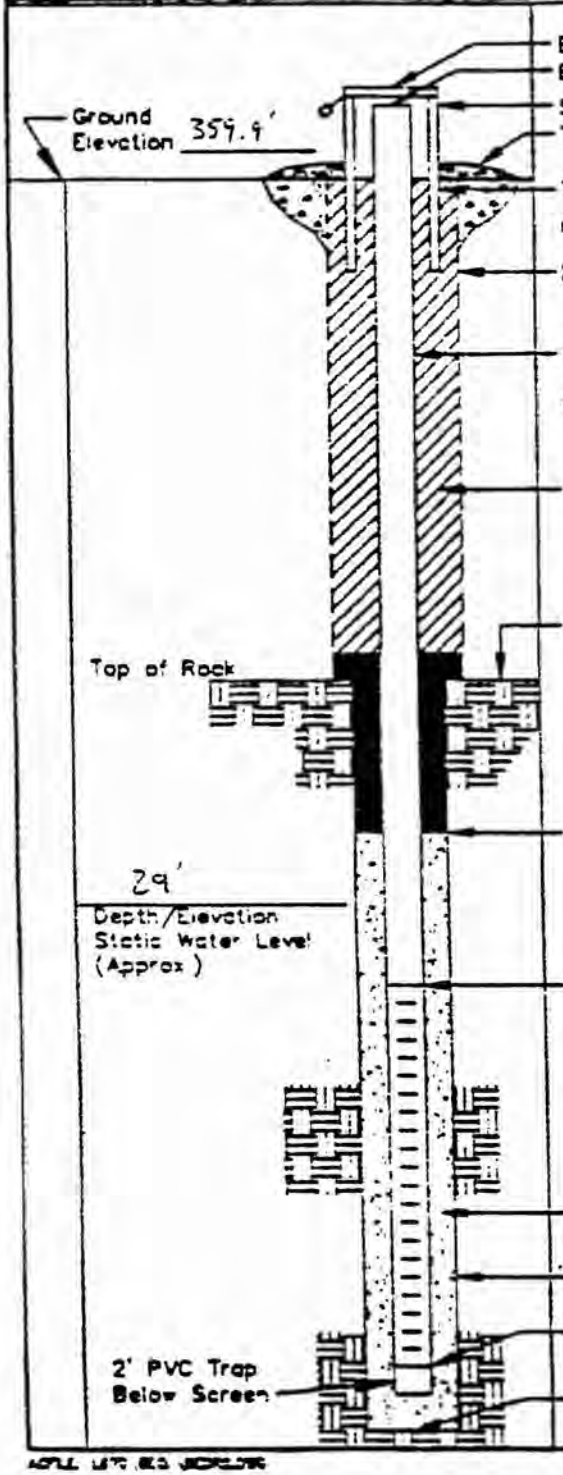
03MW055

NUS CORPORATION

WELL NO.: 9SLW-5

BEDROCK MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: Willow Grove	LOCATION:	DRILLER: T. STEWART
PROJECT NO.: 3552	BORING: 9 SLW - 5	DRILLING METHOD: SPLIT SPOON TO 14.5' 8" AIR HAMMER TO 38
ELEVATION: 359.4'	DATE: 9/10/91 - 9/11/91	DEVELOPMENT METHOD:
FIELD GEOLOGIST: R. Good		



ELEVATION OF TOP OF SURFACE CASING: 363.2'
ELEVATION TOP OF RISER: 362.9'
STICK UP OF CASING ABOVE GROUND SURFACE: 3.3'
TYPE OF SURFACE SEAL: CEMENT
TYPE OF PROTECTIVE CASING: 8" STEEL CSG.
I.D. OF PROTECTIVE CASING: 8"
DIAMETER OF HOLE: 8" HOLE.
TYPE OF RISER PIPE: 4" ID PVC, SCH. 40
RISER PIPE I.D.: 4"
TYPE OF BACKFILL/SEAL: CEMENT / BENTONITE GROUT.
DEPTH/ELEVATION TOP OF BEDROCK: 14.5' /
DEPTH/ELEVATION TOP OF SAND: 15.0' /
DEPTH/ELEVATION TOP OF SCREEN: 17.0' /
TYPE OF SCREEN: 4" ID PVC, SCH 40.
SLOT SIZE x LENGTH: 10 SLOT, 20'
TYPE OF SAND PACK: NO. 1 SAND
DIAMETER OF HOLE IN BEDROCK: 8" Ø HOLE.
DEPTH/ELEVATION BOTTOM OF SCREEN: 37.0' /
DEPTH/ELEVATION BOTTOM OF SAND: 37.5' /
DEPTH/ELEVATION BOTTOM OF HOLE: 38.0' /
BACKFILL MATERIAL BELOW SAND: 0.5'

10.5-4

BROWN & ROOT ENVIRONMENTAL

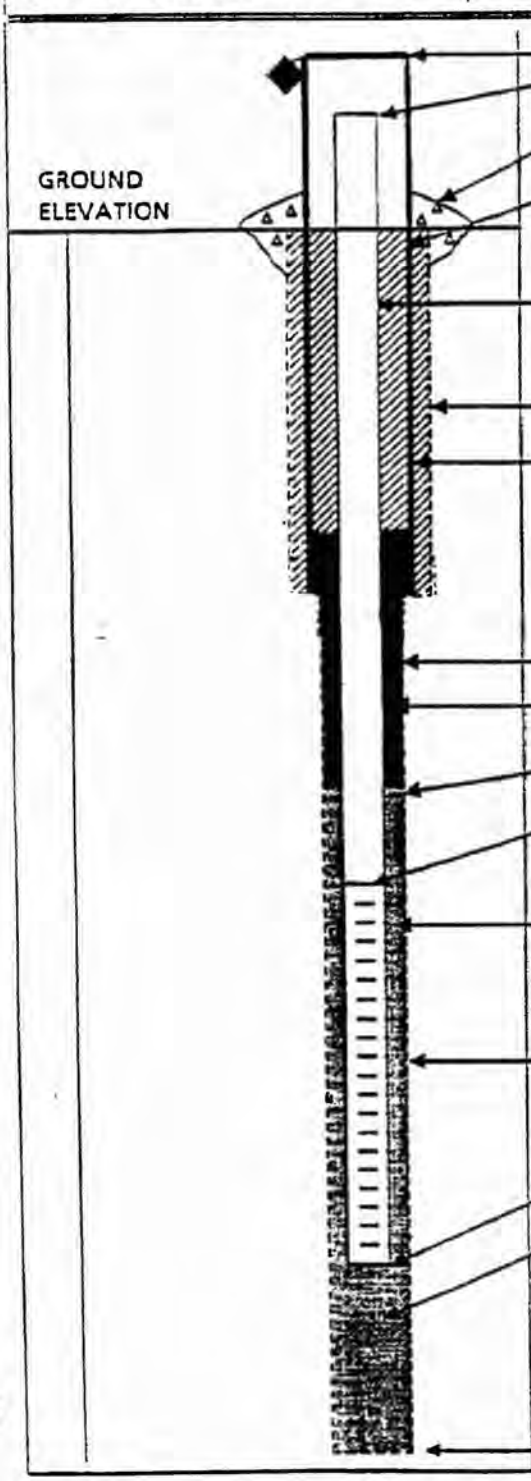
03 MW05 I

MONITORING WELL SHEET

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
FIELD GEOLOGIST Tobin Lounsbury

LOCATION 9TH St. LANDFill
BORING 03MW05I
DATE 5/22/97
Borehole S3W-5I

DRILLER Advanced Drilling INC
DRILLING METHOD Air Rotary
DEVELOPMENT METHOD Submersible Pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL:

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D. 03 MW05I
TYPE OF RISER PIPE: 2 inch PVC

BOREHOLE DIAMETER: 10 inch

PERM. CASING I.D. depth 27' bgs
TYPE OF CASING & BACKFILL: Casing to 27'
6" Steel casing set in cement/bentonite grout

ELEVATION / DEPTH TOP OF SEAL: 22' bgs
TYPE OF SEAL: Bentonite
Hole Plug, Slurry, Hole Plug

DEPTH TOP OF SAND PACK: 78' bgs

ELEVATION/DEPTH TOP OF SCREEN: 82' bgs
TYPE OF SCREEN:

TYPE OF SAND PACK: #2 Morie Sand

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 92' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 96' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION / DEPTH OF HOLE: 150' bgs

03 MW06 S

BROWN & ROOT ENVIRONMENTAL

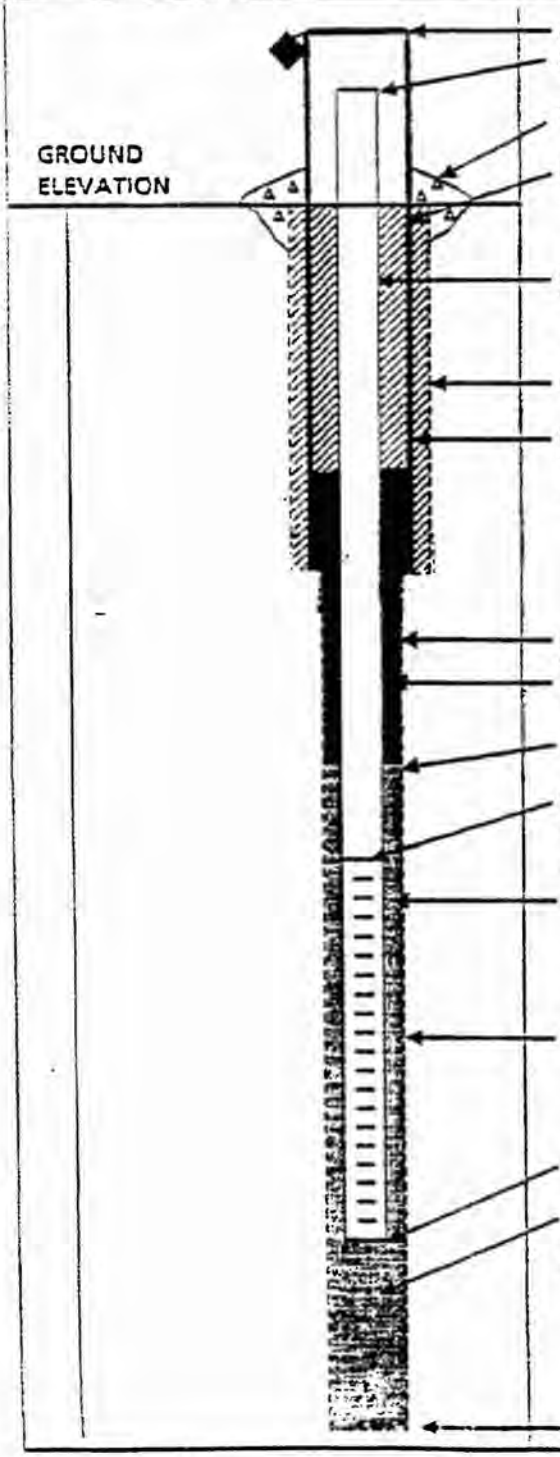
03 MW06 S

MONITORING WELL SHEET

PROJECT Willow Grove - NAS
PROJECT NO. 54666
ELEVATION
FIELD GEOLOGIST Tonin Lounsbury

LOCATION 9TH St LANDFILL
BORING S3W-65
DATE 5/22/96

DRILLER Advanced Drilling INC
DRILLING (Rock Emposm)
METHOD Air Rotary
DEVELOPMENT
METHOD Submersible Pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above grand
ELEVATION OF TOP OF RISER PIPE: 2.0' above grand

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D.
TYPE OF RISER PIPE: SCH 40- 2" diam PVC

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 25' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 20' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 25' bgs

ELEVATION/DEPTH TOP OF SCREEN: 26' bgs
TYPE OF SCREEN: 2 inch diam. PVC
SCH 40 0.02" slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 36' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 38' bgs
TYPE OF BACKFILL BELOW OBSERVATION
WELL: 38' - 72' Bentonite Hole Plug
72'-85' (well 03MW06SI in same borehole)

ELEVATION / DEPTH OF HOLE: 85' bgs

BROWN & ROOT ENVIRONMENTAL

03 MW 06 SI

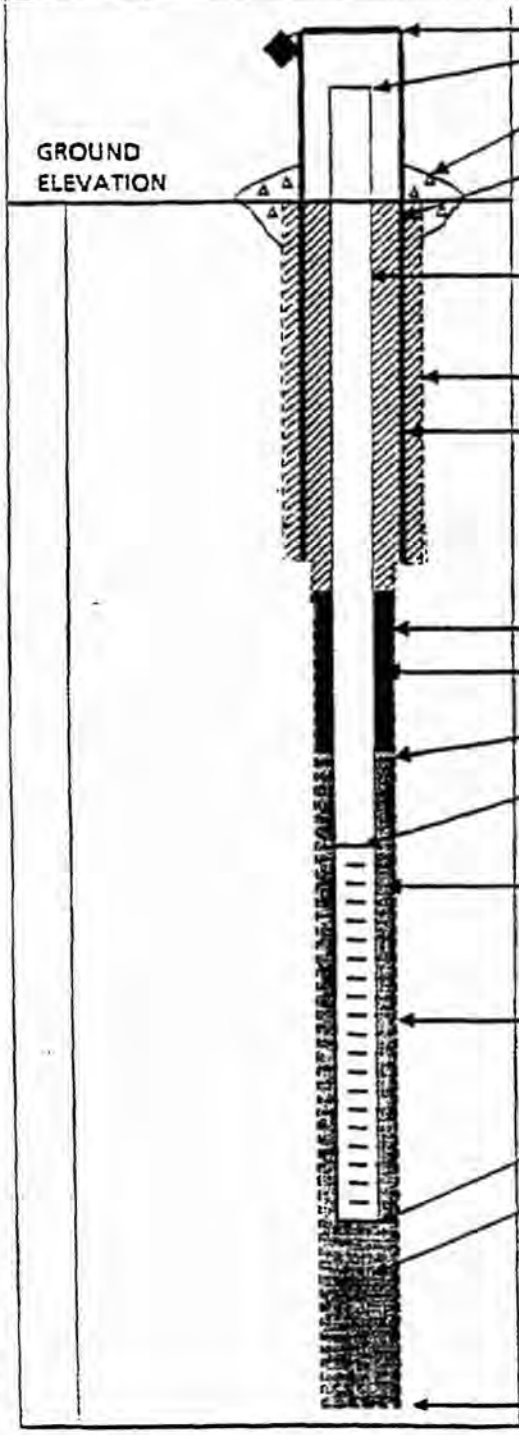
MONITORING WELL SHEET

03 MW 06 SI

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
FIELD GEOLOGIST Tobin Lounsbury

LOCATION 9TH Street Landfill
BORING 03 MW 06 SI
DATE 5/22/97

DRILLER Advanced Drilling INC
DRILLING METHOD Air Rotary
DEVELOPMENT METHOD Submersible Pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL: 2' Square Concrete

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" diam steel

RISER PIPE I.D. 03 MW 06 SI
TYPE OF RISER PIPE: SCH 40 PVC 2" Diameter

BOREHOLE DIAMETER: 10 INCHES

PERM. CASING I.D. depth - 20' bgs
TYPE OF CASING & BACKFILL:
6" diam. Steel Set with bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 38' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 72' bgs

ELEVATION/DEPTH TOP OF SCREEN: 75' bgs
TYPE OF SCREEN: 0.02 inch slot 2 inch diameter PVC

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING:

ELEVATION / DEPTH BOTTOM OF SCREEN: 85' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 85' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL:

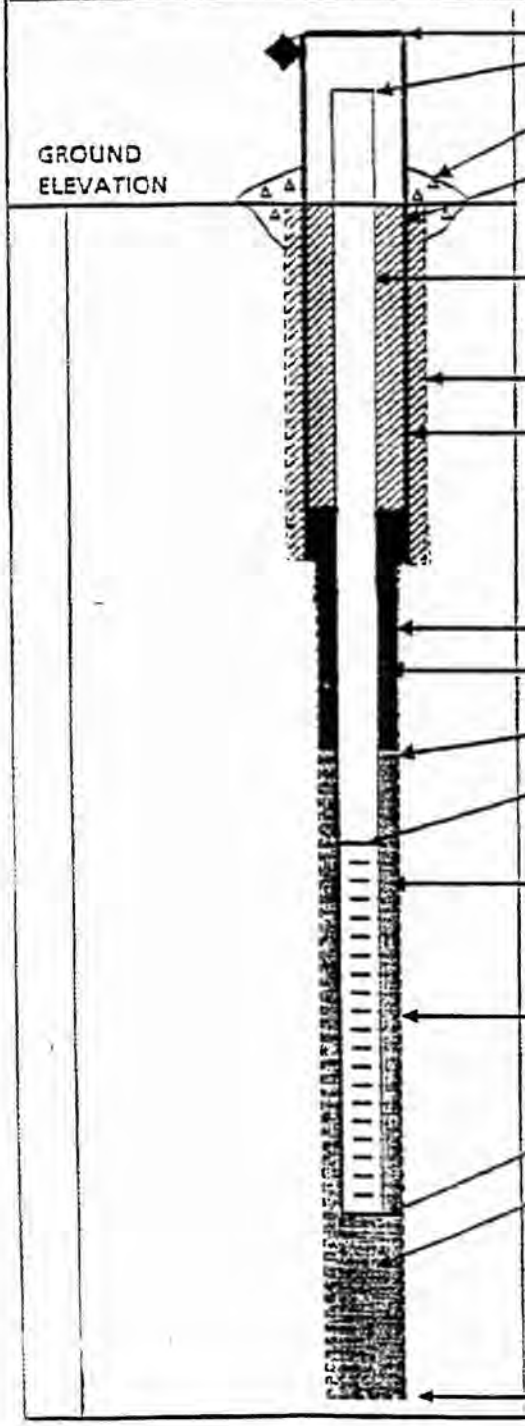
ELEVATION / DEPTH OF HOLE: 85' bgs

BORING NO: 03 MW 06 I

BROWN & ROOT ENVIRONMENTAL
03 MW 06 I

MONITORING WELL SHEET

PROJECT: Willow Grove - NAS
PROJECT NO.: 5H66
ELEVATION:
FIELD GEOLOGIST: Tobin Loughery
LOCATION: 9th ST. LANDFILL
BORING: S3W - 6I
DATE:
DRILLER: Advanced Drilling INC
DRILLING METHOD: Air Rotary
DEVELOPMENT METHOD: Submersible pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D. 03 MW 06 I
TYPE OF RISER PIPE: SCH 40- 2" diam PVC

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 20' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel Set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 18' bgs
TYPE OF SEAL: Bentonite

OEPTH TOP OF SAND PACK: 136' bgs

ELEVATION/DEPTH TOP OF SCREEN: 140' bgs
TYPE OF SCREEN: 2 inch diam PVC SCH 40 0.02" Slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 150' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 150' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: SAND

ELEVATION / DEPTH OF HOLE: 150' bgs

BORING NO.: 03 MW 07 S

BROWN & ROOT ENVIRONMENTAL

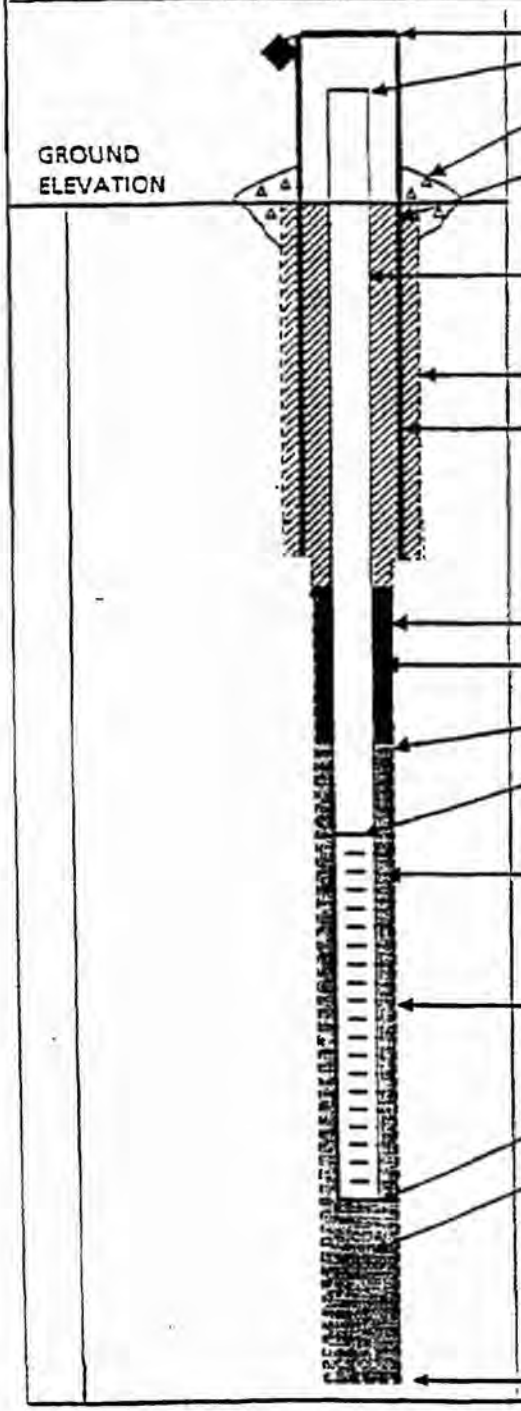
03 MW 07 S

MONITORING WELL SHEET

PROJECT: Willow Grove - NAS
PROJECT NO.: 54666
ELEVATION:
FIELD GEOLOGIST: Tonin Lounsbury

LOCATION: 9th St. - Landfill
BORING: 03 MW 07 S
DATE: 6/16/97

DRILLER: Advanced Drilling INC
DRILLING METHOD: Air Rotary
DEVELOPMENT METHOD: Submersible pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above grand
ELEVATION OF TOP OF RISER PIPE: 2.0' above grand

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D. 03 MW 07 S
TYPE OF RISER PIPE: SCH 40- 2" diam PVC
Set in cement/bentonite grout 26'-0' bgs.

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 14' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel Set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 26' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 30.5' bgs

ELEVATION/DEPTH TOP OF SCREEN: 34' bgs
TYPE OF SCREEN: 2 inch diam. PVC
SCH 40 0.02" slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 44' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 50' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: Bentonite backfill 50'-75'

ELEVATION / DEPTH OF HOLE: 75' bgs

WELL NO.: 03MW085

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: Willow Grove Site 3	LOCATION: Site 3	DRILLER: D. Ney	
PROJECT NO.:	BORING: 03MW08	DRILLING METHOD: Air rotary	
DATE BEGUN:	DATE COMPLETED:		
FIELD GEOLOGIST: R. G. Scharr		DEVELOPMENT METHOD:	
GROUND ELEVATION:	DATUM:		

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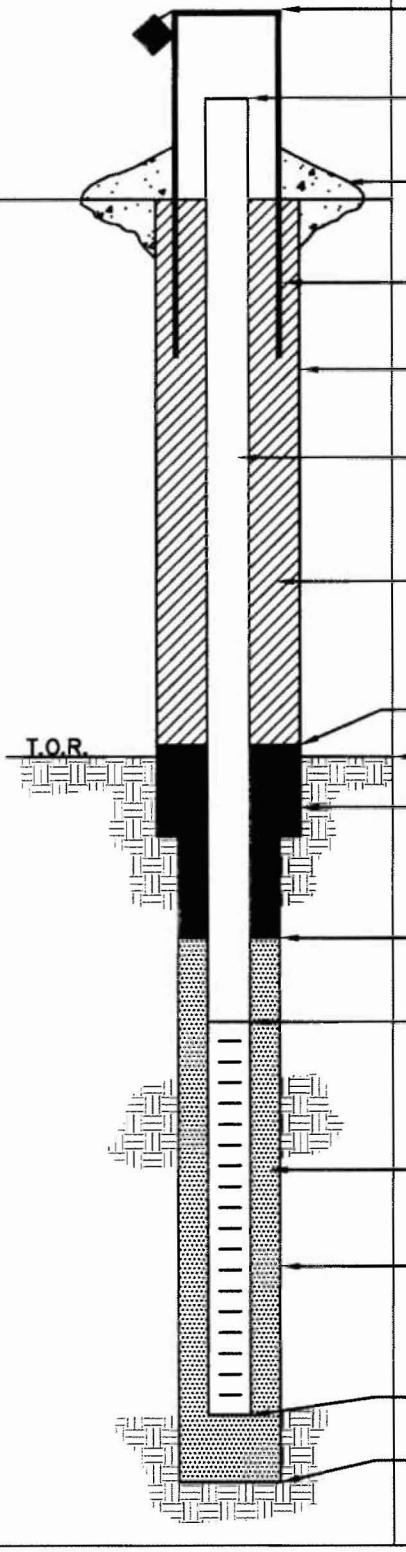


ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT TOP OF RISER: /

TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 8"

DIAMETER OF HOLE: 12"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Schedule 40 PVC

TYPE OF BACKFILL: cement/bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 128'

ELEVATION/DEPTH TOP OF BEDROCK: 10'

TYPE OF SEAL: bentonite

ELEVATION/DEPTH TOP OF SAND: 133

ELEVATION/DEPTH TOP OF SCREEN: 138

TYPE OF SCREEN: schedule 40 PVC

SLOT SIZE x LENGTH: 0.02" X 30'

I.D. SCREEN: 2"

TYPE OF SAND PACK: No. 2

DIAMETER OF HOLE IN BEDROCK: 8"

CORE/REAM:

ELEVATION/DEPTH BOTTOM SCREEN: 168

ELEVATION/DEPTH BOTTOM OF SAND: 173

ELEVATION/DEPTH BOTTOM OF HOLE: 225

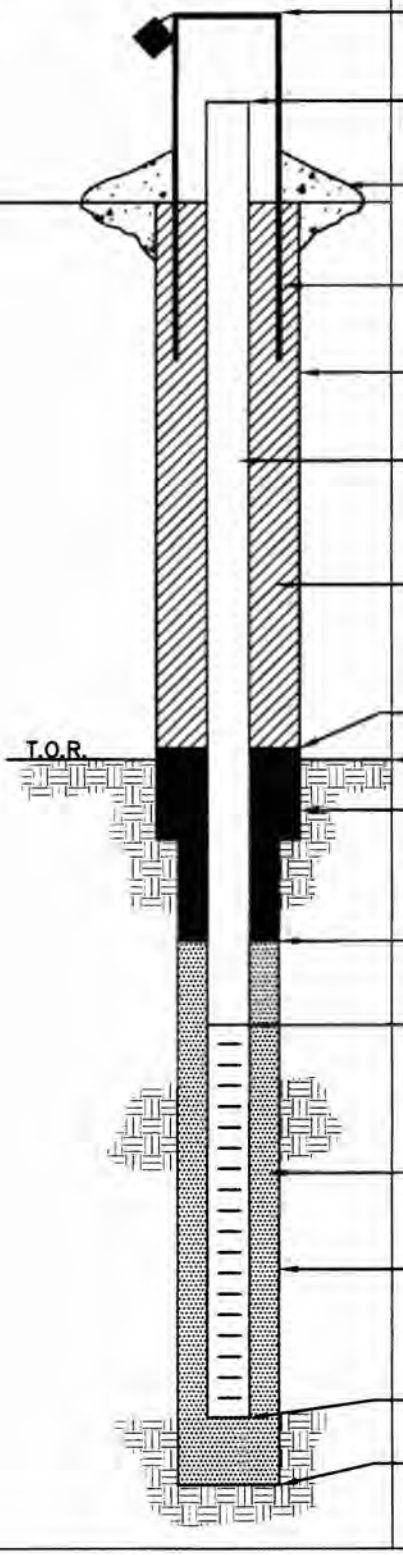
BACKFILL MATERIAL BELOW SAND: 03MW08D constructed in same borehole

WELL NO.: 03MW08D

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: Willow Grove Site 3	LOCATION: Site 3	DRILLER: D. Nay	
PROJECT NO.:	BORING: 03MW08	DRILLING METHOD: Air rotary	
DATE BEGUN:	DATE COMPLETED:		
FIELD GEOLOGIST: R.G Schaar		DEVELOPMENT METHOD:	
GROUND ELEVATION:	DATUM:		



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT TOP OF RISER: /

TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 8"

DIAMETER OF HOLE: 12"

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: Schedule 40 PVC

TYPE OF BACKFILL: Cement/bentonite grout; 03MW08S constructed in same borehole

ELEVATION/DEPTH TOP OF SEAL: 1153'

ELEVATION/DEPTH TOP OF BEDROCK: 10'

TYPE OF SEAL: bentonite

ELEVATION/DEPTH TOP OF SAND: 1158'

ELEVATION/DEPTH TOP OF SCREEN: 1163'
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE x LENGTH: 0.02" X 10'
I.D. SCREEN: 2"

TYPE OF SAND PACK: No. 2

DIAMETER OF HOLE IN BEDROCK: 8"
CORE/REAM:

ELEVATION/DEPTH BOTTOM SCREEN: 1173'
ELEVATION/DEPTH BOTTOM OF SAND: 1178'
ELEVATION/DEPTH BOTTOM OF HOLE: 1225'
BACKFILL MATERIAL BELOW SAND: cement/bentonite grout

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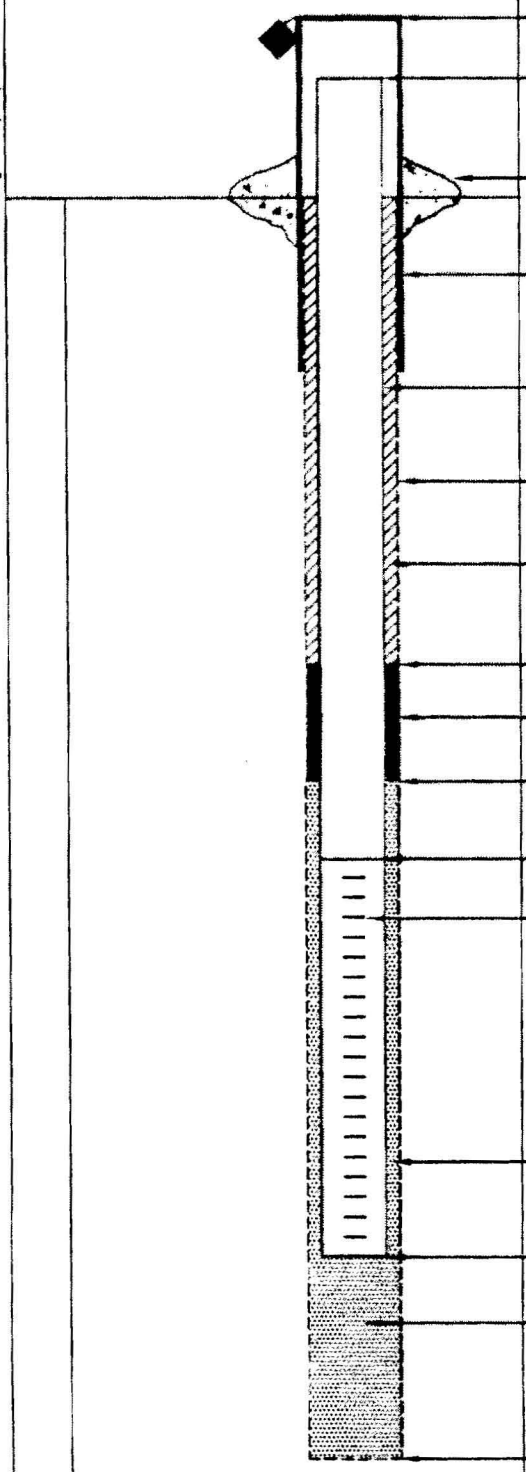
WELL NO.: 03MW09D

Tetra Tech NUS, Inc.

OVERBURDEN
MONITORING WELL SHEET
STICK-UP

PROJECT Willow Grove	LOCATION Site 3	DRILLER Joe/McKsey
PROJECT NO. 112G02014	BORING 03MW09D	DRILLING METHOD Air Rotary
DATE BEGUN 1/14/10	DATE COMPLETED 1/15/10	
FIELD GEOLOGIST T.S. Toma/AW Abt		DEVELOPMENT METHOD Pump
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 13'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 12.7'

TYPE OF SURFACE SEAL: Neat Cement

I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Steel

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Cement/Bentonite Grout

ELEVATION/DEPTH TOP OF SEAL: 13'

TYPE OF SEAL: 0.0 Sand

DEPTH TOP OF SAND PACK: 4'

ELEVATION/DEPTH TOP OF SCREEN: 15'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010"

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: No. 1 Sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 110'

ELEVATION/DEPTH BOTTOM OF SAND PACK: 110'
BACKFILL MATERIAL BELOW SAND:

ELEVATION/DEPTH OF HOLE: 110'

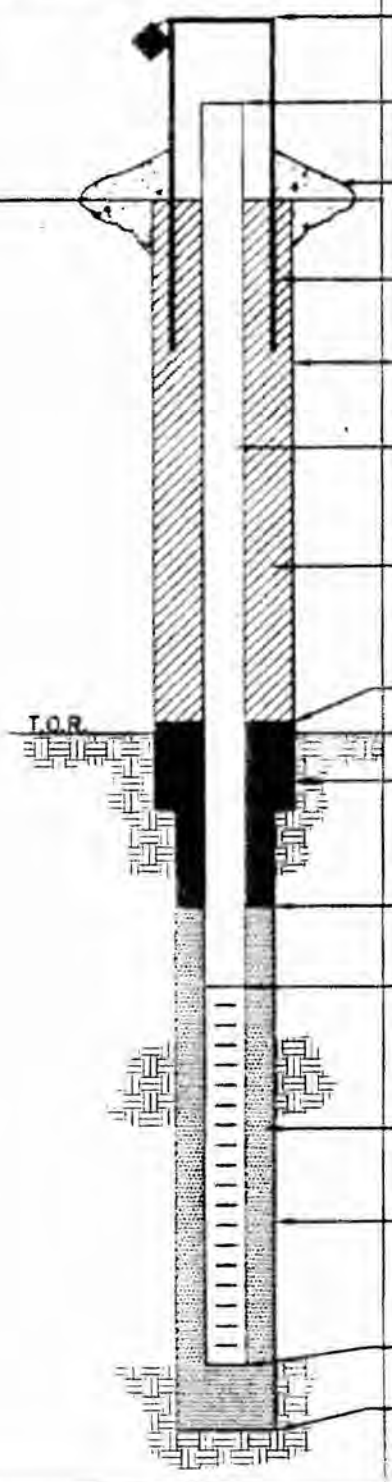
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 03MW09S
4FT

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT Willow Grove	LOCATION SITE 3	DRILLER ADVANCED DRILLING
PROJECT NO. 112G02014	BORING 03MW09S	DRILLING METHOD ROTARY
DATE BEGUN 11/14/10	DATE COMPLETED 11/20/10	DEVELOPMENT METHOD pump
FIELD GEOLOGIST V. SHICKORA		
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 12.5

ELEVATION/HEIGHT TOP OF RISER: 10.40

TYPE OF SURFACE SEAL: CEMENT

I.D. OF SURFACE CASING: 6"

DIAMETER OF HOLE: 10"

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: CEMENT GROUT

ELEVATION/DEPTH TOP OF SEAL: 14'

ELEVATION/DEPTH TOP OF BEDROCK: 15'

TYPE OF SEAL: BENTONITE CLAY

ELEVATION/DEPTH TOP OF SAND: 116'

ELEVATION/DEPTH TOP OF SCREEN: 118'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: NO.10 X 15'
I.D. SCREEN: 2"

TYPE OF SAND PACK: NO.1 FILTER SAND

DIAMETER OF HOLE IN BEDROCK: 6"
CORE/REAM:

ELEVATION/DEPTH BOTTOM SCREEN: 133
ELEVATION/DEPTH BOTTOM OF SAND: 135
ELEVATION/DEPTH BOTTOM OF HOLE: 135
BACKFILL MATERIAL BELOW SAND: NA
BEDROCK BELOW SAND

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APPENDIX C

SAMPLE COLLECTION LOGS

SURFACE SOIL SAMPLES

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5466 / GTO-277

HNUS Source No. BGSS01 Source Location background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-7-97 0955			
Sampled By: Vince Shidori			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay, moist

Analysis:
SVOC
TAL Mtals
CN
PCB/Pest

Observation/Notes

no HNU readings above background

- Duplicate sample # BGSS13 collected at this location
- Also MS/MSD sample
- See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5466 / GRO-27

HNUS Source No. BG55502 Source Location background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-7-97 1018			
Sampled By: Vince Shidora			
Signature(s):			
Type of Sample			
☑ Low Concentration ☐ High Concentration ☑ Grab ☐ Composite ☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay w/ grass roots (moist)

Analysis:
SVOC
Cn
TAL Metals
PCB/Pest

Observation/Notes

no HNU readings above background

- See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2992720113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5466 / CTO-277

HNUS Source No. BG5503 Source Location Runway background

Sample Method:	Composite Sample Data		
hand trowel	Sample	Time	Color/Description
Depth Sampled:			
0-6 inches			
Sample Date & Time:			
4-7-97 1302			
Sampled By:			
Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	silt - clay with grass & roots (moist)

Analysis:
SVOC
TAL Metal
PBC/Pest
CN

Observation/Notes

No HNU readings above background

- See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2992720113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5466 / CTO-277

HNUS Source No. BG5504 Source Location Background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0 - 6 inches			
Sample Date & Time: 4-7-97 1135			
Sampled By: Vince Shidora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay w/ grass & roots (moist)

Analysis:
SVOC
TAL Metals
Pest / PCB
CN

Observation/Notes

no HNU readings above background

-See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5466 / CTO-277

HNUS Source No. BS5505 Source Location background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0 to 6 inches			
Sample Date & Time: 4-7-97 1355			
Sampled By: Vince Strickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay w/ grass & roots (moist)

Analysis:
SVOC
TAL Metals
CN
PVC/Pest

Observation/Notes

No HNU readings above background

-See logbook # 1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Halliburton NUS CORPORATION

Page _____ of _____

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5426/GTO-277

HNUS Source No. B6S506 Source Location background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-7-97 1420			
Sampled By: Vince Shidora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			
	Sample Data		
	Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)	
	dark brown	silt-clay w/ grass & roots (moist)	

Analysis:
SVOC
TAL Metal
CN
PBC/Pest

Observation/Notes

No HNU readings above background

-See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 5466 | GTO-377

HNUS Source No. 865507 Source Location background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-7-97 1105			
Sampled By: Vince Shickori			
Signature(s):			
Type of Sample			
☐ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay w/ grass & roots (moist)

Analysis:	Observation/Notes
	No HNU readings above background
SVOC	
TAL Metals	
CN	
Pest/PCB	-See logbook # 1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5466) GTO-277

HNUS Source No. 8655508 Source Location Runway background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0 - 6 inches			
Sample Date & Time: 4-7-97 1250			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration ☐ High Concentration ☑ Grab ☐ Composite ☐ Grab - Composite	Sample Data		
	Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)	
	dark brown	organic silt-clay w/ grass & roots (moist)	

Analysis:
SVOC
Pest / PCB
TAL Metal
CN

Observation/Notes

No HNU reading above background

- See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2992720113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Halliburton NUS CORPORATION

Page _____ of _____

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number SS66 / CTO-277

HNUS Source No. B6SSD9 Source Location background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-7-97 1040			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay w/ grass & roots moist

Analysis:
SVOC
CN
TAL Metals
Pest / PCB

Observation/Notes

no HNU readings above background

- See logbook # 1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272O113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NJSRB Willow Grove Project Site Number SH66 / GO-277

HNUS Source No. BG5510 Source Location Runway, background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-7-97 1240			
Sampled By: Vince Shichora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic

Analysis:
SVOC
TAL Metals
CN
Pest / PCB

Observation/Notes

no HNU readings above background

-See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Halliburton NUS CORPORATION

Page _____ of _____

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 54661 CTO-277

HNUS Source No. BGSS11 Source Location background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0 - 6 inches			
Sample Date & Time: 4-7-97 1435			
Sampled By: Vince Strickora			
Signature(s):			
Type of Sample			
☑ Low Concentration ☐ High Concentration ☑ Grab ☐ Composite ☐ Grab - Composite	Sample Data		
	Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)	
	dark brown	organic silt - clay w/ grass & roots (moist)	

Analysis:
SVOC
TAL Metals
CN
Pest / PCB

Observation/Notes

No HNU readings above background

- See Logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 5466/CTO-277

HNUS Source No. BGSS12 Source Location Runway background

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-7-97 1315			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab	Sample Data		
☐ Composite	Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)	
☐ Grab - Composite	dark brown	silty-clay w/ grass & roots (moist)	

Analysis:	Observation/Notes
	No HNU readings above background
SVOC	
TAL Metal	
PVC/Pest	
CN	-See logbook # 1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0113	
Date Shipped	4-7-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Halliburton NUS CORPORATION

Page _____ of _____

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 5466 / CTO-277

HNUS Source No. 035501 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-8-97 1035			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			
	Sample Data		
	Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)	
	dark brown	organic silt-clay with roots (moist)	

Analysis:	Observation/Notes
	No HNU readings above background
SVOC	
TAL (Metal)	
CN	
PCB/Pest	- See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2992720043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number SH66 / CTO-277

HNUS Source No. 035502 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0 - 6 inches			
Sample Date & Time: 4-8-97 1057			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	silty-clay w/small amounts of sand & roots (moist)

Analysis:
SVOC
TAL Metals
CN
Pest / PCB

Observation/Notes

No HNU readings above background

-See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

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Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 5466 ICTO-277

HNUS Source No. 035503 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-8-97 1119			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay with roots (moist)

Analysis:
SVOC
TAL Metals
CN
Pest / PCB

Observation/Notes

No HNU readings above background

-See logbook # 1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

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Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 541661GTO-277

HNUS Source No. 035504 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-8-97 1121			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample: ☐ Low Concentration ☐ High Concentration ☑ Grab ☐ Composite ☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	Organic silt - clay w/some sand and roots (moist)

Analysis:
SVOC
TAL Metals
CN
Pest / PCB
Dioxin

Observation/Notes

No HNU readings above background

- See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Halliburton NUS CORPORATION

Page _____ of _____

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 4166 / CTO-277

HNUS Source No. 035505 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-8-97 1204			
Sampled By: Vince Smickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay w/ roots (moist)

Analysis:
SVOC
TAL Metals
CN
Pest / PCB

Observation/Notes

No HNU readings above background

-See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2992720043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5466 / CTO-277

HNUS Source No. 035506 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-8-97 1225			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay w/ roots (moist)

Analysis:

SVOC
TAL Metals
CN
Pest / PCB

Observation/Notes

No HNU readings above background

- Duplicate Sample # 035513 collected at this location

- See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272004 3	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 4466/CTO-277

HNUS Source No. 0355507 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-8-97 1248			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration ☐ High Concentration ☑ Grab ☐ Composite ☐ Grab - Composite	Sample Data		
	Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)	
	dark brown	Organic silt clay with roots (moist)	

Analysis:
SVOC
TAL Metals
CN
Pest / PCB

Observation/Notes

No HNU readings above background

- See logbook # 1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name N95SRB Willow Grove Project Site Number 54661GO-277

HNUS Source No. 0355508 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-8-97 1307			
Sampled By: Vince Smickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay w/ roots (moist)

Analysis:
SVOC
TAL Metals
CN
Pest / PCB
Dioxin

Observation/Notes

No HNU readings above background

-See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2992720043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page _____ of _____

Halliburton NUS CORPORATION

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5466 / CTO-277

HNUS Source No. 035509 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0 – 6 inches			
Sample Date & Time: 4-8-97 1325			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay, w/some roots & brownish sand (moist)

Analysis:
PVOC
TAL Metals
CN
Pest / PCB

Observation/Notes

No HNU readings above background

-See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Halliburton NUS CORPORATION

Page _____ of _____

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number SW66/GTO-277

HNUS Source No. 035510 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-4-97 1400			
Sampled By: Vince Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	organic silt-clay w/ grass & roots (moist)

Analysis:
PVOC
TAL Metals
CN
Pest / PCB

Observation/Notes

No HNU readings above background

- See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Halliburton NUS CORPORATION

Page _____ of _____

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. _____

By _____

Project Site Name NAS JRB Willow Grove Project Site Number 5466 / CTO-277

HNUS Source No. 035511 Source Location 9th Street Landfill

Sample Method: hand trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6 inches			
Sample Date & Time: 4-8-97 1420			
Sampled By: Vince Shickora			
Signature(s):			

Type of Sample

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
dark brown	silt-clay with grass & roots (moist)

Analysis:

- SVOC
- TAL Metals
- CN
- Pest / PCB

Observation/Notes

No HNU above background

-See logbook #1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2992720043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Surface Soil

Case No. ____

By ____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. 035512 Source Location Ninth Street Landfill

Sample Method:	Composite Sample Data		
Stainless Steel hand Trowel	Sample	Time	Color/Description
Depth Sampled:			
0 inches to 6 inches			
Sample Date & Time:			
4-8-97 1445			
Sampled By:			
Vincent Shickora			
Signature(s):			

Type of Sample

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
Brown	organic silt clay with grass + roots (moist to wet)

Analysis:

- ☐ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide

Observation/Notes

- No HNU readings above background
- See logbook # 1225 for location

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	299272 0043	
Date Shipped	4-8-97	
Time Shipped	1700	
Laboratory	ARDL	
Volume		

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: NAS Willow Grove Site 3
Project No.: 845

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: 03-SS-17
Sample Location: 03-SS-17
Sampled By: DW/CM
C.O.C. No.: _____

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1120	0-6"	Brown	clayey silt, moist some roots
Method: Disposable Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

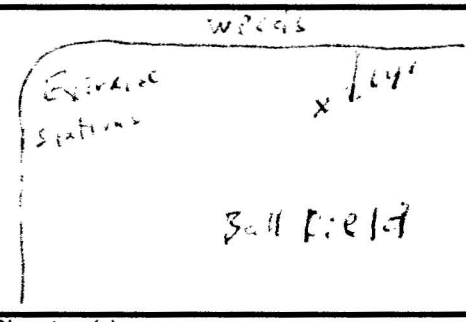
Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	✓	
SVOC/Pest/PCB	8 oz Clear Glass Jar	✓	
TAL Metals/Cyanide	2 oz Clear Glass Jar	✓	

OBSERVATIONS / NOTES:

PID Readings Above background
None

Fill Material encountered
None

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Daniel Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NAS Willow Grove Site 3
Project No.: 845

Sample ID No.: 03-SS-18
Sample Location: DW/CM
Sampled By: DW/CM
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1145	0-6"	Brown	clayey silt, moist
Method: Disposable Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

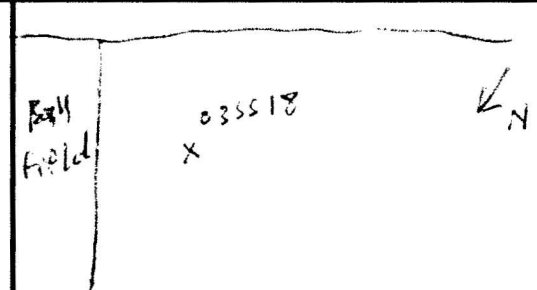
Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	✓	
SVOC/Pest/PCB	8 oz Clear Glass Jar	✓	
TAL Metals/Cyanide	2 oz Clear Glass Jar	✓	

OBSERVATIONS / NOTES:

PID Readings Above background

Fill Material encountered

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NAS Willow Grove Site 3
Project No.: 845

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SS-19
Sample Location: 03-SS-19
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/02	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1200	0 6"	Brown	clayey silt ; wet
Method: Disposable Trowel			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	✓	
SVOC/Pest/PCB	8 oz Clear Glass Jar	✓	
TAL Metals/Cyanide	2 oz Clear Glass Jar	✓	

OBSERVATIONS / NOTES:

PID Readings Above background

None

Fill Material encountered

None

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NAS Willow Grove Site 3
Project No.: 845

Sample ID No.: 03-SS-20
Sample Location: 03-SS-20
Sampled By: DW/CM
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 2/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1215	0-6"	Brown	~~s~~ clayey silt wet
Method: Disposable Trowel			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	3	
SVOC/Pest/PCB	8 oz Clear Glass Jar	1	
TAL Metals/Cyanide	2 oz Clear Glass Jar	1	

OBSERVATIONS / NOTES:

PID Readings Above background
None

Fill Material encountered
None

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald McLaughlin

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NAS Willow Grove Site 3
Project No.: 845

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SS-21
Sample Location: 03-SS-21
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1230	0-6"	Brown	silt, moist
Method: Disposable Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	✓	
SVOC/Pest/PCB	8 oz Clear Glass Jar	✓	
TAL Metals/Cyanide	2 oz Clear Glass Jar	✓	

OBSERVATIONS / NOTES:

PID Readings Above background

Fill Material encountered
small piece of scrap metal at sample location; glass fragment

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: 0000
03-SS-29

Signature(s):

David Kahler

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: NAS Willow Grove Site 3
Project No.: 845

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SS-22
Sample Location: 03-SS-22
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1250	0-6"	Brown	clayey silt, wet
Method: Disposable Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				N/A

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	3	
SVOC/Pest/PCB	8 oz Clear Glass Jar	3	
TAL Metals/Cyanide	2 oz Clear Glass Jar	3	

OBSERVATIONS / NOTES:

PID Readings Above background

None

Fill Material encountered

None

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Donald W Kalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NAS Willow Grove Site 3
Project No.: 845

Sample ID No.: 03-SS-23
Sample Location: 03-SS-23
Sampled By: DW/CM
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1320	0-6"	Brown	silty sand wet
Method: Disposable Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	3	
SVOC/Pest/PCB	8 oz Clear Glass Jar	1	
TAL Metals/Cyanide	2 oz Clear Glass Jar	1	

OBSERVATIONS / NOTES:

PID Readings Above background

Fill Material encountered

Sample collected from middle swale at S end

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

David W Rahn

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NAS Willow Grove Site 3
Project No.: 845

Sample ID No.: 03-SS-24
Sample Location: 03-SS-24
Sampled By: DV/CM
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1335	0-6"	Brown	silty sand, wet
Method: Disposable Trowel			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	3	
SVOC/Pest/PCB	8 oz Clear Glass Jar	1	
TAL Metals/Cyanide	2 oz Clear Glass Jar	1	

OBSERVATIONS / NOTES:

PID Readings Above background : None

Fill Material encountered : None

sample collected from N end of swale.

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: 03-SS-30 1535

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NAS Willow Grove Site 3
Project No.: 845

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SS-25
Sample Location: 03-SS-25
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1700	0-6"	Brown	silty clay, moist
Method: Disposable Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	3	
SVOC/Pest/PCB	8 oz Clear Glass Jar	1	
TAL Metals/Cyanide	2 oz Clear Glass Jar	1	

OBSERVATIONS / NOTES:

PID Readings Above background

None

Fill Material encountered

None

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald W. Kahler

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

Sample ID No.: 03-SS-26
Sample Location: 03-SS-26
Sampled By: DW/CM
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1420	0-6"	Dk Brn.	Sandy silt, Moist
Method: Disposable trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	5 Gram Encore Samplers	3	
SVOC/Pest/PCB	8 oz Clear Glass Widemouth	1	
TAL Metal /Cyanide	2 oz Clear Glass Widemouth	1	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Dell Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

Sample ID No.: 03-SS-27
Sample Location: 03-SS-27
Sampled By: DW/CM
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1435	0-6"	Dk. Brown	clayey silt, some sand, some roots; moist
Method: Direct Install			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	5 Gram Encore Samplers	3	
SVOC/Pest/PCB	8 oz Clear Glass Widemouth	1	
TAL Metal /Cyanide	2 oz Clear Glass Widemouth	1	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

David W Hahn

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SS-28
Sample Location: 03-SS-28
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/17/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1450	0-6"	Brown	Clayey silt, wet some roots
Method: Disps. Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

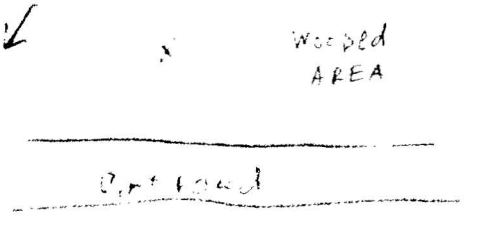
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	5 Gram Encore Samplers	3	
SVOC/Pest/PCB	8 oz Clear Glass Widemouth	1	
TAL Metal /Cyanide	2 oz Clear Glass Widemouth	1	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3
Project No.: 02014

Sample ID No.: 035531
Sample Location: SS31
Sampled By: D. Whalen
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/25/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0905	0 - 1.5'	Brown	CLAYEY SILT, some glass fragments; MOIST
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	✓	
SVOC/Pest/PCB	1 x 8 oz. jar	✓	
Metals/CN	1 x 4 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3
Project No.: 02014

Sample ID No.: 035532
Sample Location: SS 32
Sampled By: DW
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/25/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0950	0 - 1.75'	Brown	CLAYEY SILT, moist some glass, rock fragments, debris.
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore		
SVOC/Pest/PCB	1 x 8 oz. jar		
Metals/CN	1 x 4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald W Galen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 02014

Sample ID No.: 035533
Sample Location: SS33
Sampled By: D.W
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/26/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1620	0 - 2'	Brown	SILT, some CLAY, Moist
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	✓	
SVOC/Pest/PCB	1 x 8 oz. jar	✓	
Metals/CN	1 x 4 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Wheeler

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 02014

Sample ID No.: 035534
Sample Location: 5534
Sampled By: D. Whalen
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/26/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1500	0-2'	BROWN	CLAYEY SILT, Moist some SAND
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	✓	
SVOC/Pest/PCB	1 x 8 oz. jar	✓	
Metals/CN	1 x 4 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 02014

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 035535
Sample Location: SS35
Sampled By: D. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/26/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1240	0-2'	Brown and Gray	CLAYEY SILT with wire pieces, glass fragments, cinders; MOIST
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore		
SVOC/Pest/PCB	1 x 8 oz. jar		
Metals/CN	1 x 4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: 035544 (1315)

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 02014

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 035536
Sample Location: 5536
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/26/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1410	0-2'	Brown	SILT, some CLAY; Moist
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	✓	
SVOC/Pest/PCB	1 x 8 oz. jar	✓	
Metals/CN	1 x 4 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Dwight Walker

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 02014

Sample ID No.: 035537
Sample Location: SS37
Sampled By: DW
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/26/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1145			
Method: hand auger	0-2'	Brown	SILTY SAND, some CLAY; moist
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	✓	
SVOC/Pest/PCB	1 x 8 oz. jar	✓	
Metals/CN	1 x 4 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

David Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 02014

Sample ID No.: 035538
Sample Location: 5538
Sampled By: DW
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/26/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1050	0 - 2'	Brown	CLAYEY SILT, some SAND moist
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	9	
SVOC/Pest/PCB	1 x 8 oz. jar	3	
Metals/CN	1 x 4 oz. jar	3	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Donald W Kalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3
Project No.: 02014

Sample ID No.: 03 55 39
Sample Location: 5539
Sampled By: DW
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/2/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1055	0 - 2'	Brown	CLAYEY SILT, moist
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	✓	
SVOC/Pest/PCB	1 x 8 oz. jar	✓	
Metals/CN	1 x 4 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): David Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3
Project No.: 02014

Sample ID No.: 035540
Sample Location: 5540
Sampled By: DW
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/25	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1420	0 - 2'	Brown	SANDY SILT, MOIST
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	✓	
SVOC/Pest/PCB	1 x 8 oz. jar	✓	
Metals/CN	1 x 4 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Weber

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 02014

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 035541
Sample Location: SS 41
Sampled By: D. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/25/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1210	0-2'	Brown	CLAYEY SILT, MOIST
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	✓	
SVOC/Pest/PCB	1 x 8 oz. jar	✓	
Metals/CN	1 x 4 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: 035543

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 02014

Sample ID No.: 035542
Sample Location: 5542
Sampled By: D. Whalen
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8/25/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1310	0-2'	Brown	CLAYEY SILT, MOIST
Method: hand auger			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	3 x 5 g Encore	✓	
SVOC/Pest/PCB	1 x 8 oz. jar	✓	
Metals/CN	1 x 4 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

SUBSURFACE SOIL SAMPLES

SOLID/SOIL/SEDIMENT
SAMPLE LOG SHEET

Brown & Root Environmental

- ☐ Surface Soil
- ☑ Subsurface Soil
- ☐ Sediment
- ☐ Lagoon/Pond
- ☐ Other_____

Project Site Name NASJRB Willow Grove Project Site Number 5466

Source Number 035B01-0204 Source Location Ninth Street Landfill

Sample Method: 3 inch Split Spoon and stainless steel Trowel

Depth Sampled: 2.0 ft to 4.0 ft

Sample Date & Time: 5-27-97

Sampled by: Tobin Lounsbury

Signature(s): Tobin Lounsbury

Sample Type

- ☑ Low Concentration
- ☐ High Concentration
- ☐ Grab
- ☑ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☑ TCL VOAs	dark, 4°C
☐ TCL SVOAs	dark, 4°C
☐ TCL Pest/PCBs	dark, 4°C
☐ TAL Metals	4°C
☐ Cyanide	4°C

☐ Duplicate sample taken

Composite Sample Data

Sample	Time	Color and Description

Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
Yellow Brown	Sandy clay (damp)

Observation/Notes

See logbook #1229 for location

No HNU readings

SOLID/SOIL/SEDIMENT
SAMPLE LOG SHEET

Brown & Root Environmental

- [ ] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Lagoon/Pond
- [ ] Other_____

Project Site Name NASJRB Willow Grove Project Site Number 5466

Source Number 035B01-0608 Source Location Ninth Street Landfill

Sample Method: 3 inch Split Spoon and Stainless Steel Trowel

Depth Sampled: 6.0 ft to 8.0 ft.

Sample Date & Time: 5-27-97 1530

Sampled by: Tobin Lounsbury

Signature(s): Tobin Lounsbury

Sample Type

- [x] Low Concentration
- [ ] High Concentration
- [ ] Grab
- [x] Composite
- [ ] Grab - Composite

Analysis	Preservative:
[x] TCL VOAs	dark, 4°C
[ ] TCL SVOAs	dark, 4°C
[ ] TCL Pest/PCBs	dark, 4°C
[ ] TAL Metals	4°C
[ ] Cyanide	4°C

- [ ] Duplicate sample taken

Composite Sample Data

Sample	Time	Color and Description

Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
Brown	Sandy clay (damp)

Observation/Notes

See logbook #1229 for location

No HNU readings

SOLID/SOIL/SEDIMENT
SAMPLE LOG SHEET

Brown & Root Environmental

- ☐ Surface Soil
- ☑ Subsurface Soil
- ☐ Sediment
- ☐ Lagoon/Pond
- ☐ Other_____

Project Site Name NASJRB Willow Grove Project Site Number 5466

Source Number 035B01-1416 Source Location Ninth Street Landfill

Sample Method: 3 inch Split Spoon and Stainless Steel Trowel

Depth Sampled: 14.0 ft to 16.0 ft

Sample Date & Time: 5-27-97 1558

Sampled by: Tobin Lounsbury

Signature(s): Tobin Lounsbury

Sample Type

- ☑ Low Concentration
- ☐ High Concentration
- ☐ Grab
- ☑ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☑ TCL VOAs	dark, 4°C
☐ TCL SVOAs	dark, 4°C
☐ TCL Pest/PCBs	dark, 4°C
☐ TAL Metals	4°C
☐ Cyanide	4°C

☐ Duplicate sample taken

Composite Sample Data

Sample	Time	Color and Description

Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
Yellow Brown	Sandy Clay (moist)

Observation/Notes

See logbook #1229 for location

No HNU readings

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP05-0506-01
Sample Location: 03TP05
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 4/30/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1215	5' to 6'	Black Brown rust, White Light Blue	Silty sand/sandy silt charred material corroded metal fragments glass and ash
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

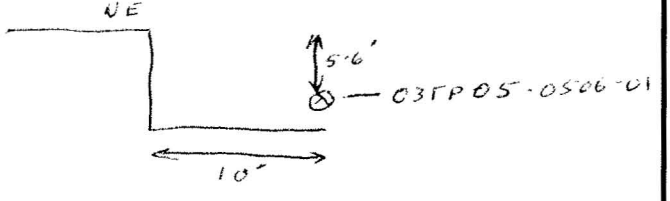
COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:



MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP05-0910-02
Sample Location: 03TP05
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 4/30/07	Depth	Color	Description (Sand, Silty, Clay, Moisture, etc.)
Time: 1515	9 - 10'	Dark Brown	Silty Sand with some Gravel and some Glass Fragments
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

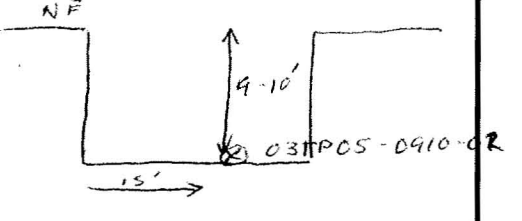
Date:	Time	Depth	Color	Description (Sand, Silty, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	6	
TCL SVOC, Pest/PCB	4 oz. jar	2	
TAL metals, cyanide	4 oz. jar	2	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.: 03TP05-0102-03
	Assigned time 1530

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP06-0304-01
Sample Location: 03TP06
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/1/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0925	3 - 4'	Brown	Silty sand with trace clay moist
Method: Disposable Trowel			
Monitor Reading (ppm): 150			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	6	
TCL SVOC, Pest/PCB	4 oz. jar	2	
TAL metals, cyanide	4 oz. jar	2	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Donald Wlake

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP06-0708-02
Sample Location: 03TP06
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: / Time: 1045 / Method: Disposable Trowel / Monitor Reading (ppm):	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
	7-8'	Brown to Light Blue	Silty Sand corroded metal, Glass Fragments, wire and pebbles

COMPOSITE SAMPLE DATA:

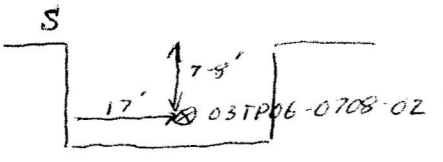
Date: / Method: / Monitor Readings (Range in ppm):	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Wheeler

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP06-0809-03
Sample Location: 03TP06
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/11/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1110	8 - 9'	Rusty Brown and Gray	Sandy silt, silty sand glass fragments, metal and charred material
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

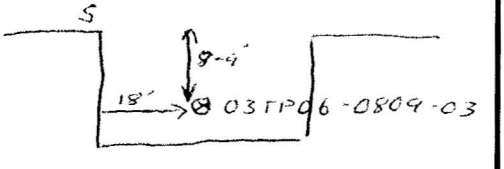
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar	3	

OBSERVATIONS / NOTES:

Duplicate and MS/MSD were collected for Dioxin at this location

MAP:



Circle if Applicable:

MS/MSD

Duplicate ID No.: 03TP06-0102-05
Assigned time = 1400

Signature(s):

Donald Wheeler

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP06-0607-04
Sample Location: 03TP06
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/11/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1330	6-7'	Rusty gray Brown	Silty Sand, cinders, Metal Fragments and glass Fragments
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

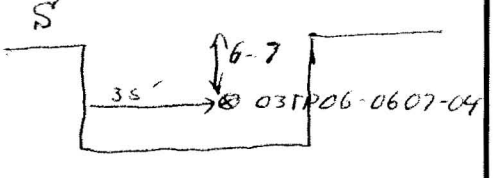
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whaley

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

Sample ID No.: 03TP07-0304-01
Sample Location: 03TP07
Sampled By: DW
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/2/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0905	3-4'	Brown	clayey silt with some sand
Method: Disposable trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald W Haber

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP07-0203-02
Sample Location: 03TP07
Sampled By: Chuck Meyer
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/2/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0935	2-3'	Brown	sandy Silt Silty Sand with trace clay
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

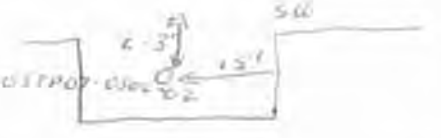
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP08-0405-01
Sample Location: 03TP08
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 05/02/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1115	4-5	Brown to Gray	Sandy Silt with clays, Asphalt, metal pieces and corroded metal
Method: Disposable Bowl			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

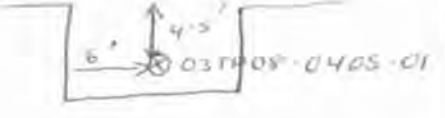
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Wheeler

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP08-0304-02
Sample Location: 03TP08
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/2/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1250	3-4'	Brown	silty sand moist
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

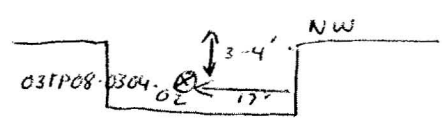
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

Sample ID No.: 03TP08-0203 03
Sample Location: 03TP08
Sampled By: DW
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/2/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1350	2-3'	Brown to Black	Silty Sand charred material glass fragments and metal pieces
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Wade

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP09-0506-01
Sample Location: 03TP09
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/3/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0820	5-6'	Brown	Sandy clay with some silt moist
Method: Disposable Trowel			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Daniel Wilson

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP09-0506-02
Sample Location: 03TP09
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 05/03/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0850	5-6	Brown	silty sand to sandy clay
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

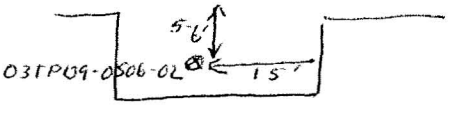
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP10-0405-01
Sample Location: 03TP10
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/3/07 Time: 1405 Method: Disposable Trowel Monitor Reading (ppm): 0.0	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
	4-5	Brown	Silty Sand with some Clay

COMPOSITE SAMPLE DATA:

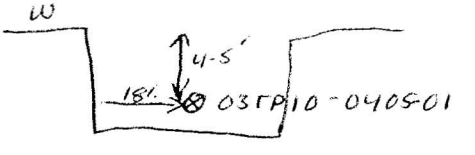
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Welsh

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP10-0304-02
Sample Location: 03TP10
Sampled By: DW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/3/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1430	3-4'	Brown	Silty Sand moist
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP11-0304-01
Sample Location: 03TP11
Sampled By: CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 05/04/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1155	3-4'	Brown	Silty Clay
Method: Disposable Trowel			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP11-0405-02
Sample Location: 03TP11
Sampled By: CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/4/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1235	4-5'	Brown	Silty clay with trace sand and rock fragments
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	9	
TCL SVOC, Pest/PCB	4 oz. jar	3	
TAL metals, cyanide	4 oz. jar	3	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP12-0405-01
Sample Location: 03TP12
Sampled By: CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/4/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0525	4-5'	Gray to Brown	Silty Clay with some Sand
Method: Disposable Bowl			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

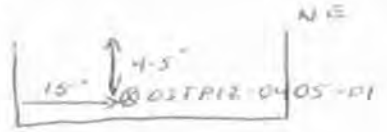
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

A slight sulfur odor was noted from the material

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP12-0504-02
Sample Location: 03TP12
Sampled By: CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/4/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0855	3-4'	Gray	Silty Clay with some Sand
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

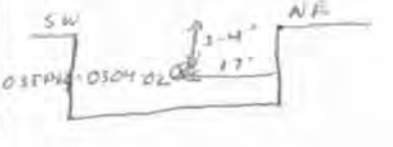
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP12-0102-03
Sample Location: 03TP12
Sampled By: GH
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/4/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0955	1-2'	Brown	Silty Clay trace Sand and glass ceramics Frag other mixed materials
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP13-0203-01
Sample Location: 03TP13
Sampled By: CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/4/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1520	2-3'	Brown	Silty Sand
Method: Disposable Trowel			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

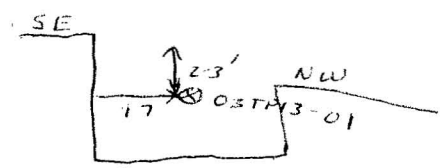
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

Sample ID No.: 03TP14-0203-01
Sample Location: 03TP14
Sampled By: CM
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/4/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1610	2-3'	Dark Brown	silty clay some bits of fill material
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP15-0405-01
Sample Location: 03TP15
Sampled By: CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/7/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0950	4-5'	Brown	Silty Sand with trace Clay
Method: Disposable Trowel			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP16-0102-01
Sample Location: 03TP16
Sampled By: CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/7/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1250	1 – 2'	Brown	Sandy Clay with some silt and Rock Fragments
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	6	
TCL SVOC, Pest/PCB	4 oz. jar	2	
TAL metals, cyanide	4 oz. jar	2	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: 03-DUP-02
Assigned time 1650

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP17-0304-01
Sample Location: 03TP17
Sampled By: Chuck Meyer
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/2/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1510	3-4'	Brown	Sandy Clay with rock Fragments
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	3	
TCL SVOC, Pest/PCB	4 oz. jar	1	
TAL metals, cyanide	4 oz. jar	1	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3 Test Pits
Project No.: 2192

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP18-0203-1
Sample Location: 03TP18
Sampled By: CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 5/8/07	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1025	2-3'	Brown	Silty Sand with corroded metal blue white friable material ash + cinders
Method: Disposable Trowel			
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

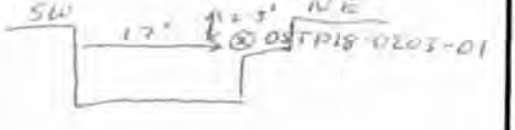
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	3 x Encore sampler	6	
TCL SVOC, Pest/PCB	4 oz. jar	2	
TAL metals, cyanide	4 oz. jar	2	
Dioxin (SW846 8290)	4 oz. jar		

OBSERVATIONS / NOTES:

Duplicate 03 was collected at this location

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
	03TP18-0203-04 - Assigned Time = 1045

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 3 LF Delineation
Project No.: 00845

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP19-0607-01
Sample Location: 03TP19
Sampled By: D. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-12-09 / Time: 1415 / Method: Disposable trowel / Monitor Reading (ppm): 0	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
	6'-7'	DK. Gray/ DK. Brown	SILTY SAND, cinders, glass fragments; moist

COMPOSITE SAMPLE DATA:

Date: / Method: / Monitor Readings (Range in ppm):	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald J. Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 3 LF Delineation
Project No.: 00845

Sample ID No.: 03TP19-0607-01
Sample Location: 03TP19
Sampled By: D. Whalen
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-12-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1415	6-7'	DK. GRAY/ DK. BROWN	SILTY SAND, cinders, glass fragments; moist
Method: Disposable trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar		
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald J. Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Site 3 LF Delineation
Project No.: 00845

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP19-0304-02
Sample Location: 03TP19
Sampled By: D. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-12-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1440	3'-4'	DARK GRAY and DARK BROWN	SILTY SAND with pebbles, cinders, glass
Method: Disposable trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

David Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Site 3 LF Delineation
Project No.: 00845

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP20-0708-01
Sample Location: 03TP20
Sampled By: D. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-12-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0940	7'-8'	Rusty Brown	SILTY SAND, glass, metal, ceramic fragments
Method: Disposable Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NAS Willow Grove Site 3
Project No.: 00845

Sample ID No.: 03TP23-0304-01
Sample Location: TP23
Sampled By: D. Whalen
C.O.C. No.:

[X] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-13-04	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1350	3'-4'	BROWN	SILTY SAND and CLAYEY SILT, SOME FINE GRAVEL; MOIST
Method: Disposable Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 gram EnCore sampler	✓	
SVOC/Pest/PCB	8 oz. jar	✓	
TAL Metals/Cyanide	8 oz. jar	✓	

OBSERVATIONS / NOTES:

Collected from the bottom of a layer of miscellaneous trash.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Site 3 LF Delineation
Project No.: 00845

Sample ID No.: 03TP23-0304-01
Sample Location: 03TP23
Sampled By: DW
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1/13/09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1350	3'	Brn	Silty sand and clayey silt some fine gravel
Method: disposable trowel			
Monitor Reading (ppm): 1.5			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:			N/A	
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

collected from bottom of a layer of misc. trash

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

David Wheeler

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 3 LF Delineation
Project No.: 00845

Sample ID No.: D3TP24-0304-01
Sample Location: D3TP24
Sampled By: DW
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-13-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1210	3'-4'	rusty Brown, Brn, M. blue white	SILty sand and pebbles, glass fragments
Method: Disposable towel			
Monitor Reading (ppm): @1.5			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Wheeler

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: NAS Willow Grove Site 3
Project No.: 00845

Sample ID No.: 03TP25-0506-01
Sample Location: TP25
Sampled By: D. Whalen
C.O.C. No.:

[X] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-13-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0755	5'-6'	Brown	Sandy SILT/SILTY SAND MOIST, SOLVENT ODOR
Method: Disposable trowel			
Monitor Reading (ppm): 500			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 gram EnCore sampler	✓	
SVOC/Pest/PCB	8 oz. jar	✓	
TAL Metals/Cyanide	8 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Site 3 LF Delineation
Project No.: 00845

Sample ID No.: 03TP25-0607-02
Sample Location: TP25
Sampled By: D. Whalen
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-13-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0950	6'-7'	DK GRAY	SANDY SILT, some GRAVEL, Glass Fragments, metal; WET
Method: Disposable Trowel			
Monitor Reading (ppm): 2.5			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
			N A	
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Dalil Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Site 3 LF Delineation
Project No.: 00845

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP26-0506-01
Sample Location: 03TP26
Sampled By: R. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-14-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1045	5'-6'	Rusty BRN to BRN	SILTY SAND, some Fine GRAVEL, Glass fragments, metal fragments; MOIST
Method: Disposable Trowel			
Monitor Reading (ppm): 0.6			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald R. Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Site 3 LF Delineation
Project No.: 00845

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP27-0304-00
Sample Location: 03TP27
Sampled By: D. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-15-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0800	3'-4'	Rusty Brown, Black, white, Lt. Blue	SILTY SAND, some fine GRAVEL, glass, metal, ceramic, charred debris MOIST
Method: Disposable Trowel			
Monitor Reading (ppm): 0.5			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

(Duplicate ID No.:) 03TP-DUP-02

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Site 3 LF Delineation
Project No.: 00845

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP27-0304-02
Sample Location: 03TP27
Sampled By: D. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-15-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0830	3'-4'	Rusty Brown, Black, white	SILTY SAND with glass, metal fragments, wire, ceramic; MOIST
Method: Disposable Trowel			
Monitor Reading (ppm): 10			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler		
TCL SVOC, Pest/PCB	8 oz. jar		
TAL Metals/CN	2 oz. jar		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

David Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Site 3 LF Delineation
Project No.: 00845

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP29-0304-01
Sample Location: 03TP29
Sampled By: D. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-14-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1320	3'-4'	BROWN	SANDY SILT, MOIST
Method:			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Donald W Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Site 3 LF Delineation
Project No.: 00845

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03TP30-0506-01
Sample Location: 03TP30
Sampled By: D. Whalen
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1-14-09	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1415	5'-6'	Brown to Black	SANDY SILT, some glass metal fragments, charred material; MOIST
Method:			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			NA	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	3 x 5 gram EnCore sampler	✓	
TCL SVOC, Pest/PCB	8 oz. jar	✓	
TAL Metals/CN	2 oz. jar	✓	
Dioxin		✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

D. Whalen

SURFACE WATER

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☑ Stream
- ☐ Lagoon/Pond
- ☐ Other____

Case No. ____

By ____

Project Site Name NASJRB Willow Grove Project Site Number 5466-

HNUS Source No. BGSW01 Source Location offsite Background

Sample Method: Direct Grab	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: Surface to 6 inches			
Sample Date & Time: 3-13-97 1355			
Sampled By: Vincent Shickora			
Signature(s):			
Type of Sample			

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
Clear	—

Analysis:

- ☑ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide

Observation/Notes

pH → 7.55
Temp → 8°C
Cond → 387

No HNU readings
No odor

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2505133282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☑ Stream
- ☐ Lagoon/Pond
- ☐ Other____

Case No. ____

By ____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. BGSW02 Source Location Offsite Background

Sample Method: Direct Grab	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: Surface to 6 inches			
Sample Date & Time: 3-13-97 1420			
Sampled By: Vincent Shickora			
Signature(s):			
Type of Sample			

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
Clear	—

Analysis:

- ☑ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide

Observation/Notes

pH → 7.60
Temp. → 8°C
Cond → 375

- No HNU readings
- No odor

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2505133282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☑ Stream
- ☐ Lagoon/Pond
- ☐ Other____

Case No. ____

By ____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. BGSW03 Source Location Offsite Background

Sample Method: Direct Grab	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: Surface to 6 inches			
Sample Date & Time: 3-13-97 1100			
Sampled By: Vincent Shickora			
Signature(s):			
Type of Sample: ☑ Low Concentration ☐ High Concentration ☑ Grab ☐ Composite ☐ Grab - Composite			
	Sample Data		
	Color: Clear	Description: (Sand, Clay, Dry, Moist, Wet, etc): —	

Analysis:
- ☑ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide

Observation/Notes
- pH → 6.78
- Temp → 9 °C
- Cond → 329
- No HNU readings
- Duplicate sample # BGSW09 collected at this location
- Sample is also MS/MSD

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2505133282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☐ Other____

Case No. ____

By ____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. BGSW04 Source Location Offsite Background

Sample Method: Direct Grab	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: Surface to 6 inches			
Sample Date & Time: 3-13-97 1130			
Sampled By: Vincent Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab	Sample Data		
☐ Composite	Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)	
☐ Grab - Composite	Clear	—	

Analysis:	Observation/Notes
☑ TCL VOAs	- pH → 6.75
☑ TCL SVOAs	- Temp → 9°C
☑ TCL Pest/PCBs	- Cond → 335
☑ TAL Metals	- No HNU readings
☑ Cyanide	- No odor

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	25051133282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☑ Stream
- ☐ Lagoon/Pond
- ☐ Other____

Case No. ____

By ____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. BGSW05 Source Location Offsite Background

Sample Method: Direct Grab	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: Surface to 6 inches			
Sample Date & Time: 3-13-97 0950			
Sampled By: Vincent Shickora			
Signature(s):			
Type of Sample			

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
Clear	—

Analysis:

- ☑ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide

Observation/Notes

pH → 6.80
Temp → 9°C
Cond → 258

- No HNU readings
- No odor

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2505133282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SURFACE WATER
SAMPLE LOG SHEET

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☒ Stream
- ☐ Other_____

Project Site Name NASJRB Willow Grove Project Site Number SW66 / CTO-277

Source Number BG SW06 Source Location Offsite Background

Sample Method: direct grab ~~steel hand trowel~~

Depth Sampled: surface to 6 inches

Sample Date & Time: 3-13-97 1030

Sampled by: Vince Shickora

Signature(s): [signature]

Sample Type

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☑ TCL VOAs	HCl to pH<2, 4°C
☑ TCL SVOAs	4°C
☑ TCL Pest/PCBs	4°C
☑ TAL Metals	HNO_3 to pH<2
☑ Cyanide	NaOH to pH>12, 4°C

Sample Data

pH	S.C.	Temp (°C)	Color and Turbidity
6.8	250	8°C	clear

Sample Location Map

See logbook # 1225

Observations and Notes

☐ Duplicate sample taken

No HNU readings above background

Revised 4/5/96

SURFACE WATER
SAMPLE LOG SHEET

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☒ Stream
- ☐ Other_____

Project Site Name NASJRB Willow Grove Project Site Number 5466/CTO-277

Source Number BGSW07 Source Location Offsite Background

Sample Method:	Sample Data			
	pH	S.C.	Temp (°C)	Color and Turbidity
direct grab				
Depth Sampled: surface to 6inchs	6.80	252	9.0	clear

Sample Date & Time: 3-13-97 0925

Sampled by: Vince Shickora

Signature(s):

Sample Type

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☑ TCL VOAs	HCl to pH<2, 4°C
☑ TCL SVOAs	4°C
☑ TCL Pest/PCBs	4°C
☑ TAL Metals	HNO_3 to pH<2
☑ Cyanide	NaOH to pH>12, 4°C

Sample Location Map

See logbook # 1225

Observations and Notes

☐ Duplicate sample taken

- No HNU readings above background.

Revised 4/5/98

SURFACE WATER
SAMPLE LOG SHEET

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☒ Stream
- ☐ Other_____

Project Site Name NASJRB Willow Grove Project Site Number 5466 / CTO-277

Source Number BGSW08 Source Location Offsite Background

Sample Method: direct grab	Sample Data			
	pH	S.C.	Temp (°C)	Color and Turbidity
Depth Sampled: surface to 6 inches	6.79	247	9°C	clear

Sample Date & Time: 3-13-97 1010

Sampled by: Vince Shickora

Signature(s):

Sample Location Map

See logbook #1225

Sample Type

- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☑ TCL VOAs	HCl to pH<2, 4°C
☑ TCL SVOAs	4°C
☑ TCL Pest/PCBs	4°C
☑ TAL Metals	HNO_3 to pH<2
☑ Cyanide	NaOH to pH>12, 4°C

Observations and Notes

☐ Duplicate sample taken

No HNU readings above background

Revised 4/5/96

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB
Project No.: 845

Sample ID No.: 035W10-20080319
Sample Location: 03SW10
Sampled By: CM
C.O.C. No.:

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

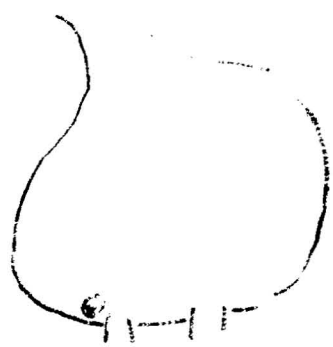
Date: 3/19/08 Time: 1013 Depth: 0-4" Method: Bailer	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
	clear	6.64	0165	6.70	19.9	13.39	239	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl	40 ml VOA Vial	2
1, 4-Dioxane	4 C	1 Liter Amber Glass	2
Dissolved Metals	HNO3	500 ml Poly	1
TAL Metals	HNO3	500 ml Poly	1

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB
Project No.: 845

Sample ID No.: 035WI1-200803H
Sample Location: 035WI1
Sampled By: CM
C.O.C. No.:

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

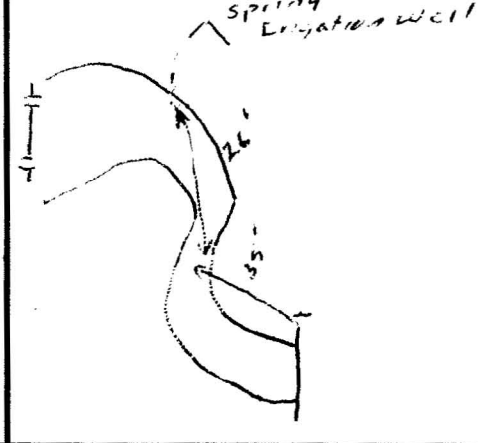
	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
Date: 3/19/08								
Time: 0944								
Depth: 0-4"	Light Green	6.81	0.273	7.26	41.4	11.69	243	
Method: Bottle Wave								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl	40 ml VOA Vial	2
1, 4-Dioxane	4 C	1 Liter Amber Glass	2
Dissolved Metals	HNO3	500 ml Poly	1
TAL Metals	HNO3	500 ml Poly	1

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G000845

Sample ID No.: 03SW10-20081013
Sample Location: SW10
Sampled By: DW/CM
C.O.C. No.:

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

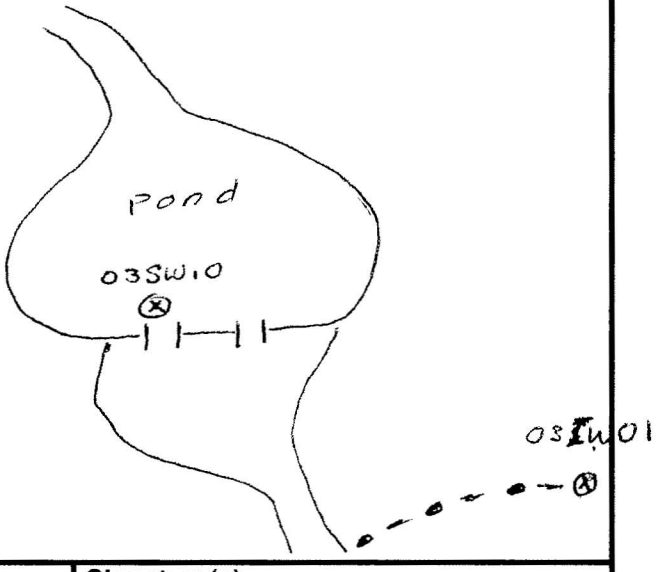
Date: 10/13/08 Time: 1055 Depth: 0-3" Method: Sample Bottles	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other SAL
	Clear	6.78	0.406	16.1	2.7	12.83	235	0.0

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl	40 ml VOA Vial	2

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G000845

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 035W11-20081013
Sample Location: SW 11
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

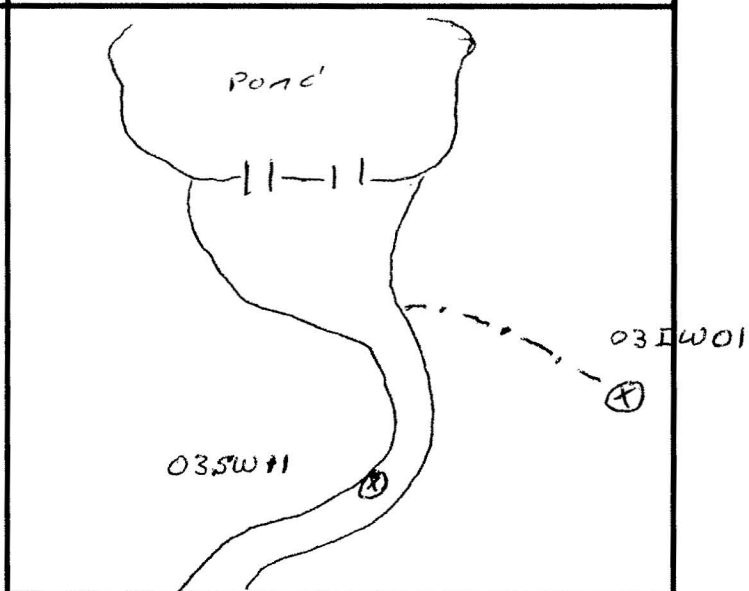
Date: 10/13/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1040	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	Mv	SAL
Depth: 0-3"								
Method: Sample Bottles	Clear	6.55	0.415	15.9	5.8	10.14	205	0.0

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl	40 ml VOA Vial	2

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 035W10 20090401
Sample Location: 035W10
Sampled By: ~~DW/CM~~ VS/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4/1/09 Time: 1040 Depth: 0-6 Method: Sample Bottles	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
	clear	7.17	0.223	10.3	2.9	8.93	219	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 ml VOA Vial	4

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: 03Dup01 20090401
Assigned Time = 0000

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

Sample ID No.: 035W112009040 1
Sample Location: 035W11
Sampled By: ~~DW/CM~~ VS/CM
C.O.C. No.:

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4/11/09 Time: 1035 Depth: 0-6" Method: Sample Bottles	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
	Clear	6.79	0.667	10.3	1.8	9.98	215	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 ml VOA Vial	2

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G000845

Sample ID No.: 03-SW-12
Sample Location: 03-SW-12
Sampled By: DW/CM
C.O.C. No.:

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
Date: 12/15/08								
Time: 1515								
Depth: 0-6"	clear	5.47	.094	9.28	20	8.18	227	
Method: Sample Bottles								

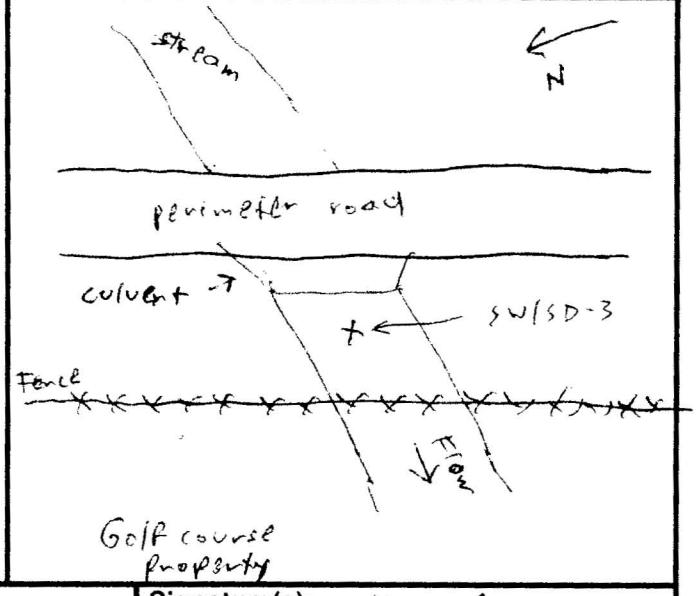
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 ml VOA Vial	9
SVOC	4 C	1 Liter Amber Glass	6
Pest/PCB	4 C	1 Liter Amber Glass	6
TAL Metals	HNO3	500 ml Poly	3
Cyanide	NaOH	250 ml Poly	3

OBSERVATIONS / NOTES:

Stream width ~ 6'
depth ~ 6"
flow ~1-2'/sec
water was clear, cold, no odor

MAP:



Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

Sample ID No.: 03-SW-13
Sample Location: 03-SW-13
Sampled By: DW/CM
C.O.C. No.:

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/16/08	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
Time: 0930								
Depth: 9"								
Method: Sample Bottles	clear	5.50	.177	9.26	16	6.75	~270	

SAMPLE COLLECTION INFORMATION:

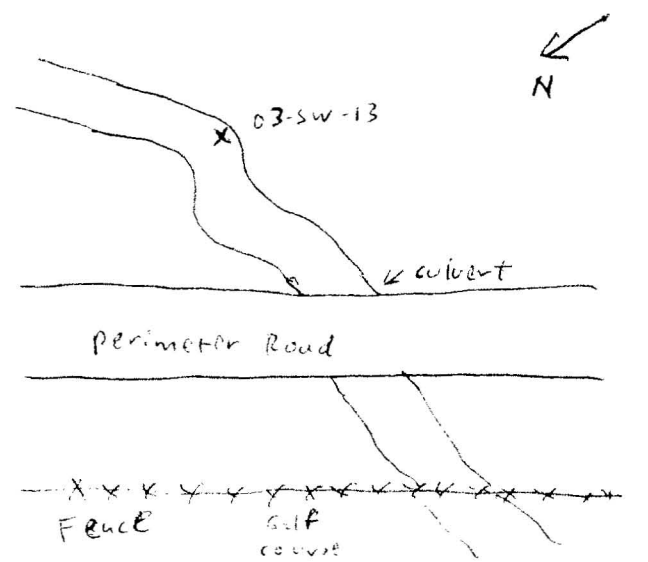
Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 ml VOA Vial	3
SVOC	4 C	1 Liter Amber Glass	2
Pest/PCB	4 C	1 Liter Amber Glass	2
TAL Metals	HNO3	500 ml Poly	1
Cyanide	NaOH	250 ml Poly	1

OBSERVATIONS / NOTES:

stream ~ 9" deep
5' wide
flow ≈ 0.5'/sec

water was clear, cold, no odor

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Kahn

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

Sample ID No.: 03-SW-14
Sample Location: 03-SW-14
Sampled By: DW/CM
C.O.C. No.:

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/16/08 Time: 1035 Depth: ~3" Method: Sample Bottles	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
	clear	6.~~04~~ 14	.081 ~~.104~~	9.19	25	6.93	205	

SAMPLE COLLECTION INFORMATION:

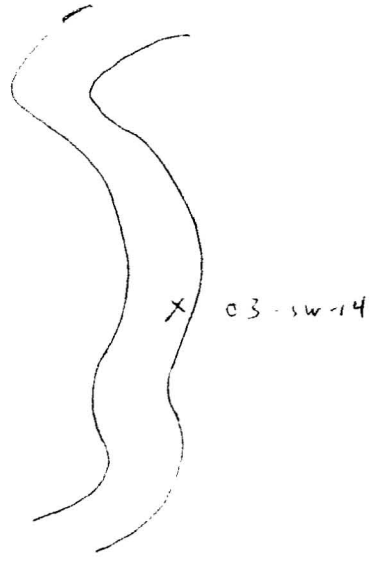
Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 ml VOA Vial	3
SVOC	4 C	1 Liter Amber Glass	2
Pest/PCB	4 C	1 Liter Amber Glass	2
TAL Metals	HNO3	500 ml Poly	1
Cyanide	NaOH	250 ml Poly	1

OBSERVATIONS / NOTES:

Stream width ~ 6'
depth ~ 6"

Water was clear, cold, no odor

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Khaler

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SW-15
Sample Location: 03-SW-15
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
Date: 12-16-08								
Time: 1145								
Depth: 3"								
Method: Sample Bottles	clear	6.23	.077	8.09	18	7.11	208	

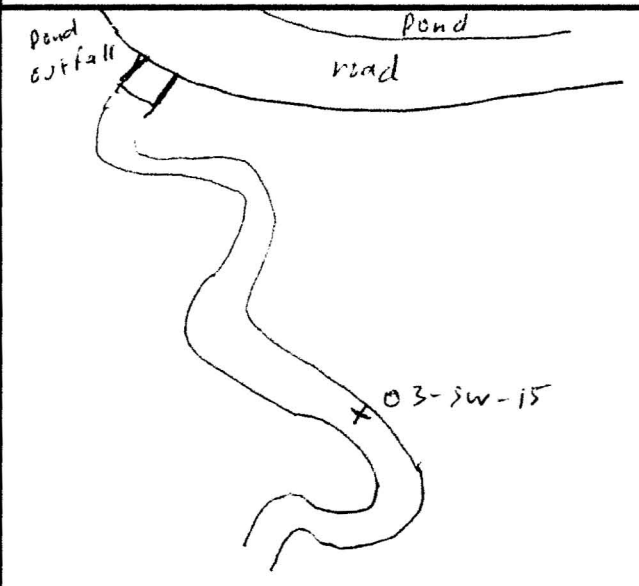
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 ml VOA Vial	3 6
SVOC	4 C	1 Liter Amber Glass	2 4
Pest/PCB	4 C	1 Liter Amber Glass	2 4
TAL Metals	HNO3	500 ml Poly	1 2
Cyanide	NaOH	250 ml Poly	1 2

OBSERVATIONS / NOTES:

Stream width 6'
depth 6"
flow ~1'/sec
water was clear, cold,
no odor
stream bed was rocky

MAP:



Circle if Applicable:

MS/MSD | Duplicate ID No.: 03-SW-18

Signature(s):

Donald McKalen

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SW-16
Sample Location: 03-SW-16
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
Date: 12/16/08								
Time: 1310								
Depth: 4"								
Method: Sample Bottles	clear	6.46	.087	7.73	22	6.75	209	

SAMPLE COLLECTION INFORMATION:

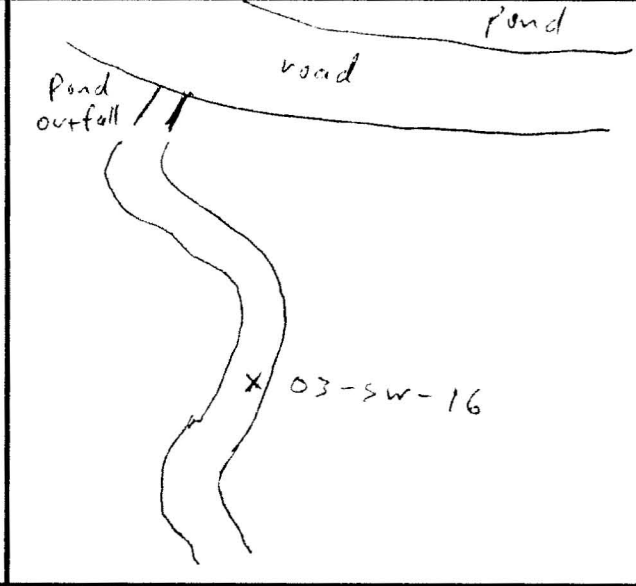
Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 ml VOA Vial	3
SVOC	4 C	1 Liter Amber Glass	2
Pest/PCB	4 C	1 Liter Amber Glass	2
TAL Metals	HNO3	500 ml Poly	1
Cyanide	NaOH	250 ml Poly	1

OBSERVATIONS / NOTES:

stream width: ~8'
depth: 6"-8"

water was clear, cold, no odor

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald W. Hahn

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SW-17
Sample Location: 03-SW-17
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/16/08	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP Mv	Other NA
Time: 1415								
Depth: 2"	clear	6.57	.083	8.17	27	7.10	229	
Method: Sample Bottles								

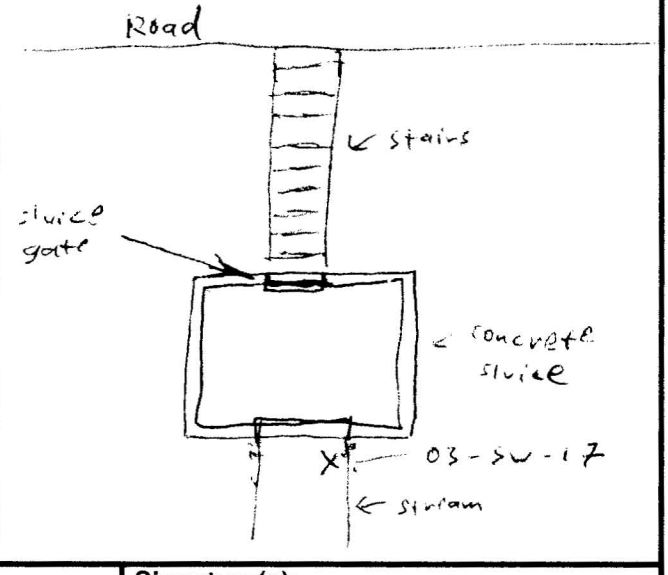
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 ml VOA Vial	3
SVOC	4 C	1 Liter Amber Glass	2
Pest/PCB	4 C	1 Liter Amber Glass	2
TAL Metals	HNO3	500 ml Poly	1
Cyanide	NaOH	250 ml Poly	1

OBSERVATIONS / NOTES:

Sample collected from outfall from the pond

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald W Kaber

SEDIMENT SAMPLES

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Sediment

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. BGSD01 Source Location Offsite Background

Sample Method:	Composite Sample Data		
Stainless steel hand Trowel	Sample	Time	Color/Description
Depth Sampled:			
1.0 Feet			
Sample Date & Time:			
3-13-97 1400			
Sampled By:			
Vincent Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
Black/Brown	Sandy Gravel

Analysis:

- ☑ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide
- ☑ Grain Size

Observation/Notes

- No HNU readings
- No staining

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	250513282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Sediment

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. BGSD02 Source Location Offsite Background

Sample Method: Stainless steel hand Trowel	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 1.0 feet			
Sample Date & Time: 3-13-97 1425			
Sampled By: Vincent Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
Brown	Silty Sand

Analysis:

- ☑ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide
- ☑ Grain Size

Observation/Notes

- No HNU readings
- No staining

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2505133282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Sediment

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. BGSD03 Source Location Offsite Background

Sample Method:	Composite Sample Data		
Stainless steel hand Trowel	Sample	Time	Color/Description
Depth Sampled: 1.0 feet			
Sample Date & Time: 3-13-97 1110			
Sampled By: Vincent Shickora			
Signature(s):			

Type of Sample

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
Brown	Silty sand and clay with some leaves

Analysis:

- ☑ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide
- ☑ Grain Size

Observation/Notes

- No HNU readings
- Duplicate sample # BGSD09 also collected at this location
- Sample is also MS/MSD

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2505133282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Sediment

Case No. _____

By: _____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. BGSD04 Source Location Offsite Background

Sample Method:	Composite Sample Data		
Stainless steel hand Trowel	Sample	Time	Color/Description
Depth Sampled:			
1.0 feet			
Sample Date & Time:			
3-13-97 1135			
Sampled By:			
Vincent Shickora			
Signature(s):			
Type of Sample			
☑ Low Concentration			
☐ High Concentration			
☑ Grab			
☐ Composite			
☐ Grab - Composite			

Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
Brown	Silty clay and sand with some leaves

Analysis:

- ☑ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide
- ☑ Grain Size

Observation/Notes

- No HNU readings
- No staining

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	2505133282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SAMPLE LOG SHEET

Page ____ of ____

Brown & Root Environmental

- ☐ Spring
- ☐ Lake
- ☐ Stream
- ☐ Lagoon/Pond
- ☑ Other Sediment

Case No. _____

By _____

Project Site Name NASJRB Willow Grove Project Site Number 5466

HNUS Source No. BGSD05 Source Location offsite Background

Sample Method: Stainless Steel hand trowel

Depth Sampled: 1.0 Feet

Sample Date & Time: 3-13-97 0955

Sampled By: Vincent Shickora

Signature(s):

Type of Sample

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis:

- ☑ TCL VOAs
- ☑ TCL SVOAs
- ☑ TCL Pest/PCBs
- ☑ TAL Metals
- ☑ Cyanide
- ☑ Grain Size

Composite Sample Data

Sample	Time	Color/Description

Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc)
Brown	Sandy silt and gravel with leaves + moss

Observation/Notes

- No HNU readings
- No staining

	Organic	Inorganic
Traffic Report No.		
Tag No.		
AB No.	250513282	
Date Shipped	3-13-97	
Time Shipped	1930	
Laboratory	ARDL	
Volume		

SOLID/SOIL/SEDIMENT
SAMPLE LOG SHEET

Brown & Root Environmental

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☑ Sediment
- ☐ Lagoon/Pond
- ☐ Other_____

Project Site Name NAS JRB Willow Grove Project Site Number SH66 / CTO-277

Source Number BGSD06 Source Location Offsite background

Sample Method: Stainless steel hand trowel	
Depth Sampled: 1 foot	
Sample Date & Time: 3-13-97 1035	
Sampled by: Vince Shridora	
Signature(s):	

Sample Type

- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☑ TCL VOAs	dark, 4°C
☑ TCL SVOAs	dark, 4°C
☑ TCL Pest/PCBs	dark, 4°C
☑ TAL Metals	4°C
☑ Cyanide	4°C
☑ Grain Size	

Observations and Notes

☐ Duplicate sample taken

No HNU readings above background

Composite Sample Data

Sample	Time	Color and Description

Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
brown-black	silty sand with some gravel and organic material

Sample Location Map

See logbook #1225

SOLID/SOIL/SEDIMENT
SAMPLE LOG SHEET

Brown & Root Environmental

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☒ Sediment
- ☐ Lagoon/Pond
- ☐ Other_____

Project Site Name NAS JRB Willow Grove Project Site Number 5466 / CTO-277

Source Number BGSD07 Source Location Offsite Background

Sample Method: [redacted] [redacted] Stainless steel trowel

Depth Sampled: 1 foot

Sample Date & Time: 3-13-97 0930

Sampled by: Vince Shrckora

Signature(s):

Sample Type

- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☑ TCL VOAs	dark, 4°C
☑ TCL SVOAs	dark, 4°C
☑ TCL Pest/PCBs	dark, 4°C
☑ TAL Metals	4°C
☑ Cyanide	4°C
☑ Grain Size	

Composite Sample Data

Sample	Time	Color and Description

Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
brown	silty sand and gravel mixture with some organic material

Sample Location Map

See logbook #1225

Observations and Notes

☐ Duplicate sample taken

- No HNU ~~samples~~ readings above background.

SOLID/SOIL/SEDIMENT
SAMPLE LOG SHEET

Brown & Root Environmental

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☑ Sediment
- ☐ Lagoon/Pond
- ☐ Other_____

Project Site Name NAS JRB Willow Grove Project Site Number 5466/CTO-277

Source Number BBSD08 Source Location Background Offsite

Sample Method: stainless steel hand trowel

Depth Sampled: 1 foot

Sample Date & Time: 3-13-97 1015

Sampled by: Vince Shickora

Signature(s):

Sample Type

- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☑ TCL VOAs	dark, 4°C
☑ TCL SVOAs	dark, 4°C
☑ TCL Pest/PCBs	dark, 4°C
☑ TAL Metals	4°C
☑ Cyanide	4°C
☑ Grain Size	

Observations and Notes

☐ Duplicate sample taken

No HNU readings above background

Composite Sample Data

Sample	Time	Color and Description

Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
brown	silty sand and gravel mix w/ some organic material

Sample Location Map

See logbook #1225

Revised 4/5/96

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NAS Willow Grove Site 3
Project No.: 845

Sample ID No.: 03-SD-12
Sample Location: 03-SD-12
Sampled By: DW/CM
C.O.C. No.:

[X] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/15/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1545	0-6"	Brown	silty sand, wet
Method: Disposable Trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
			NA	
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC	5 Gram Encore Sampler	9	
SVOC/Pest/PCB	8 oz Clear Glass Jar	3	
TAL Metals/Cyanide	2 oz Clear Glass Jar	3	

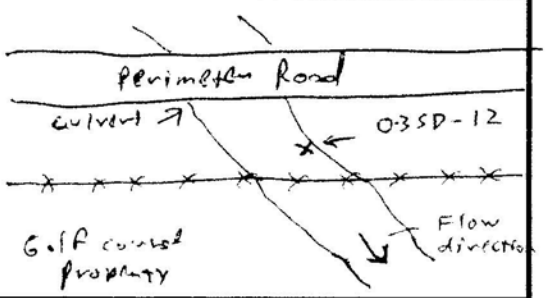
OBSERVATIONS / NOTES:

PID Readings Above background - none

Fill Material encountered - none

Sample collected from south side of stream between culvert and perimeter fence

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

David Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SD-13
Sample Location: 03-SD-13
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/16/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0935	0-6"	Brown	Silty sand, some roots, wet
Method: disposs. trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

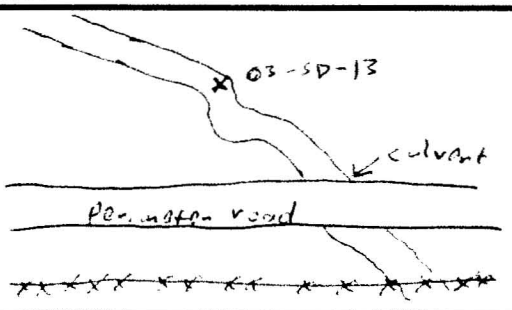
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	5 Gram Encore Samplers	3	
SVOC/Pest/PCB	8 oz Clear Glass Widemouth	1	
TAL Metal /Cyanide	2 oz Clear Glass Widemouth	1	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald McKabe

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SD-14
Sample Location: 03-SD-14
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12-16-08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1045	0-6"	Brown	silty sand, wet, some roots
Method: disposable trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	5 Gram Encore Samplers	3	
SVOC/Pest/PCB	8 oz Clear Glass Widemouth	1	
TAL Metal /Cyanide	2 oz Clear Glass Widemouth	1	

OBSERVATIONS / NOTES:

MAP:

see sample logsheet for SD-SW-14

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

Sample ID No.: 03-SD-15
Sample Location: 03-SP-15
Sampled By:
C.O.C. No.:

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12-16-08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1200	0-6"	Brown	silty sand, some roots, wet
Method:			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	5 Gram Encore Samplers	6	
SVOC/Pest/PCB	8 oz Clear Glass Widemouth	2	
TAL Metal /Cyanide	2 oz Clear Glass Widemouth	2	

OBSERVATIONS / NOTES:

MAP:

see sample log sheet for 03-SW-15

Circle if Applicable:

MS/MSD

Duplicate ID No.: 03-SD-18

Signature(s):

Donald Wilkes

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

Sample ID No.: 03-SD-16
Sample Location: 03-SD-16
Sampled By: DW/CM
C.O.C. No.:

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/16/08 Time: 1315 Method: Disposable trowel Monitor Reading (ppm): 0	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
	0-6"	Brown	silty sand, some pebbles, some roots, wet

COMPOSITE SAMPLE DATA:

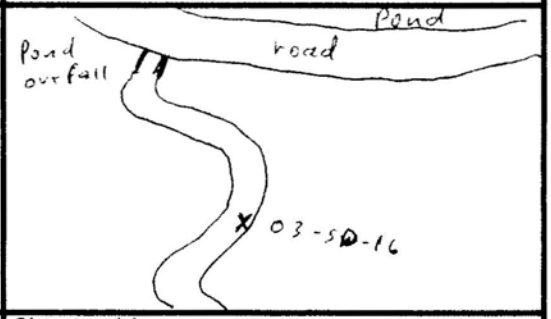
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:			N/A	
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	5 Gram Encore Samplers	3	
SVOC/Pest/PCB	8 oz Clear Glass Widemouth	1	
TAL Metal /Cyanide	2 oz Clear Glass Widemouth	1	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Daniel McLaughlin

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 03-SD-17
Sample Location: 03-SD-17
Sampled By: DW/CM
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 12/16/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1420	0-6"	Brown	silty sand, some rocks, some roots; wet
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				N/A

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	5 Gram Encore Samplers	3	
SVOC/Pest/PCB	8 oz Clear Glass Widemouth	1	
TAL Metal /Cyanide	2 oz Clear Glass Widemouth	1	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLES

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other _____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW01S Source Location Site #3 - Ninth Street Landfill

Total Well Depth: 32'	Purge Data					
Well Casing Size & Depth: 4" PVC	~~Volume~~ Time	pH	S.C.	Temp (°C)	Color and Turbidity D.O.	
Static Water Level: 24.52	1337	5.64	.126	24.94	8.74	121.6
One Casing Volume: 4.88 gal.						
Start Purge (hrs): 1337	1339	5.53	.125	24.82	7.61	235.2
End Purge (hrs.): 1353						
Total Purge Time (min.): 16	1341	5.49	.127	25.41	7.40	364
Total Amount Purged (gal.): 4 Liters						
Monitor reading: No readings	1343	5.41	.116	21.64	6.69	340.2
Purge Method: Low flow submersible pump	1345	5.42	.123	24.65	7.04	545.8
Sample Method: Low flow submersible pump						
Depth Sampled: 27'	1347	5.43	.120	23.16	6.58	626.8
Sample Date & Time: 6/25/97 1353						
	1349	5.42	.118	22.65	6.53	701.8
Sampled by: Matt Woolford						
	1351	5.42	.120	23.77	6.42	802.0

Signature(s): Matt Woolford

SAMPLE DATA

pH	S.C.	Temp (°C)	Color and Turbidity	D.O.
5.42	.120	23.77	clear	802.0 6.42

Type of Sample
☒ Low Concentration
☐ High Concentration
☒ Grab
☐ Composite
☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other _____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW01I Source Location Site #3 - Ninth Street Landfill

Total Well Depth: 180'	**Purge Data**					
Well Casing Size & Depth: 4" PVC	~~Volume~~ Time	pH	S.C.	Temp (°C)	~~Color~~ and Turbidity	D.O.
Static Water Level: 13.39'	1224	8.51	.195	14.04	2.99	0.8
One Casing Volume: 108.8 Gal.						
Start Purge (hrs): 1224	1226	9.07	.197	14.51	3.31	0.2
End Purge (hrs.): 1240						
Total Purge Time (min.): 16	1228	9.10	.198	14.97	2.68	1.1
Total Amount Purged (gal.): 2.5						
Monitor reading: No readings	1230	9.08	.196	14.61	2.31	2.1
Purge Method: Low flow submersible pump	1232	9.03	.193	14.12	1.61	2.0
Sample Method: Low flow submersible pump						
Depth Sampled: 169'	1234	8.99	.192	14.82	1.32	1.8
Sample Date & Time: 6/25/97 1240						
	1236	8.95	.191	13.72	1.04	2.6
Sampled by: Matt Woolford						

Signature(s):	**SAMPLE DATA**				
	pH	S.C.	Temp (°C)	Color and Turbidity	D.O.
Matt Woolford	8.95	.191	13.72	clear	2.6 1.04

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other _____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW02S Source Location Site #3 - Ninth Street Landfill

Total Well Depth:	Purge Data					
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	Color and Turbidity	D.O.
Static Water Level: 12.'	1434	5.69	.109	17.25	7.89	10.1
One Casing Volume:						
Start Purge (hrs): 1434	1436	5.52	.108	17.19	5.67	10.4
End Purge (hrs.): 1442						
Total Purge Time (min.): 8	1438	5.48	.110	17.83	5.38	11.6
Total Amount Purged ~~(gal.)~~: 4 Liters						
Monitor reading: No readings	1440	5.47	.113	18.75	5.18	15.6
Purge Method: Low flow submersible pump	1442	5.49	.114	19.46	5.08	35
Sample Method: Low flow submersible pump						
Depth Sampled:						
Sample Date & Time: 6/26/97 1442						
Sampled by: Tobin Lounsbury						
Signature(s): Tobin Lounsbury						

SAMPLE DATA

pH	S.C.	Temp (°C)	Color and Turbidity	D.O.
5.49	.114	19.46	35	5.08

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/5/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other_____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW02SI Source Location Site #3 - Ninth Street Landfill

Total Well Depth:	Purge Data					
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	~~Color~~ and Turbidity	D.O.
Static Water Level:	0931	7.15	.191	15.33	6.95	39.8
One Casing Volume:						
Start Purge (hrs): 0930	0933	7.13	.186	14.79	6.82	45.4
End Purge (hrs.): 0940						
Total Purge Time (min.): 10	0935	7.16	.186	15.20	7.02	66.0
Total Amount Purged (gal.): 4 Liters						
Monitor reading: No readings	0937	7.15	.186	15.10	6.98	58.2
Purge Method: Low flow submersible pump						
Sample Method: Low flow submersible pump						
Depth Sampled:						
Sample Date & Time: 7/7/97 0940						
Sampled by: Matt Woolford						
Signature(s): Matt Woolford	SAMPLE DATA					
	pH	S.C.	Temp (°C)	Color and Turbidity		D.O.
	7.15	.186	15.10	clear	58.2	6.98

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other _____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW02I Source Location Site #3 - Ninth Street Landfill

Total Well Depth:	Purge Data					
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	~~Color~~ and Turbidity D.O.	
Static Water Level:	1015	7.39	.173	15.1	8.05	78.6
One Casing Volume:						
Start Purge (hrs): 1014	1017	7.42	.175	15.3	7.63	138
End Purge (hrs.): 1025						
Total Purge Time (min.): 11	1019	7.44	.173	15.28	7.60	145.1
Total Amount Purged (gal.): 5.5 Liters						
Monitor reading:	1021	7.49	.173	15.17	7.60	148
No readings						
Purge Method: Low flow submersible pump						
Sample Method: Low flow submersible pump						
Depth Sampled: 139'						
Sample Date & Time: 7/7/97 1025						
Sampled by: Matt Woolford						

Signature(s):	SAMPLE DATA				
	pH	S.C.	Temp (°C)	Color and Turbidity	D.O
Matt Woolford	7.49	.173	15.17	clear	148 7.60

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
- ☐ Duplicate sample taken

Revised 4/5/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other_____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW03S Source Location Site #3 - Ninth Street Landfill

Total Well Depth:	Purge Data				
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	Color and Turbidity
Static Water Level: 6.25	1451	6.26	.137	14.02	39.9
One Casing Volume:					
Start Purge (hrs): 1448	1453	6.58	.143	15.22	315
End Purge (hrs.): 1505					
Total Purge Time (min.): 17	1455	6.44	.144	15.71	374
Total Amount Purged (gal.): 11 Liters					
Monitor reading: ~~No readings~~ 10 ppm	1457	6.32	.145	16.15	397
Purge Method: Low flow submersible pump	1459	6.18	.145	16.10	365
Sample Method: Low flow submersible pump					
Depth Sampled: 14'	1501	6.06	.146	16.09	348
Sample Date & Time: 6/25/97 1505					
	1503	5.94	.146	16.28	391
Sampled by: Tobin Lounsbury					
	1505	5.87	.146	16.47	421

Signature(s): Tobin Lounsbury

SAMPLE DATA

pH	S.C.	Temp (°C)	Color and Turbidity
5.87	.146	16.47	421

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other _____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW03SI Source Location Site #3 - Ninth Street Landfill

Total Well Depth:	Purge Data				
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	Color and Turbidity
Static Water Level: —	1549	6.32	.184	13.14	3.4
One Casing Volume:					
Start Purge (hrs): 1547	1551	6.20	.186	13.16	3.4
End Purge (hrs.): 1557					
Total Purge Time (min.): 10	1553	6.19	.186	13.37	3.1
Total Amount Purged (gal.): 15					
Monitor reading: No readings	1555	6.20	.187	13.42	3.0
Purge Method: Low flow submersible pump	1557	6.20	.187	13.40	3.0
Sample Method: Low flow submersible pump					
Depth Sampled: 71'					
Sample Date & Time: 6/25/97 1557					
Sampled by: Tobin Lounsbury					

Signature(s): Tobin Lounsbury

SAMPLE DATA

pH	S.C.	Temp (°C)	Color and Turbidity
6.20	.187	13.40	3.0

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Artesian well

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other_____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW03I Source Location Site #3 - Ninth Street Landfill

Total Well Depth:	Purge Data					
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	Color and Turbidity D.O.	
Static Water Level:	1448	8.01	.168	12.44	8.01	4.9
One Casing Volume:						
Start Purge (hrs): 1445	1450	8.02	.166	11.97	7.98	8.4
End Purge (hrs.): 1505						
Total Purge Time (min.): 20	1452	8.02	.165	11.80	7.98	10.9
Total Amount Purged (gal.): 2						
Monitor reading:	1454	8.03	.165	11.61	8.35	21.3
No readings						
Purge Method: Low flow submersible pump	1456	8.05	.164	11.53	8.36	32.7
Sample Method: Low flow submersible pump						
Depth Sampled: 158'	1458	8.05	.165	11.23	8.40	40.3
Sample Date & Time: 6/30/97 1505						
Sampled by: Vince Shickora						
Signature(s):	SAMPLE DATA					
	pH	S.C.	Temp (°C)	Color and Turbidity		D.O.
	8.05	.165	11.23	clear	40.3	8.40

Type of Sample

☒ Low Concentration
☐ High Concentration
☒ Grab
☐ Composite
☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:

☒ Duplicate sample taken 03MW17I

Artesian well

Revised 4/5/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other _____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW04S Source Location Site #3 - Ninth Street Landfill

	Purge Data					
Total Well Depth: 35'	~~Volume~~ Time	pH	S.C.	Temp (°C)	~~Color~~ and Turbidity	D.O.
Well Casing Size & Depth: 4" PVC						
Static Water Level: 13.84	1500	6.47	.209	15.14	8.77	103.7
One Casing Volume: 13.81 gal.						
Start Purge (hrs): 1455	1502	6.38	.208	14.86	7.95	217
End Purge (hrs.): 1512						
Total Purge Time (min.): 17	1504	6.36	.212	15.90	8.35	639
Total Amount Purged (gal.): 12.75 Liters						
Monitor reading: No readings	1506	6.36	.213	16.09	7.05	762.3
Purge Method: Low flow submersible pump	1508	6.36	.213	16.12	7.67	928.8
Sample Method: Low flow submersible pump						
Depth Sampled: 25'	1510	6.36	.215	16.34	7.89	985.0
Sample Date & Time: 6/25/97 1512						
Sampled by: Matt Woolford						

Signature(s): Matt Woolford

SAMPLE DATA				
pH	S.C.	Temp (°C)	Color and Turbidity	D.O.
6.36	.215	16.34	clear 985	7.89

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/30/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other_____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW04S/I Source Location Site #3 - Ninth Street Landfill

Total Well Depth: 80'	**Purge Data**					
Well Casing Size & Depth: 2"	~~Volume~~ Time	pH	S.C.	Temp (°C)	~~Color~~ and Turbidity D.O.	
Static Water Level: 5.48'	1554	6.03	.196	13.44	7.09	15.8
One Casing Volume: 12.15 gal.	1556	6.04	.194	13.45	8.41	13.5
Start Purge (hrs): 1552	1558	6.11	.196	13.85	8.38	15.5
End Purge (hrs.): 1612	1600	6.12	.196	14.00	8.33	17.7
Total Purge Time (min.): 20	1602	6.12	.194	13.99	9.43	21.3
Total Amount Purged (gal.): 20 Liters	1604	6.03	.194	14.05	8.38	22.1
Monitor reading:	1606	6.11	.195	14.02	8.31	24.6
No readings	1608	6.14	.194	14.00	8.28	27.6
Purge Method: Low flow submersible pump	1610	6.15	.194	14.07	8.22	29.4
Sample Method: Low flow submersible pump						
Depth Sampled: 75'						
Sample Date & Time: 6/25/97 1612						
Sampled by: Matt Woolford						
Signature(s): Matt Woolford	**SAMPLE DATA**					
	pH	S.C.	Temp (°C)	Color and Turbidity	D.O.	
	6.15	.194	14.07	clear	29.4	8.22

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☒ Duplicate sample taken 03MW10S

Revised 4/2/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other_____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW04I Source Location Site #3 - Ninth Street Landfill

Total Well Depth:	Purge Data					
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	~~Color~~ and Turbidity D.O.	
Static Water Level:	1604	6.83	.173	12.03	7.89	.6
One Casing Volume:						
Start Purge (hrs): 1602	1606	6.81	.173	12.11	7.87	.6
End Purge (hrs.): 1615						
Total Purge Time (min.): 13	1608	6.79	.173	12.13	7.86	.6
Total Amount Purged (gal.): 2						
Monitor reading: No readings	1610	6.78	.173	12.12	7.96	.7
Purge Method: Low flow submersible pump	1612	6.77	.173	12.09	7.82	.6
Sample Method: Low flow submersible pump						
Depth Sampled: 158'						
Sample Date & Time: 6/30/97 ~~1615~~ 1615						
Sampled by: Vince Shickora						

Signature(s):

SAMPLE DATA				
pH	S.C.	Temp (°C)	Color and Turbidity	D.O.
6.77	.173	12.09	clear .6	~~7~~.82

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Artesian well

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other_____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW05S Source Location Site #3 - Ninth Street Landfill

Total Well Depth: 40'	**Purge Data**					
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	~~Color~~ and Turbidity	D.O.
Static Water Level: 29.73'	1435	5.47	.123	15.53	26.14	5.1
One Casing Volume:						
Start Purge (hrs): 1433	1438	5.40	.121	15.85	23.16	5.5
End Purge (hrs.): 1442						
Total Purge Time (min.): 9	1440	5.40	.124	16.60	23.84	7.8
Total Amount Purged (gal.): 4.5 Liters						
Monitor reading: No readings	1442	5.42	.124	16.69	22.64	8.5
Purge Method: Low flow submersible pump						
Sample Method: Low flow submersible pump						
Depth Sampled: 35'						
Sample Date & Time: 6/18/97 1442						
Sampled by: Tobin Lounsbury						

Signature(s): Tobin Lounsbury

SAMPLE DATA

pH	S.C.	Temp (°C)	Color and Turbidity	D.O.
5.42	.124	16.69	clear	8.5 22.64

Type of Sample
☒ Low Concentration
☐ High Concentration
☒ Grab
☐ Composite
☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other _____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW05I Source Location Site #3 - Ninth Street Landfill

Total Well Depth: 94'	**Purge Data**					
Well Casing Size & Depth: ~~89~~	~~Volume~~ Time	pH	S.C.	Temp (°C)	~~Color~~ and Turbidity D.O.	
Static Water Level: ~~28.73~~ 28.65'	1330	6.35	.110	14.41	30.26	150.5
One Casing Volume:						
Start Purge (hrs): 1327	1333	6.25	.106	13.74	26.30	110.5
End Purge (hrs.): 1338						
Total Purge Time (min.): 11	1335	6.23	.106	14.15	25.75	65.3
Total Amount Purged (~~gal.~~): 11 Liters						
Monitor reading: No readings	1338	6.22	.105	14.47	27.20	64.3
Purge Method: Low flow submersible pump						
Sample Method: Low flow submersible pump						
Depth Sampled: 89'						
Sample Date & Time: 6/18/97 1338						
Sampled by: Tobin Lounsbury						

Signature(s): Tobin Lounsbury

SAMPLE DATA

pH	S.C.	Temp (°C)	Color and Turbidity	D.O.
6.22	.105	14.47	clear	64.3 / 27.2

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other _____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW065 Source Location Site #3 - Ninth Street Landfill

Total Well Depth: 38'	**Purge Data**				
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	Color and Turbidity
Static Water Level: 35.45'	1431	5.76	.204	18.71	103
One Casing Volume: ~~.42 gal~~					
Start Purge (hrs): 1424	1433	5.32	.199	17.79	112
End Purge (hrs.): 1439					
Total Purge Time (min.): 15	1435	5.21	.199	17.69	122
Total Amount Purged (gal.): 3 Liters					
Monitor reading: No readings	1437	5.18	.200	17.93	160
Purge Method: Low flow submersible pump	1439	5.16	.201	18.40	167
Sample Method: Low flow submersible pump					
Depth Sampled: 37'					
Sample Date & Time: 6/30/97 1439					
Sampled by: Tobin Lounsbury					

Signature(s): Tobin Lounsbury

SAMPLE DATA

pH	S.C.	Temp (°C)	Color and Turbidity
5.16	.201	18.40	167

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other_____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW06SI Source Location Site #3 - Ninth Street Landfill

Total Well Depth: 87.2'	**Purge Data**					
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	~~Color~~ and Turbidity OD.	
Static Water Level: 31.61'	1230	6.06	.094	15.16	26.60	54
One Casing Volume:						
Start Purge (hrs): 1224	1232	5.84	.095	15.77	26.17	53.2
End Purge (hrs.): 1240						
Total Purge Time (min.): 16	1234	5.77	.095	15.92	26.13	46
Total Amount Purged (~~gal.~~): 9.6 Liters						
Monitor reading: No readings	1236	5.72	.095	15.92	26.00	40.80
Purge Method: Low flow submersible pump						
Sample Method: Low flow submersible pump						
Depth Sampled: 82'						
Sample Date & Time: 6/18/97 12:40						
Sampled by: Tobin Lounsbury						
Signature(s): Tobin Lounsbury	**SAMPLE DATA**					
	pH	S.C.	Temp (°C)	Color and Turbidity		D.O
	5.72	.095	15.92	clear	40.8	26

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/3/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other_____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW06I Source Location Site #3 - Ninth Street Landfill

Total Well Depth:	Purge Data				
Well Casing Size & Depth:	~~Volume~~ Time	pH	S.C.	Temp (°C)	Color and Turbidity
Static Water Level: 32.6'	1241	7.79	.307	30.37	86.2
One Casing Volume:					
Start Purge (hrs): 1239	1243	7.99	.303	29.72	101.6
End Purge (hrs.): 1257					
Total Purge Time (min.): 18	1245	8.23	.311	31.05	172
Total Amount Purged (gal.): 3.3 Liters					
Monitor reading:	1247	8.34	.303	28.12	196
No readings					
Purge Method: Low flow submersible pump	1249	8.43	.296	26.07	279
Sample Method: Low flow submersible pump					
Depth Sampled: 146'	1251	8.47	.299	25.56	322
Sample Date & Time:					
8/25/97 1257	1253	8.49	.307	26.12	366
Sampled by:					
Tobin Lounsbury	1255	8.49	.312	26.69	380

Signature(s):
Tobin Lounsbury

SAMPLE DATA

pH	S.C.	Temp (°C)	Color and Turbidity
8.48	.318	27.37	slightly turbid 433

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Observations/Notes:
- ☐ Duplicate sample taken

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Revised 4/5/96

GROUNDWATER
SAMPLE LOG SHEET

Brown & Root Environmental

☒ Monitoring Well Data
☐ Domestic Well Data
☐ Other_____

Project Site Name NAS JRB - Willow Grove Project Site Number 5466

Source Number 03MW07S Source Location Site #3 - Ninth Street Landfill

Total Well Depth: 46'	**Purge Data**				
Well Casing Size & Depth: 2" PVC	~~Volume~~ Time	pH	S.C.	Temp (°C)	Color and Turbidity
Static Water Level: 14.84	1230	5.69	.255	14.36	28.5
One Casing Volume: 5.08 Gal					
Start Purge (hrs): 1228	1232	5.69	.256	14.55	23.0
End Purge (hrs.): 1240					
Total Purge Time (min.): 12	1234	5.66	.256	14.85	18.3
Total Amount Purged (gal.): 2.5					
Monitor reading: No readings	1236	5.62	.262	15.16	13.5
Purge Method: Low flow submersible pump	1238	5.60	.265	15.50	10.5
Sample Method: Low flow submersible pump					
Depth Sampled: 41'	1240	5.58	.266	15.64	8.7
Sample Date & Time: 7/7/97 1242					
Sampled by: Joy Devor					
Signature(s):	**SAMPLE DATA**				
	pH	S.C.	Temp (°C)	Color and Turbidity	
	5.58	.266	15.64	clear 8.7	

Type of Sample
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab - Composite

Analysis	Preservative:
☒ TCL VOAs	HCl to pH<2, 4°C
☒ TCL SVOAs	4°C
☒ TCL Pest/PCBs	4°C
☒ TAL Metals	HNO_3 to pH<2
☒ Cyanide	NaOH to pH>12

Observations/Notes:
☐ Duplicate sample taken

Revised 4/5/96

GROUNDWATER SAMPLE LOG SHEET

page ___ of ___

Project Site Name: NAS JRB
Project No.: _____

Sample ID No.: 03MW015
Sample Location: _____
Sampled By: _____

SAMPLING DATA:

Date: 2/3/06
Time: 1555
Purge Method: Low Flow

FINAL VALUES:

Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
	5.35	0.147	12.42	0.42	3.19	170.9

PURGE DATA:

Date: 2/3/06
Purge Method: Low Flow
PID Reading (ppm): _____
Well Casing Diameter & Material: 4" PVC
Total Well Depth (TD): 32.00
Static Water Level (DTW): 21.15
Static Product Level (DTP) _____
One Casing Volume (gal): _____
Start Purge (hrs): 1341
End Purge (hrs): _____
Total Purge Time (min): _____
Total Vol. Purged (gal/L): _____

Purge Calculations:

1": 0.04080 6": 1.46869
2": 0.16319 8": 2.61101
3": 0.36717 10": 4.07970
(4") 0.65275 12": 5.87477

3 x 10.85 x 0.652

7.2 x 3 = 21.6

7.2 x 2 = 14.4

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS/NOTES:

Well needs redevelopment - screen clogged w/ white deposits (flaky).
- Ran dry, let recharge & grabbed sample

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 2/3/06

Sample ID No.: 03MW01S

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft below TOC)	(mL/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
1343	21.15								
1348	21.15		5.69	0.151	6.11	4.72	13.22	161.4	
1358	21.37	100	5.50	0.151	5.43	4.28	12.78	161.4	
1408	21.55	100	5.42	0.149	5.11	3.47	12.50	164.0	
1418	21.67	100	5.42	0.149	3.21	3.28	12.50	165.2	3000L
1428	21.85	100	5.39	0.148	0.66	3.21	12.46	169.0	
1438	22.03	100	5.35	0.147	0.42	3.19	12.42	170.8	pump dry

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Lillon Grove
Project No.: 40100-210
Sample ID No.: 03MW015F
Sample Location:
Sampled By: KG/AB

SAMPLING DATA: KG

Date: 2/1/06 2/3/06
Time: 1537
Purge Method: Bailer

FINAL VALUES:

Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Clear	6.16	0.224	13.16	93.3	5.31	156.9

PURGE DATA:

Date: 2/1/06 KG 2/3/06
Purge Method: Bailer
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 80'
Static Water Level (DTW): 21.52'
Static Product Level (DTP) —
One Casing Volume (gal): —
Start Purge (hrs): —
End Purge (hrs):
Total Purge Time (min):
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
(2"): 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

20 ft. screen interval

3.26 gal

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260B	HCl	3 VOA	3

OBSERVATIONS/NOTES:

Well was hit by car & casing is bent too much to fit pump in well. Grab sample with bailer. (22.06' @ time of sample

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

page ___ of ___

Project Site Name: NAS JRB Willow Grove
Project No.: N0100.210

Sample ID No.: 03MW01I
Sample Location: Near parking lot outside magazine
Sampled By: KG/MB

SAMPLING DATA:	FINAL VALUES:						
Date: 02/06/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1300							
Purge Method: Low Flow	Clear	7.07	0.324	11.00	~~5.22~~ 1.8	5.23	77.4

PURGE DATA:

Date: 2/6/06
Purge Method: Low Flow
PID Reading (ppm): —
Well Casing Diameter & Material: 4" PVC
Total Well Depth (TD): 179
Static Water Level (DTW): 7.05
Static Product Level (DTP) —
One Casing Volume (gal): NA
Start Purge (hrs): 0900
End Purge (hrs): 1300
Total Purge Time (min): 240
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Sat. screen = 20'

2 × 0.65 × 20 = 26 G = 98.4 L

Purge Vol = ~~0 × PF × (DTW - TD)~~

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260 B	HCl	3 VOA	

OBSERVATIONS/NOTES:

@ 0825, gathered Field Blank (Equipment Blank) RB020604061
Also collected duplicate FD-2 @ 1300

Circle if Applicable:

MS/MSD | Duplicate ID No.: FD-2

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 2/6/06

Sample ID No.: 03MW01I

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
	(ft below TOC)	(mL/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
0906	7.56	300-400	9.20	0.417	12.2	6.36	11.01	123.4	Lowered pump speed
0910	8.09	200	9.02	0.337	10.0	5.61	10.67	130.5	
0920	8.29	200	9.07	0.326	7.3	5.60	9.88	135.2	
0930	8.59	200	9.14	0.332	6.2	5.69	10.18	134.7	
0940	9.03	200	9.19	0.326	4.7	5.75	9.71	130.3	
0950	9.51	200	9.19	0.326	4.3	5.78	9.63	128.3	
1000	9.77	200	9.18	0.323	0.2	5.70	9.68	126.8	
10	10.09	200	9.18	0.334	-3.3	5.71	11.13	118.2	
20	10.40	"	9.18	0.336	2.4	5.75	10.79	112.8	
30	10.55	"	9.18	0.330	-5.1	5.69	10.49	110.2	
40	10.62		9.16	0.327	-4.8	5.62	10.48	108.7	
~~50~~	~~10.57~~	~~"~~	~~9.17~~	~~0.335~~	~~6.4~~	~~6.77~~	~~11.60~~	~~99.4~~	Generator Stalled
1100	10.57	"	9.17	0.335	6.4	6.77	11.60	99.4	
10	10.99	200	9.19	0.335	-2.9	5.89	11.87	102.0	
20	11.51	200	9.11	0.328	3.4	5.58	11.30	102.4	
30	12.05	200	9.13	0.331	2.0	5.61	11.50	99.1	
40	12.48	200	9.10	0.326	2.7	5.50	11.15	97.6	
50	12.54	200	9.10	0.325	2.3	5.46	11.00	95.6	
1200	12.61	200	9.09	0.324	2.5	5.44	11.09	93.1	
10	12.67	200	9.10	0.322	2.2	5.43	10.62	89.7	
20	12.71	200	9.10	0.320	2.1	5.41	10.46	87.7	
30	12.72	200	9.10	0.322	1.7	5.35	10.82	85.1	
40	12.72	200	9.07	0.321	-0.2	5.28	10.75	84.4	
45	12.73	200	9.07	0.321	-5.0	5.25	10.77	82.7	
50	12.71	200	9.07	0.321	-2.3	5.25	10.75	82.2	
55	12.71	200	9.07	0.323	-5.6	5.22	10.95	78.6	
1300	12.71	200	9.07	0.324	1.8	5.23	11.00	77.4	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0100.210
Sample ID No.: 03HN025
Sample Location: In mag area
Sampled By: KG/MB

SAMPLING DATA:	FINAL VALUES:						
Date: 02/6/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1625							
Purge Method: ~~Low F~~	Clear	5.71	0.177	13.97	-0.1	4.43	152.2

PURGE DATA:

Date: 2/6/06
Purge Method:
PID Reading (ppm): —
Well Casing Diameter & Material: 4" PVC
Total Well Depth (TD): 22.5
Static Water Level (DTW): 9.99
Static Product Level (DTP) —
One Casing Volume (gal): ~10
Start Purge (hrs): 1425
End Purge (hrs): 1625
Total Purge Time (min): 120
Total Vol. Purged (gal/L): 32 G

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717,	10": 4.07970
4": 0.65275	12": 5.87477

Pump @ 13.5'
Screen = 18'
= 31 G = ~118L (2 hrs @ 1L/min)

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260B	HCl	3 VOA	3

OBSERVATIONS/NOTES:

Needs a cap & a lock

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 2/6/06

Sample ID No.: 03MW02S

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft below TOC)	(mL/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(°C or °F)	(mV)	
1425		~900mL	5.90	0.177	5.4	4.49	13.64	95.0	Probe not working - Interference w/ pump
1430		1000	5.86	0.177	2.8	4.47	13.74	97.8	
1446		1500mL	5.80	0.177	0.1	4.38	13.87	115.8	
1450		1000mL	5.79	0.178	0.0	4.39	13.94	123.4	
1500		1L	5.74	0.178	0.0	4.40	14.01	132.2	
1510		1L	5.75	0.178	0.0	4.39	13.98	139.8	
1520		1L	5.74	0.178	0.0	4.40	13.94	139.7	
1530		1L	5.73	0.178	0.0	4.40	13.96	142.0	
1540		1L	5.72	0.177	0.0	4.41	13.94	145.6	
1550		1L	5.73	0.178	0.0	4.41	13.96	145.7	
1600		1L	5.72	0.178	0.0	4.42	13.99	148.2	
1610		1L	5.71	0.177	-0.1	4.42	13.97	150.7	
1620		1L	5.71	0.178	-0.1	4.43	13.97	151.7	
1625		1L	5.71	0.177	-0.1	4.43	13.97	152.2	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: NX100.210
Sample ID No.: OBMW02SI
Sample Location: May area
Sampled By: MB, KP

SAMPLING DATA:

Date: 2/1/06
Time: 1454
Purge Method: Low flow

FINAL VALUES:

Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Clear	7.14	0.234	8.05	0.00	4.94	165.2

PURGE DATA

Date: 2/1/06
Purge Method: Low flow
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 65
Static Water Level (DTW): 10.70
Static Product Level (DTP): —
One Casing Volume (gal): 1.63 gal
Start Purge (hrs): ~~1350~~
End Purge (hrs): 1454
Total Purge Time (min): 64
Total Vol. Purged (gal/L): 3.5 gal

Purge Calculations:

1": 0.04080	6": 1.46869
(2": 0.16319)	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

10ft screen

3.26 gal

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260B	HCl	3 VOA	3

OBSERVATIONS/NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s): Matthew A Band

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 2/1/06

Sample ID No.: 03MW25I

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
	(ft below TOC)	(mL/min)	(S.U.)	(mS/cm)	(NTUs)	(mg/L)	(Celsius)	(mV)	
1354	10.72								
1359	10.70	100 ml	7.44	0.227	1.16	8.30	7.79	175.4	
1409	10.70	100 ml	7.31	0.219	0.46	6.39	6.41	173.5	1000 ml
1419	10.72	200 ml	7.21	0.229	0.36	5.28	7.73	171.2	3000 ml
1429	10.72	300 ml	7.21	0.236	0.00	5.01	8.58	166.8	6000 ml
1439	10.72	300	7.17	0.234	0.00	5.03	8.06	166.7	9000 ml
1449	10.72	300	7.15	0.232	0.00	4.98	7.92	165.6	12000 ml
1454	10.72	300	7.14	0.234	0.00	4.94	8.05	165.2	13500 ml

Signature(s): Matthew A Bond

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0100.210
Sample ID No.: 03MW02I
Sample Location: Mag area
Sampled By: MB, KP

SAMPLING DATA:	FINAL VALUES:						
Date: 2/1/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1214							
Purge Method: Low flow	Clear	7.30	0.196	6.10	0.21	4.71	174.7

PURGE DATA:

Date: 2/1/06
Purge Method: Low flow
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 144 ft
Static Water Level (DTW): 2.52
Static Product Level (DTP): —
One Casing Volume (gal): 1.63
Start Purge (hrs): 1040
End Purge (hrs): 1214
Total Purge Time (min): 94
Total Vol. Purged (gal/L): 3.4

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

10ft screen

3.26 gal

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260B	HCl	3 VOA	3

OBSERVATIONS/NOTES:

with large distance to pump 150 ml/min max flow possible

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Matthew A Bund

856-204-5607

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 2/1/06

Sample ID No.: 03MW02I

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft below TOC)	(mL/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mv)	
0959	~~2.18~~ 2.12								
1009	2.12								Pump problem
1044	2.12	160 mL/min	6.40	0.187	2.52	7.06	4.23	201.7	
1054	2.22	160 mL/min	6.83	0.200	3.33	6.76	6.26	188.8	1600 ml
1104	2.12	"	7.01	0.203	2.41	4.74	6.63	183.3	3200 ml
1114	2.25	"	7.11	0.204	2.11	4.54	6.73	179.8	4800 ml
1124	2.26		7.18	0.205	1.02	4.58	6.70	177.2	6400 ml
1134	2.22		7.24	0.202	0.58	4.61	6.67	176.4	8000 ml
1144	2.16	160 ml	7.26	0.202	0.37	4.55	6.24	175.0	9600
1154	2.16	"	7.30	0.199	0.33	4.57	6.20	174.9	11200
1204	2.17	"	7.29	0.195	0.24	4.67	6.14	174.8	12800
1214	2.17		7.30	0.196	0.21	4.71	6.10	174.7	13400

Signature(s): Matthew A Bruno

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: NO60.210

Sample ID No.: 03MW035
Sample Location: Woods
Sampled By: KG/AB

SAMPLING DATA:	FINAL VALUES:						
Date: 2/8/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1020							
Purge Method: Low flow	Clear	7.70	29.69	11.86	3.1	5.09	134.6

PURGE DATA:

Date: 2/8/06
Purge Method: Low flow
PID Reading (ppm): —
Well Casing Diameter & Material: 4" PVC
Total Well Depth (TD): —
Static Water Level (DTW): 1.05
Static Product Level (DTP) —
One Casing Volume (gal): 15' screen = 19.5 G = 74 L
Start Purge (hrs): 0915
End Purge (hrs): 1020
Total Purge Time (min): 62
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260 B	HCl	VOA	3

OBSERVATIONS/NOTES:

610 441 9685

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Amanda Bell

RB 020806 08 collected @ 0835. AB/KG

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 2/8/06

Sample ID No.: 03MW035

Time	Water Level (ft below TOC)	Flow (mL/min)	pH (SU)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0920	<0.5	1L	7.46	30.25	3.9	5.18	11.74	135.3	
0930	<1.5		7.61	30.46	9.9	5.00	11.48	130.5	
0940	<0.5	1L	7.66	30.52	0.0	5.64	11.76	134.4	
0950	<0.5	1L	7.67	30.31	5.8	5.18	11.86	135.9	
1000		1L	7.68	30.01	13.5	5.09	11.91	136.0	
1010	<0.5	1L	7.69	29.90	0.0	5.04	11.93	136.8	
1020		1L	7.70	29.69	8.1	5.09	11.84	134.6	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0100.210

Sample ID No.: 03MW03SI
Sample Location: Woods (SE closest to magazine)
Sampled By: KCG/AB

SAMPLING DATA:	FINAL VALUES:						
Date: 2/7/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1030							
Purge Method:							

PURGE DATA:

Date: 2/7/06
Purge Method: Grab
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): —
Static Water Level (DTW): —
Static Product Level (DTP)
One Casing Volume (gal):
Start Purge (hrs):
End Purge (hrs):
Total Purge Time (min):
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260B	HCl	3 VOA	3

OBSERVATIONS/NOTES:

Attempted to purge w/ grundfos pump but inner casing is broken & pump wouldn't go in. After calls to TtNUS & attempts to sample w/ pump, the samples were grabbed from the well. The well is artesian & was flowing ~3-5 gpm for about 1.5 hrs.

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0160.210

Sample ID No.: 03 MW 03 I
Sample Location: Woods
Sampled By: AB / KG

SAMPLING DATA:	FINAL VALUES:						
Date:	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time:							
Purge Method:							

PURGE DATA:

Date: 2/8/06
Purge Method:
PID Reading (ppm): —
Well Casing Diameter & Material: 4" PVC
Total Well Depth (TD): —
Static Water Level (DTW): 3.20
Static Product Level (DTP)
One Casing Volume (gal):
Start Purge (hrs):
End Purge (hrs):
Total Purge Time (min):
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS/NOTES:

Could not sample due to obstruction in well @ 990 feet. Unable to lower grundfos to recommended interval of 158.5'. Unable to bail.

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	Amanda Ball

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N6660.10
Sample ID No.: D3 MW 04 S
Sample Location: WTAS
Sampled By: AH, KE

SAMPLING DATA:	FINAL VALUES:						
Date: 2/10/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1010							
Purge Method: Low flow	Clear	6.29	0.439	10.95	0.0	5.88	225.2

PURGE DATA:

Date: 2/10/06
Purge Method:
PID Reading (ppm):
Well Casing Diameter & Material:
Total Well Depth (TD): –
Static Water Level (DTW): 6.94
Static Product Level (DTP) –
One Casing Volume (gal):
Start Purge (hrs): 0906
End Purge (hrs): 1010
Total Purge Time (min): 64
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

9.99 gal = 36 L

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260 B	HCl	VOA	6

OBSERVATIONS/NOTES:

Grundfos pump turned down as low as possible - Flow cannot be lower than 1600 ml/min.

Circle if Applicable:

MS/MSD

Duplicate ID No.: DUP-3

a.k.a. FB-3

Signature(s):

PURGE DATA SHEET

ECOR Solutions Inc.

Date: 2/10/16

Sample ID No.: CS MW 04 S

			(+/- 0.1)	(+/- 3%)		(+/- 10%)	(+/- 3%)	(+/- 10 mV)	
Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft. below TOC)	(mL/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
0910	0.94	600	6.31	0.424	15.1	3.14	10.55	215.6	
0920	1.02	600	6.31	0.425	4.3	4.71	10.79	219.5	Lol
0930	1.00	600	6.31	0.427	2.1	5.40	10.71	221.5	12
0940	1.04	600	6.30	0.434	1.1	5.63	10.81	223.2	18
0950	1.04	600	6.29	0.436	1.8	5.76	10.87	224.2	24
1000	1.00	600	6.29	0.437	0.9	5.78	10.88	224.7	30
1010	1.04	600	6.29	0.439	0.0	5.88	10.95	225.2	36 L

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0100.210
Sample ID No.: 03 MW 04 SI
Sample Location: woods
Sampled By: KG / AB

SAMPLING DATA:	FINAL VALUES:						
Date:	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time:							
Purge Method:							

PURGE DATA:

Date: 2/10/06
Purge Method: Bailer
PID Reading (ppm): —
Well Casing Diameter & Material: 4" PVC
Total Well Depth (TD): —
Static Water Level (DTW): 12.43
Static Product Level (DTP) —
One Casing Volume (gal):
Start Purge (hrs):
End Purge (hrs):
Total Purge Time (min):
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260 B	HCl	VOA	

OBSERVATIONS/NOTES:

Obstruction in well @ 38' - unable to lower grundfos below this point. Used bailer to collect @ H_2O sample @ 1045

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0100.210
Sample ID No.: 03 MW 04 I
Sample Location: Woods
Sampled By: KG / AB

SAMPLING DATA:

Date: 2/10/06
Time:
Purge Method: High Flow

FINAL VALUES:

Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Clear	6.84	0.390	11.58	0.0	5.88	206.4

PURGE DATA:

Date: 2/10/06
Purge Method: High Flow
PID Reading (ppm): —
Well Casing Diameter & Material: 4" PVC
Total Well Depth (TD): —
Static Water Level (DTW): Art.
Static Product Level (DTP) —
One Casing Volume (gal): 130
Start Purge (hrs): 1055
End Purge (hrs): 1215
Total Purge Time (min): 85
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
(4"): 0.65275	12": 5.87477

390 gal (3 well Vol.)

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260 B	HCl	VOA	3

OBSERVATIONS/NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 2/10/06

Sample ID No.: 03 MW 04 I

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments	
(hrs)	(ft. below TOC)	~~(mL/min)~~ gpm	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	Vol.	Total
1100	Art.	5 gpm	6.78	0.367	0.0	5.78	11.38	215.3	25 gal	
1110	Art.	5	6.79	0.375	0.0	6.05	11.55	213.8	50 gal	75 gal
1120	Art.	5	6.82	0.379	0.0	5.99	11.56	212.7	50 gal	125 gal
1130	Art.	5	6.82	0.382	0.0	5.96	11.57	211.6	50 gal	175 gal
1140	Art.	5	6.83	0.385	0.0	5.93	11.58	210.4	50 gal	225 gal
1150	Art.	5	6.83	0.387	0.0	5.91	11.59	209.4	50 gal	275 gal
1200	Art.	5	6.84	0.389	0.0	5.90	11.60	208.1	50 gal	325 gal
1210	Art.	5	6.84	0.390	0.0	5.90	11.59	207.1	50 gal	375 gal
1215	Art.	5	6.84	0.390	0.0	5.88	11.58	206.4	25 gal	400 gal

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: 30100.210

Sample ID No.: 03MW05S
Sample Location: Behind hangar
Sampled By: ICG/AB

SAMPLING DATA	FINAL VALUES						
Date: 2/3/06	Color	Ph	S.C.	Temp	Turbidity	DO	ORP
Time: ~~0950~~ 1125	(Visual)	(Standard)	(mS/cm)	(°C)	(NTU)	(mg/l)	(MV)
Purge Method:	Clear	5.04	0.115	15.07	-0.5	5.69	241.9

PURGE DATA

Date: 2/3/06
Purge Method:
PID Reading (ppm): —
Well Casing Diameter & Material: 4" PVC
Total Well Depth (TD): 37
Static Water Level (DTW): 25.15
Static Product Level (DTP) —
One Casing Volume (gal): —
Start Purge (hrs): 0950
End Purge (hrs): 1125
Total Purge Time (min): ~~N/A~~ 95 min
Total Vol. Purged (gal/L): 19.5 G / 75L

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

3 × 0.625 × 12 = 19.5 G

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
8260B	HCl	3 VOA	3

OBSERVATIONS/NOTES:

Equipment Blank collected @ 0847 (RB02030605)

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 02/3/06

Sample ID No.: 03MW05S

Time	Water Level (ft below TOC)	Flow (mL/min)	pH (SU)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0950	29.7	1L/min							
0955	30.1	200	5.13	0.115	0.1	5.64	14.33	225.2	
1000	30.1								Turned off pump, well recharging
1005	25.2	X Key							
1015	25.2	1L/min	5.07	0.116	1.5	5.73	14.80	231.4	Started pumping
1020	"	1L/min	5.07	0.116	0.6	5.75	14.96	232.0	*Probe not working
1025	"	1L/min	5.08	0.116	0.4	5.76	14.97	233.0	
1030		1L	5.07	0.116	0.0	5.74	15.00	234.1	
1035		1L	5.07	0.116	-0.6	5.74	15.04	234.6	
1040		1L	5.06	0.116	-0.4	5.74	15.00	235.5	
1045		1L	5.06	0.116	-0.3	5.74	14.99	236.5	
1050		1L	5.05	0.116	-0.3	5.73	14.99	237.5	
1055		1L	5.05	0.116	-0.3	5.73	15.03	238.3	
1100		1L	5.05	0.116	-0.3	5.73	15.06	238.8	
1105		1L	5.05	0.116	-0.4	5.73	15.06	239.7	
1110		1L	5.05	0.116	-0.4	5.72	15.07	240.4	
1115		1L	5.05	0.116	-0.5	5.70	15.11	241.0	
1120		1L	5.04	0.115	-0.3	5.71	15.10	241.2	
1125		1L	5.04	0.115	-0.5	5.69	15.07	241.9	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0100.210

Sample ID No.: 03MW05I
Sample Location: Hangar
Sampled By: MB

SAMPLING DATA:	FINAL VALUES:						
Date: 2/3/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1050							
Purge Method: Low flow	clear	6.03	0.146	13.16	1.15	6.23	164.0

PURGE DATA:

Date: 2/3/06
Purge Method: Low flow
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): ~~23.55~~ 92'
Static Water Level (DTW): 23.55
Static Product Level (DTP): ———
One Casing Volume (gal): 1.63
Start Purge (hrs): 928
End Purge (hrs): 1050
Total Purge Time (min): 92
Total Vol. Purged (gal/L): 4.5 gal

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

3.26 gal

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260B	HCl	3 VOA	3

OBSERVATIONS/NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s): Matthew A Bond

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 2/3/06

Sample ID No.: 03MW05I

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
	(ft bgs)	(ft below TOC)	(mL/min)	(S.U.)	(mS/cm @ 25°C)	(NTU)	(mg/L)	(Celsius)	(mV)	
930	~~23.55~~	23.55								
0935	~~23.71~~	23.71	150	6.76	0.158	5.10	5.09	12.87	144.0	
0945	~~23.68~~	23.68	100	6.22	0.148	4.64	5.40	12.98	151.4	1000
0955	23.81		225	6.07	0.146	0.92	6.05	13.02	149.3	3250
1005	23.80		200	6.02	0.146	0.79	6.16	12.99	153.8	5250
1015	23.82		200	6.02	0.146	0.94	6.24	13.02	157.6	7250
1025	23.81		200	6.03	0.147	0.92	6.25	13.13	159.5	9250
1035	23.81		200	6.02	0.146	1.16	6.28	13.04	162.0	11250
1645	23.80		200	6.03	0.146	2.79	6.15	13.15	163.5	13250
1050	23.81		200	6.03		1.15	6.23	13.16	164.0	14250

Signature(s): _____

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: NO1XO.210

Sample ID No.: 03MW01S KG
Sample Location: Hangar
Sampled By: MB

SAMPLING DATA:	FINAL VALUES:						
Date: 2/6/05	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time:							
Purge Method: Low flow							

PURGE DATA:

Date: 2/6/05
Purge Method: Low flow
PID Reading (ppm): —
Well Casing Diameter & Material: 2-PVC
Total Well Depth (TD): 36'
Static Water Level (DTW): 30.95
Static Product Level (DTP) —
One Casing Volume (gal): 1.63
Start Purge (hrs): 1452
End Purge (hrs):
Total Purge Time (min):
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

10 ft screen
3.26 gal

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260B			

OBSERVATIONS/NOTES:

Pumping well dry to sample w/ bailer, pump setting is 31 ft ~~water at 30 ft~~ well has sufficient Recharge

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

ECOR Solutions Inc.

PURGE DATA SHEET

page ___ of ___

Date: 2/6/06

Sample ID No.: ~~03MW65~~ 03 MW65 KG

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft below TOC)	(mL/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
1457	30.35	100	6.39	0.325		5.54	11.68	37.0	
1507	30.31	100	5.80	0.330	56.2	5.52	12.08	42.4	1000ml
1517	30.36	200	5.21	0.337	32.6	5.62	13.46	40.4	3000ml
1527	30.35	300	4.44	0.338	15.8	5.62	13.61	40.7	6000ml
1537	30.37	300	4.77	0.336	7.65	5.56	13.50	40.1	7000ml
1547	30.36	300	4.66	0.336	6.12	5.60	13.54	41.8	12000ml
1557	30.37	300	4.57	0.335	4.03	5.56	13.53	43.1	15000ml
1602	30.36	300	4.50	0.335	6.05	5.60	13.58	44.1	16500ml
1607	30.37	300	4.45	0.335	6.11	5.60	13.65	46.1	15000ml
1612	30.37	300	4.39	0.334	5.52	5.57	13.66	47.8	
1617	30.36	300	4.40	0.334	5.57	5.52	13.66	48.2	

Signature(s): _____

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0160-216

Sample ID No.: 03 MW 06 SI
Sample Location: Inside Hangar fence
Sampled By: JTB, KG

SAMPLING DATA:	FINAL VALUES:						
Date: 2/7/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1205							
Purge Method: Low flow	Clear	5.91	0.138	14.65	0.0	7.38	149.4

PURGE DATA:

Date: 2/7/06
Purge Method: Low flow (bladder pump)
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): —
Static Water Level (DTW): 26.37
Static Product Level (DTP) —
One Casing Volume (gal): 1.63
Start Purge (hrs): 1055
End Purge (hrs): 1205
Total Purge Time (min):
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
(2"): 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

≈ 10' screen

2 screen int. = 3.3 gal. = 12.5 L

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260 B	HCl	VOA	3

OBSERVATIONS/NOTES:

Needs grifter plug & lock
Attempted to purge w/bladder pump. No flow so using grundfos.

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

ECOR Solutions Inc

PURGE DATA SHEET

Date: 03MW06SI (AB)

Sample ID No.: 7 Feb 2006

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
	ft below TOC	mL/min	SU	mS/cm	NTU	mg/L	Celsius	mV	
1055	26.46	200	5.93	0.133	-6.6	8.09	12.67	133.0	
1100	26.46	200	5.92	0.134	9.2	7.96	12.53	136.9	
1110	26.46	200	5.93	0.138	0.0	7.66	13.90	139.7	
1120	26.46	200	5.92	0.137	0.0	7.58	13.94	143.3	
1130	26.46	200	5.92	0.138	0.0	7.50	14.40	144.7	
1140	26.46	200	5.92	0.138	0.0	7.42	14.39	145.7	
1150	26.46	200	5.92	0.139	0.0	7.38	15.12	146.6	
1155	26.46	200	5.91	0.137	0.0	7.44	14.34	147.9	
1200	26.46	200	5.91	0.139	0.0	7.43	14.85	148.9	
1205	26.46	200	5.91	0.138	0.0	7.38	14.65	149.4	

Signature(s): Andrew Bell

GROUNDWATER SAMPLE LOG SHEET

page ___ of ___

Project Site Name: _____ Sample ID No.: 03MCGF

Project No.: _____ Sample Location: _____

Sampled By: _____

SAMPLING DATA:	FINAL VALUES:						
Date:	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time:							
Purge Method:							

PURGE DATA:

Date: _____

Purge Method: _____

PID Reading (ppm): _____

Well Casing Diameter & Material: _____

Total Well Depth (TD): 150'

Static Water Level (DTW): 26.66

Static Product Level (DTP) _____

One Casing Volume (gal): _____

Start Purge (hrs): 205

End Purge (hrs): _____

Total Purge Time (min): _____

Total Vol. Purged (gal/L): _____

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

10ft screen

3.26 gal

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS/NOTES:

Needs new lock, old one rusted & doesn't close

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 2/6/06

Sample ID No.: 03MW06I

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft below TOC)	(ml/min)	(SU)	(ms/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
909	26.45								
914	26.45								
0923	26.57	100ml	7.58	0.367	19.2	6.25	9.58	63.3	
0933	27.57	100ml	8.35	0.363	32.9	4.73	10.94	53.9	1000
0943	27.70	100ml	8.35	0.379	135.0	3.52	11.75	45.7	2000
0953	27.77	100ml	8.36	0.391	223.0	2.96	11.72	41.4	3000
1003	27.79	100ml	8.33	0.358	268	2.87	11.25	38.9	4000
1013	27.99	"	8.38	0.397	327	2.72	12.16	35.5	5000
1023	28.01	"	8.35	0.398	270	2.63	12.09	33.4	6000
1033	26.76	"	8.32	0.393	188	2.62	11.80	32.1	7000
1043	28.21	"	8.30	0.396	136	2.59	12.53	28.5	8000
1053	28.04	"	8.23	0.394	190	2.90	12.71	27.0	9000
1103	28.41	"	8.26	0.397	77.8	2.51	12.79	24.7	10,000
1113	25.44		8.11	0.377	62.9	2.34	12.94	23.7	
1123	28.45		7.83	0.350	35.2	1.92	12.87	20.9	12,000
1133	28.47	"	7.67	0.341	29.3	1.61	12.78	20.6	
1143	28.48		7.58	0.336	22.9	1.48	12.62	20.6	14,000
1153	28.45		7.47	0.332	24.1	1.41	12.54	20.0	
1203	28.36		7.39	0.331	20.6	1.40	12.69	19.7	
1213	28.34		7.30	0.326	18.4	1.45	12.32	19.3	
1223	28.30		7.23	0.325	17.9	1.61	12.35	20.1	
1233	28.44		7.19	0.328	15.5	1.45	13.71	19.5	
1243	28.34		7.15	0.317	14.1	1.59	12.47	20.6	
1253	28.40		7.02	0.324	12.8	1.44	12.35	19.2	
1303	27.93		7.06	0.318	10.74	1.51	12.38	19.4	
1313	28.35		1.01	0.325	10.46	1.54	12.50	19.3	
1323	28.31		7.06	0.325	14.5	1.57	12.54	19.0	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0102.210

Sample ID No.: 03 MW 07S
Sample Location: Corner of Rec. Area
Sampled By: AB, MB

SAMPLING DATA:	FINAL VALUES:						
Date: 1/31/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time:							
Purge Method: Low flow							

PURGE DATA:

Date: 1/31/06
Purge Method: Low flow
PID Reading (ppm): -
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): -
Static Water Level (DTW): 11.02
Static Product Level (DTP)
One Casing Volume (gal):
Start Purge (hrs): 1134
End Purge (hrs):
Total Purge Time (min):
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
(2"): 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

2 10' screen -

6.26 gal total

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260 B	HCl	VOA	
8270 C	Ø	Amber Liter	

OBSERVATIONS/NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 1/31/06

Sample ID No.: # 05 MW 075

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
	(ft bls) or ft below TOC	(mL/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
1137	11.02	~~150~~ 100 @	6.09	0.520		7.21	9.81	140.8	
1142	11.04	150	6.18	0.551	1.32	6.42	9.98	141.8	
1152	11.05	~~150~~ 200 @	6.16	0.597	0.62	5.20	10.79	136.9	
1202	11.05	200	6.19	0.617	0.36	5.20	11.39	133.4	
1212	11.03	265	6.20	0.626	1.80	5.10	11.76	131.4	
1222	11.06	300	6.21	0.630	0.49	5.03	11.84	130.1	
1232	11.06	400	6.20	0.637	0.01	5.05	12.16	128.9	
1242	11.07	400	6.21	0.638	0.00	4.98	12.17	128.1	
1252	11.07	400	6.20	0.641	0.00	4.95	12.23	127.4	
1302	11.07	400	6.21	0.642	0.00	4.98	12.24	126.6	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: NO100.210
Sample ID No.: 03MW08S
Sample Location: Off tarmac
Sampled By: KG/MB/MB

SAMPLING DATA:	FINAL VALUES:						
Date: 01/30/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1258							
Purge Method: Low Flow	Clear	5.20	0.206	14.39	1.51	5.69	123.6

PURGE DATA

Date: 01/30/06
Purge Method: Low Flow
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 69.7
Static Water Level (DTW): 21.91
Static Product Level (DTP) —
One Casing Volume (gal): ~~3.24~~ 9.79 (Sat. screen vol.) - 30'
Start Purge (hrs): 0854
End Purge (hrs): ~~1258~~
Total Purge Time (min): 240 (4 hrs.)
Total Vol. Purged (gal/L):

~~6.52~~ 9.79

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260B	HCl	3 VOAs	
8270C	None	3 1 L Amber	

OBSERVATIONS/NOTES:

Gathered duplicate for VOCs & SVOCs (3 VOAs & 3 1 L Amber) KG

Circle if Applicable:

MS/MSD

Duplicate ID No.: FD1

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 1/30/06

Sample ID No.: 03MW08S

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
			+/- 0.1	+/- 3%	+/- 10% < 10 NTU	+/- 10%	+/- 3%	+/- 10 mV	
	(ft below TOC)	(mL/min)	(S.U.)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
0858	22.04								
0903	22.13								
0908	22.20	110	5.35	~~64.2~~ NB	22.2	6.85	11.51	120.4	
0913	22.29	110	5.35	0.196	33.2	6.04	12.44	120.9	
0918	22.31	110	5.33	0.198	30.2	6.18	12.85	121.9	
0923	22.31	110	5.31	0.199	24.6	6.10	13.07	122.6	
0928	22.35	110	5.31	0.199	18.9	6.09	13.14	123.4	
0933	22.33	110	5.30	0.201	13.7	6.01	13.35	124.0	
0938	22.32	110	5.28	0.201	9.45	6.02	13.41	124.8	1.24
0943	22.31	NB ~~110~~ 80	5.27	0.202	7.10	5.98	13.51	125.1	
0948	22.30	80	5.27	0.202	5.46	10.14	13.51	125.6	
0953	22.27	80	5.26	0.203	4.32	6.19	13.56	125.5	~~1.54~~ 1.62
0958	22.22	80	5.26	0.203	3.57	6.15	13.68	126.0	
1004	22.29	90	5.25	0.203	4.28	6.18	13.45	126.8	
1008	22.29	90	5.25	0.205	12.4	5.91	13.94	126.8	
1013	22.31	90	5.25	0.205	15.5	5.91	14.03	126.6	
1023		90	5.25	0.206	9.78	5.90	14.11	126.8	
1033	22.25	90	5.25	0.207	4.25	5.97	14.23	126.8	
1043	22.23	90	5.24	0.209	3.11	5.99	14.42	126.8	
1053	22.32	100	5.25	0.210	2.30	6.09	14.25	127.0	
1103	22.34	100	5.29	0.210	2.33	6.02	14.39	127.4	
1113		100	5.37	0.211	1.60	5.94	14.51	126.5	
1123	22.37	100	5.36	0.211	1.84	5.94	14.50	125.9	
1133	22.39	100	5.28	0.209	1.66	5.98	14.48	126.1	
1143	22.43	100	5.24	0.209	1.86	5.93	14.49	126.2	
1153	22.44	100	5.24	0.209	2.18	5.88	14.52	126.0	
1203	22.40	100	5.22	0.208	2.00	6.06	14.53	125.3	
1213	22.49	100	5.27	0.207	2.12	6.12	14.47	125.0	
1223	22.43	100	5.22	0.207	1.89	5.78	14.78	123.4	

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 1/30/06

Sample ID No.: 03 MW 085

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hr)	(ft below TOC)	(mL/min)	(S.U.)	(mS/cm)	(NTU)	(mg/L)	(Deg. C)	(mV)	
1233	22.34	100	5.21	0.205	2.04	5.74	14.49	123.3	
1243	22.31	100	5.19	0.204	1.71	5.78	14.23	123.8	
1253	22.30	100	5.18	0.205	1.55	5.79	14.18	123.8	
1258	22.31	100	5.20	0.206	1.81	5.69	14.39	123.6	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove
Project No.: N0100.210

Sample ID No.: 03MW08D
Sample Location: off. Tarmac
Sampled By: AB, KG, MB

SAMPLING DATA:	FINAL VALUES:						
Date: 01/30/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1608							
Purge Method: Low Flow	Clear	7.09	0.385	13.91	13.0	1.43	89.8

PURGE DATA:

Date: 1/30/06
Purge Method: Low Flow
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD):
Static Water Level (DTW): 24.48
Static Product Level (DTP) —
One Casing Volume (gal): —
Start Purge (hrs): 1413
End Purge (hrs): 1608
Total Purge Time (min): 125
Total Vol. Purged (gal/L):

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260B	HCl	3 VOAs	
8270C	None	3 1L Amber	

OBSERVATIONS/NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 1/30/06

Sample ID No.: 03 MW08D

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft below TOC)	(mL/minute)	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
1413	24.47								
1418	24.48								
1423	24.48								
1428	24.48								
1433	24.47								
1438	24.47								
1443	24.48								
1448	24.48								
1453	24.46	60	6.72	0.389	13.6	3.02	14.01	80.4	
1458	24.48	60	6.82	0.391	14.1	2.42	14.00	83.9	
1508	24.49	60	6.91	0.394	13.6	1.98	13.81	88.6	~~900~~ MB 1200
1518	24.51	120	6.97	0.393	13.7	1.93	13.64	88.3	~~1500~~ MB 2400
1528	24.47	120	7.02	0.391	11.6	1.75	13.76	89.2	3600ml
1538	24.48	200	7.05	0.388	13.1	1.53	13.96	88.9	5600ml
1548	24.48	200	7.07	0.386	12.7	1.46	13.91	89.1	7600ml
1558	24.50	275	7.08	0.386	13.0	1.48	13.97	89.5	10350
1608	24.52	275	7.01	0.385	13.0	1.43	13.91	89.8	13100

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: OSMW015-2008
Sample Location: OSMW015
Sampled By: CM/SC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/11/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 12:45	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo2 Pump	~~Clear~~ Clear	5.37	0.112	12.45	10.00	9.83	210	28.35

PURGE DATA:

Date: 3/11/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	6.50	0.115	12.03	4.95	9.40	168	19.71
Monitor Reading (ppm): 0.0	0.5 Vol	5.45	0.119	12.01	16.70	8.78	189	24.82
Well Casing Diameter & Material	1.0 Vol	5.39	0.116	12.34	26.00	8.88	194	26.18
Type: 4" PVC	1.5 Vol	5.36	0.114	12.77	8.14	9.90	196	26.52
Total Well Depth (TD): ~~28.93~~	2.0 Vol	5.28	0.113	12.23	6.20	9.27	205	26.72
Static Water Level (WL): 14.71	2.5 Vol	5.30	0.113	12.17	5.58	9.05	210	27.41
One Casing Volume (gal/L): 9.3	3.0 Vol	5.30	0.112	11.94	11.80	8.56	215	27.85
Start Purge (hrs): 1109								
End Purge (hrs): 12:45								
Total Purge Time (min): 96								
Total Vol. Purged (gal/L): 30								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	4
TAL Metals	HNO3	500 ml Poly	2
Dissolved Metals	HNO3	500 ml Poly	2
Hexavalent Chromium	4 C	1 Liter Poly	2
1-4 - Dioxane	4°C	1 Liter Amber Glass	4

OBSERVATIONS / NOTES:

Pump set at 23 feet would not hold 0.25 gallon Purge rate set pump to the bottom of the well 1135 began pump 1/2 gal/min Water level 23 feet

Circle if Applicable:

MS/MSD —

Duplicate ID No.: Dup01 17:45

Signature(s): James Olsen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW01SE
Sample Location: 03MW01SE
Sampled By: CM
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/20/09	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1425	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic Pump	Clear	6.28	0.146	10.58	0.00	9.08	232	20.92

PURGE DATA:

Date: 3/20/09	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	6.12	0.321	10.90	4.55	7.15	245	20.65
Monitor Reading (ppm): 0.0	0.5 Vol	7.05	0.271	9.97	4.14	10.02	247	21.08
Well Casing Diameter & Material	1.0 Vol	6.73	0.207	10.48	1.46	3.17	266	20.92
Type: 2" PVC	1.5 Vol	6.49	0.170	10.26	0.24	3.05	268	20.92
Total Well Depth (TD): 30.85'	2.0 Vol	6.34	0.154	10.82	0.00	8.38	216	20.92
Static Water Level (WL): 20.65	2.5 Vol	6.30	0.149	10.61	0.00	8.43	221	20.92
One Casing Volume (gal/L): 4.84	3.0 Vol	6.28	0.146	10.58	0.00	9.08	232	20.92
Start Purge (hrs): 0915								
End Purge (hrs): 1423								
Total Purge Time (min): 227								
Total Vol. Purged (gal/L): 30								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4°C	1 Liter Amber Glass	2

OBSERVATIONS / NOTES:

0745 Went to gate to escort person to pick up truck and
1103 Arrived back onsite to continue the purge

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: ____
[] QA Sample Type: ____

Sample ID No.: 03MW01I
Sample Location: 03MW01I
Sampled By: CM/JC
C.O.C. No.: ____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/11/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 0923 am	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: 2" Little 2 Pump	Cloudy Initial	6.39	0.248	9.65	21	5.97	217	48.80

PURGE DATA:

Date: 3/10/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	7.07	0.300	11.21	7.4	10.05	223	4.94
Monitor Reading (ppm): 0.0	0.5 Vol	8.36	0.234	11.87	2.3	10.05	173	68.00
Well Casing Diameter & Material	1.0 Vol	8.76	0.227	12.20	5.1	10.39	157	102.80
Type: 4" PVC	1.5 Vol	8.47	0.207	12.98	5.1	8.40	140	126.10
Total Well Depth (TD): 180.61	2.0 Vol	8.49	0.216	13.00	6.4	10.75	91	156.37
Static Water Level (WL): 4.84								
One Casing Volume (gal/L): 114.78	16:24	Purge	to	Dry		3/10/2008		
Start Purge (hrs): 1346								
End Purge (hrs): 1624								
Total Purge Time (min): 158								
Total Vol. Purged (gal/L): 217.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	6
TAL Metals	HNO3	500 ml Poly	3
Dissolved Metals	HNO3	500 ml Poly	3
Hexavalent Chromium	4 C	1 Liter Poly	3
1-4 Dioxane	4°C	1 Liter Amber	6

OBSERVATIONS / NOTES:

180.61
- 4.84
175.77
x 0.653
52731
87985
105462
114.77781

1346 Purge Rate 1.5 gpm
1500 Purge rate dropped to 1 gpm due to draw down
1624 Purging completed after drawing down to the top of the screen.
1635 Recovery rate of 6.75 Feet over 10 minutes
3/11/08 WL = 4.40 9:00 am Flow Rate 0.45 gpm

Circle if Applicable:

(MS/MSD) Duplicate ID No.: ____

Signature(s):

James Alun

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: ___
[] QA Sample Type: ___

Sample ID No.: 05MW025
Sample Location: 05MW025
Sampled By: CM/JC
C.O.C. No.: ___
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/18/2008 Time: 17:46	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
Method: Redi-Flo2 pump	Clear	5.69	0.122	10.41	0.0	6.27	257	9.90

PURGE DATA:

Date: 3/18/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	7.43	0.126	10.68	34.10	7.45	368	9.73
Monitor Reading (ppm):	0.5 VOL	5.77	0.122	10.82	2.10	6.82	302	9.95
Well Casing Diameter & Material	1.0 VOL	5.70	0.122	10.89	0.00	6.18	281	9.91
Type: 4" PVC	1.5 VOL	5.69	0.122	10.84	0.00	6.20	270	9.90
Total Well Depth (TD): 14.26	2.0 VOL	5.68	0.122	10.68	0.48	6.40	262	9.90
Static Water Level (WL): 9.73	2.5 VOL	5.70	0.122	10.46	0.00	6.30	258	9.90
One Casing Volume (gal/L): 4.5	3.0 VOL	5.69	0.122	10.54	0.00	6.25	257	9.90
Start Purge (hrs): 16:27	3.5 VOL	5.69	0.122	10.50	0.00	6.30	256	9.90
End Purge (hrs): 17:34								
Total Purge Time (min): 67								
Total Vol. Purged (gal/L): 33.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4 - Dioxane	4°C	1 Liter Amber Glass	2

OBSERVATIONS / NOTES:

Pump was set at 14 ft depth.
Pumping Rate: 0.5 gal/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW02SI
Sample Location: 03MW02SI
Sampled By: CH/JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Date: 3/18/2008								
Time: 15:46								
Method: Redi-Flo2 Pump	Clear	7.02	0.205	11.60	0.0	6.33	149	10.07

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Date: 3/18/08								
Method: Redi-Flo2 Pump	See Low Flow purge Data Sheet							
Monitor Reading (ppm): 0.								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 66.95								
Static Water Level (WL): 10.02								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 14:32								
End Purge (hrs): 15:42								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 3.70								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4 Dioxane	4C	1 Liter Amber	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 62 ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Olsen

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

2SI ,M 3/16/06

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 845

WELL ID.: 03MW02~~SI~~ 20060315
DATE: 3/15/06

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
14:32	10.00	200	7.35	0.195	4.79	12.09	11.51	271	pump was set
14:37	10.07	200	7.14	0.201	1.99	7.30	11.39	236	at 62 ft depth.
14:42	10.07	200	7.08	0.202	0.81	6.86	11.43	220	
14:47	10.07	200	7.05	0.203	0.00	6.64	11.44	207	
14:52	10.07	200	7.03	0.203	0.00	6.55	11.55	186	
14:57	10.07	200	7.02	0.205	0.00	6.52	11.45	173	
15:02	10.07	200	7.03	0.205	0.00	6.50	11.43	171	
1507	10.07	200	7.02	0.205	0.00	6.46	11.42	164	
15:12	10.07	200	7.02	0.205	0.00	6.40	11.45	157	
15:17	10.07	200	7.02	0.205	0.00	6.38	11.53	154	
15:22	10.07	200	7.02	0.205	0.00	6.37	11.56	151	
15:27	10.07	200	7.02	0.205	0.00	6.35	11.59	150	
15:32	10.07	200	7.02	0.205	0.00	6.34	11.51	149	
15:37	10.07	200	7.02	0.205	0.00	6.33	11.63	149	
15:42	10.07	200	7.02	0.205	0.00	6.34	11.60	149	

CALCULATIONS

SIGNATURE(S): James Chen

PAGE ___ **OF**

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW021
Sample Location: 03MW021
Sampled By: CM/JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/18/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 13:46	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo2 pump	Clear	7.32	1.99	10.96	0.0	10.12	233	1.16

PURGE DATA:

Date: 3/18/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	See	Low	Flow	Purge	Data	Sheet		
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 146.05								
Static Water Level (WL): 1.12								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 12:33								
End Purge (hrs): 13:43								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 3.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4°C	1 Liter Amber	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 140 ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 845

WELL ID.: 03MW02I
DATE: 3/18/2008

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
12:33	1.16	200	6.29	0.207	0.43	15.42	10.15	260	Pump was set
12:38	1.16	200	6.68	0.207	6.50	12.41	10.17	262	at 140 ft depth
12:43	1.16	200	6.75	0.206	6.25	12.24	10.17	262	
12:48	1.16	200	6.91	0.204	4.91	11.74	10.30	257	
12:53	1.16	200	6.99	0.202	3.17	11.49	10.38	254	
12:58	1.16	200	7.07	0.202	2.39	11.26	10.45	250	
13:03	1.16	200	7.13	0.202	1.32	11.09	10.46	245	
13:08	1.16	200	7.16	0.200	0.67	10.88	10.61	241	
13:13	1.16	200	7.20	0.200	0.40	10.70	10.72	240	
13:18	1.16	200	7.22	0.199	0.07	10.62	10.64	238	
13:23	1.16	200	7.24	0.199	0.20	10.50	10.80	236	
13:28	1.16	200	7.27	0.199	0.00	10.39	10.85	234	
13:33	1.16	200	7.29	0.198	0.00	10.30	10.89	232	
13:38	1.16	200	7.31	0.199	0.00	10.20	10.92	232	
13:43	1.16	200	7.32	0.199	0.00	10.12	10.95	232	

CALCULATIONS

SIGNATURE(S): _____ **PAGE** ___ **OF**

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW035
Sample Location: 03MW035
Sampled By: DW/JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/17/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 13:27	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo2 pump	Clear	5.56	0.161	9.65	0.0	6.54	233	1.95

PURGE DATA:

Date: 3/17/2008	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	5.94	0.161	8.55	1.6	7.24	272	1.76
Monitor Reading (ppm): 0.0	0.5 Vol	5.66	0.161	9.71	0.0	6.65	265	1.95
Well Casing Diameter & Material	1.0 Vol	5.58	0.161	9.82	0.0	6.63	256	1.95
Type: 4" PVC	1.5 Vol	5.56	0.161	9.68	0.0	6.68	245	1.95
Total Well Depth (TD): 9.15'	2.0 Vol	5.56	0.161	9.78	0.0	6.50	228	1.95
Static Water Level (WL): 1.76'	2.5 Vol	5.55	0.161	9.71	0.0	6.67	233	1.95
One Casing Volume (gal/L): 13	3.0 Vol	5.56	0.161	9.65	0.0	6.54	233	1.95
Start Purge (hrs): 12:01								
End Purge (hrs): 13:19								
Total Purge Time (min): 78								
Total Vol. Purged (gal/L): 39								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4C	1 Liter Amber	2

OBSERVATIONS / NOTES:

Pump was set at 6.6 ft depth.
Pumping Rate: 0.5 gal/min.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW03SI
Sample Location: 03MW03SI
Sampled By: DW/JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/17/08 Time: 10:10 Method: Redi-Flo2 Pump	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
	Clear	6.55	0.223	10.98	0.0	8.58	247	0

PURGE DATA:

Date: 3/17/2008	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	5.48	0.243	10.35	0.0	9.55	249	0
Monitor Reading (ppm): 0	0.5 Vol	6.20	0.222	10.93	0.0	8.70	245	0
Well Casing Diameter & Material	1.5 Vol	6.32	0.220	11.05	0.0	8.24	245	0
Type: 2" PVC	2.0 Vol	6.39	0.221	11.14	0.0	8.15	243	0
Total Well Depth (TD): 80'	2.5 Vol	6.42	0.223	11.03	0.0	8.90	243	0
Static Water Level (WL): 0	3.0 Vol	6.49	0.222	11.05	0.0	8.63	244	0
One Casing Volume (gal/L): 13	3.5 Vol	6.53	0.221	10.95	0.0	8.59	245	0
Start Purge (hrs): 09:41	4.0 Vol	6.55	0.223	10.98	0.0	8.58	247	0
End Purge (hrs): 10:08								
Total Purge Time (min): 27								
Total Vol. Purged (gal/L): 54								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	4
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4C	1 Liter Amber	4

OBSERVATIONS / NOTES:

Start Purge: 09:41. Pumping Rate: 2 gal/min

Circle if Applicable:

MS/MSD —

Duplicate ID No.: DUP-02

Signature(s):

James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW03I
Sample Location: 03MW03I
Sampled By: DW/JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/17/2008 Time: 16:37 Method: Redi-Flo2 Pump	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
	Clear	7.81	0.216	11.30	0.0	7.60	211	39.40

PURGE DATA:

Date: 3/17/2008	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	6.90	0.209	11.02	0.0	7.24	229	0
Monitor Reading (ppm): 0.0	0.5 Vol	7.57	0.219	11.50	0.0	7.52	208	26.30
Well Casing Diameter & Material Type: 4" PVC	1 Vol	7.71	0.215	11.46	0.0	7.62	204	34.80
	1.5 Vol	7.76	0.216	11.40	0.0	8.33	214	37.71
Total Well Depth (TD): 168.5	2.0 Vol	7.80	0.216	11.45	0.0	7.53	212	38.80
Static Water Level (WL): Clear	2.5 Vol	7.78	0.216	11.25	0.0	7.63	211	39.32
One Casing Volume(gal/L): 110	3.0 Vol	7.80	0.216	11.35	0.0	7.64	212	39.55
Start Purge (hrs): 14:42								
End Purge (hrs): 16:36								
Total Purge Time (min): 114								
Total Vol. Purged (gal/L): 342								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	1
1,4 Dioxane	4°C	1 Liter Amber	2

OBSERVATIONS / NOTES:

Water level was 10.6 ft above ground surface.
Initial flow rate = 3 gpm

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

Sample ID No.: 03MW04S
Sample Location: 03MW04S
Sampled By: CM/JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

SAMPLING DATA:

Date: 3/14/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 17:25	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo2 Pump	Clear	6.39	0.304	10.28	0.0	8.86	211	12.22

PURGE DATA:

Date: 3/14/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	6.62	0.327	12.32	50	10.41	238	10.34
Monitor Reading (ppm): 384	0.5 Vol	6.45	0.327	10.59	12.2	9.28	226	12.20
Well Casing Diameter & Material	1.0 Vol	6.42	0.324	10.59	6.0	9.16	218	12.23
Type: 4" PVC	1.5 Vol	6.32	0.315	10.37	3.0	9.43	216	12.21
Total Well Depth (TD): 36.47	2.0 Vol	6.44	0.301	10.21	1.4	9.40	215	12.21
Static Water Level (WL): 10.34	2.5 Vol	6.37	0.306	10.36	0.7	8.91	211	12.22
One Casing Volume(gal/L): 1.687	3.0 Vol	6.39	0.304	10.30	0.25	8.91	211	12.22
Start Purge (hrs): 16:09	3.5 Vol	6.39	0.304	10.28	0.0	8.86	211	12.22
End Purge (hrs): 17:22								
Total Purge Time (min): 73								
Total Vol. Purged (gal/L): 55								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4°C	1 Liter Amber Glass	2

OBSERVATIONS / NOTES:

36.47
10.34
5
2613
.1653
7934
12065
15678
138259

16:09 Pump Rate . 1 Gal/min
16:26 Pump Rate 0.75 gal/min

Pump was set at 14 ft depth.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW04SI
Sample Location: 03MW04SE
Sampled By: CM/SC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/14/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 14:03	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo2 Pump	Clear	6.26	0.327	10.85	0.0	9.37	178	N/A

PURGE DATA:

Date: 3/14/2008	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	6.82	0.324	11.94	0.0	11.32	179	0
Monitor Reading (ppm): 0.0	0.5 Vol	6.31	0.319	11.25	0.0	10.20	175	0
Well Casing Diameter & Material	1.0 Vol	6.29	0.327	11.04	0.0	9.66	173	0
Type: 2" PVC	1.5 Vol	6.26	0.322	10.93	0.0	9.56	173	0
Total Well Depth (TD): 80	2.0 Vol	6.29	0.323	11.03	0.0	9.53	172	0
Static Water Level (WL): 0.0	2.5 Vol	6.26	0.327	10.84	0.0	9.34	173	0
One Casing Volume(gal/L): 13.0	3.0 Vol	6.20	0.328	10.76	0.0	9.35	177	0
Start Purge (hrs): 13:07	3.5 Vol	6.28	0.328	11.01	0.0	9.25	176	0
End Purge (hrs): 14:01	4.0 Vol	6.26	0.327	10.85	0.0	9.37	178	
Total Purge Time (min): 54								
Total Vol. Purged (gal/L): 60								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4°C	1 Liter Amber Glass	2

OBSERVATIONS / NOTES:

13:07: Pump Rate: 3 Gal/min.
13:11: Pump Rate: 1 Gal/min
Water level was 3.0 feet above ground surface.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: ____
[] QA Sample Type: ____

Sample ID No.: 03MW04I
Sample Location: 03MW04E
Sampled By: CM/JC
C.O.C. No.: ____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/14/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 12:18	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo2 pump	Clear	6.96	0.254	11.30	0.0	9.82	178	0

PURGE DATA:

Date: 3/14/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	6.67	0.239	10.78	50	9.27	293	0
Monitor Reading (ppm): 0.0	0.5 Vol	6.71	0.247	11.08	9.4	10.39	257	0
Well Casing Diameter & Material	1.0 Vol	6.90	0247	11.22	1.6	10.21	247	0
Type: 4" PVC	1.5 Vol	6.90	0.253	11.06	0.0	10.00	225	0
Total Well Depth (TD): 168	2.0 Vol	6.91	0.250	11.08	0.0	10.16	210	0
Static Water Level (WL): 0.0	2.5 Vol	6.94	0.250	11.28	0.0	10.37	203	0
One Casing Volume(gal/L): 110	3.0 Vol	6.95	0.253	11.25	0.0	9.80	194	0
Start Purge (hrs): 10:36	3.5 Vol	6.95	0.255	11.23	0.0	9.84	187	0
End Purge (hrs): 12:12	4.0 Vol	6.96	0.254	11.30	0.0	9.82	178	0
Total Purge Time (min): 96								
Total Vol. Purged (gal/L): 350								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4°C	1 Liter Amber Glass	2

OBSERVATIONS / NOTES:

Start to pump 10:36, pump rate: 2 gal/min
1055 speeded up pump rate to 4 gal/min
Water level was 12.04 feet above ground surface

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: ___
[] QA Sample Type: ___

Sample ID No.: 03MW055
Sample Location: 03MW055
Sampled By: CM/JC
C.O.C. No.: ___
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5/12/08 Time: 10.46 Method: Redi-Flo2 Pump	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
	Clear	5.13	0.135	12.02	0.00	8.57	265	23.57

PURGE DATA:

Date: 5/12/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	4.84	0.172	11.28	0.40	8.62	262	23.44
Monitor Reading (ppm): 0.5	0.5 Vol	5.02	0.135	11.90	0.00	8.64	268	23.55
Well Casing Diameter & Material	1 Vol.	5.14	0.133	12.40	0.00	13.90	266	23.58
Type: 4" PVC	1.5 Vol	5.11	0.136	12.63	0.00	12.46	266	23.57
Total Well Depth (TD): 40.44	2 Vol	5.13	0.135	12.37	0.00	8.18	267	23.57
Static Water Level (WL): 23.43	2.5 Vol	5.13	0.136	12.38	0.00	8.21	268	23.58
One Casing Volume (gal/L): 11.19	3 Vol	5.13	0.135	12.02	0.00	8.57	268	23.57
Start Purge (hrs): 09:32								
End Purge (hrs): 10:43								
Total Purge Time (min): 71								
Total Vol. Purged (gal/L): 35								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	1
1.4. Dioxane	4C	1 Liter Glass	2

OBSERVATIONS / NOTES:

Start to Purge 9:32 Am
Pump Set to 25 ft. Flow Rate : 2 L/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Aren

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW05I
Sample Location: 03MW05I
Sampled By: CM/JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/11/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1559	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi Flow 2 Pump	Clear	6.08	0.124	12.38	3.63	11.75	153	21.93

PURGE DATA:

Date: 3/11/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	See	Low	Flow	Purge	Data	Sheet		
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 43.95								
Static Water Level (WL): 21.61								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 14:39								
End Purge (hrs): 15:54								
Total Purge Time (min): 75								
Total Vol. Purged (gal/L): 5.06								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	1
1,4 – Dioxane	4°C	1 Liter Amber Glass	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 86 ft

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	James Chen
—	—	

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 845

WELL ID.: 03MW05I
DATE: 3/11/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
14:39	21.68	150 mL/min	6.34	0.130	23.2	13.12	11.48	195	
14:44	21.85	200	6.25	0.126	22.0	9.05	11.42	174	
14:49	21.91	200	6.12	0.127	192	11.20	11.60	119	
14:54	21.95	250	6.07	0.126	55.1	12.13	11.94	119	
14:59	21.97	250	6.05	0.125	17.8	12.69	12.03	125	
15:04	21.98	250	6.05	0.126	9.19	12.65	12.03	131	
15:09	21.99	250	6.05	0.125	6.14	12.82	11.95	136	
15:14	21.99	250	6.05	0.125	4.05	12.88	12.01	139	
15:19	21.99	250	6.06	0.125	3.12	12.75	12.21	143	
15:24	21.99	250	6.06	0.125	1.88	12.74	12.15	146	
15:29	21.98	250	6.06	0.124	1.85	12.54	12.43	148	
15:34	21.96	250	6.07	0.124	1.99	12.30	12.25	150	
15:39	21.96	250	6.07	0.124	1.14	12.09	12.26	151	
15:44	21.94	250	6.08	0.124	0.98	12.02	12.05	153	
15:49	21.92	250	6.08	0.124	1.03	11.80	12.40	154	
15:54	21.93	250	6.08	0.124	0.90	11.75	12.38	153	

CALCULATIONS

SIGNATURE(S): James Chen

PAGE ___ **OF**

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW065
Sample Location: MW065
Sampled By: CH/JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/13/08 Time: 1714 Method: Redi-Flo 2 Pump	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
	Clear	5.11	0.188	17.04	1.00	9.21	268	28.43

PURGE DATA:

Date: 3/13/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump								
Monitor Reading (ppm): 25.7								
Well Casing Diameter & Material Type: 2" PVC		(See Low Flow Purge Data Sheets)						
Total Well Depth (TD): 38.27								
Static Water Level (WL): 28.35								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 1516								
End Purge (hrs): 1711								
Total Purge Time (min): 115								
Total Vol. Purged (gal/L): 5.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	3
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	1
1,4-Dioxane	4°C	1Liter Amber Glass	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 31 ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3 **WELL ID.:** OSMW065 20080313

PROJECT NUMBER: 845 **DATE:** 3/13/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
15:16	28.38	125	5.26	0.187	95	12.95	12.48	230	Pump was set
15:21	28.40	150	5.16	0.183	95	13.47	14.08	233	at 31 ft depth
15:26	28.39	150	5.13	0.185	50	12.98	14.77	232	
15:31	28.39	125	5.14	0.187	39.2	13.00	14.18	233	
15:36	28.41	150	5.15	0.181	36.0	11.47	15.65	225	
15:41	28.41	140	5.12	0.182	20.1	10.50	17.50	235	
15:46	28.37	120	5.15	0.192	18.0	11.18	15.67	238	
15:51	28.38	100	5.15	0.189	18.0	9.67	15.29	235	
15:56	28.42	150	5.13	0.187	15.0	9.62	16.90	249	
16:01	28.41	250	5.11	0.186	11.14	9.61	17.04	252	
16:06	28.43	250	5.12	0.183	6.43	9.51	16.34	259	
16:11	28.43	250	5.12	0.187	5.69	9.24	16.29	261	
16:16	28.43	250	5.11	0.187	5.07	9.02	15.96	259	
16:21	28.41	250	5.13	0.188	3.87	8.87	15.47	255	
16:26	28.40	240	5.13	0.190	3.45	9.20	14.52	255	
16:31	28.40	230	5.14	0.192	3.32	9.25	12.80	249	
16:36	28.39	200	5.13	0.190	4.96	9.00	13.10	242	
16:41	28.40	200	5.13	0.188	4.00	9.04	13.80	238	
16:46	28.39	200	5.12	0.184	5.72	9.10	14.10	238	
16:51	28.39	150	5.12	0.186	4.50	9.15	14.28	239	
16:56	28.43	200	5.12	0.179	5.40	9.48	17.80	245	
17:01	28.43	200	5.11	0.187	2.34	9.50	17.60	259	
17:06	28.43	200	5.11	0.188	2.90	9.39	17.20	260	
17:11	28.43	200	5.11	0.188	1.00	9.21	17.04	268	

CALCULATIONS

SIGNATURE(S): James Chen **PAGE** ___ **OF**

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: ____
[] QA Sample Type: ____

Sample ID No.: OS-MW06-SE
Sample Location: MW06SE
Sampled By: CW/JC
C.O.C. No.: ____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/13/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 14:40	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo2 Pump	Clear	5.54	0.102	13.35	5.7	11.95	192	24.39

PURGE DATA:

Date: 3/13/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	See	low	Flow	Purge	Data	Sheet		
Monitor Reading (ppm): 3800								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 96.35'								
Static Water Level (WL): 24.36								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 13:24								
End Purge (hrs): 14:34								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 3.36								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	1
1,4 – Dioxane	4°C	1 Liter Amber Glass	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 81 ft

Circle if Applicable:

MS/MSD — Duplicate ID No.: ____

Signature(s): James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3 **WELL ID.:** 03MW06SI

PROJECT NUMBER: 845 **DATE:** 3/13/2008

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
13:24	24.37	180	5.01	0.103	23	12.05	12.38	154	Pump was set at
13:29	24.39	180	6.65	0.103	30	10.51	12.30	163	81 ft
13:34	24.39	180	6.11	0.103	26	11.03	12.30	163	
13:39	24.39	180	5.86	0.103	20	11.41	12.41	166	
13:44	24.39	180	5.71	0.103	[redacted]19	11.66	12.64	170	
13:49	24.39	180	5.62	0.103	17	11.84	12.75	174	
13:54	24.39	180	5.57	0.104	14	12.00	12.84	177	
13:59	24.39	180	5.54	0.103	14	12.06	12.90	180	
14:04	24.39	180	5.52	0.103	12	12.03	13.19	184	
14:09	24.39	180	5.50	0.102	9.7	12.10	13.29	186	
14:14	24.39	180	5.51	0.102	7.2	12.03	13.35	187	
14:19	24.39	180	5.51	0.102	7.6	12.04	13.33	189	
14:24	24.39	180	5.51	0.102	6.4	12.06	13.33	191	
14:29	24.39	180	5.53	0.102	6.2	12.05	13.31	192	
14:34	24.39	180	5.54	0.102	5.7	11.95	13.35	192	

CALCULATIONS

SIGNATURE(S): James Chen **PAGE** ___ **OF**

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW06I
Sample Location: 03MW06I
Sampled By: CM/JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/14/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 0910	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi Flo2 Pump	Brown	6.16	0.246	11.92	330	7.75	237	

PURGE DATA:

Date: 3/13/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	See	low	Flow	Purge	Data	Sheets		
Monitor Reading (ppm): 3.2								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 148.82								
Static Water Level (WL): 25.03								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 09:24								
End Purge (hrs): 12:27								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	1
1,4-Dioxane	4°C	1 Liter Amber Glass	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 144.3 ft
3/13/2008
11:46 Purging Dry was begun.
12:27 Purging Dry was completed
Water Level = 25.52 3/14/08 0909

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 845

WELL ID.: 03MW06I
DATE: 3/13/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
09:24	24.52	100	7.79	0.226	25.1	12.00	10.31	219	Pump was set
09:29	25.92	100	8.78	0.223	33.4	9.46	10.13	213	at 144.3 ft depth
09:34	25.95	100	9.31	0.224	41.9	7.71	10.15	209	
09:39	25.98	90	9.42	0.224	43.1	7.13	10.00	208	
09:44	26.01	100	9.24	0.217	120.0	6.24	10.47	210	
09:49	26.18	100	8.86	0.213	527.0	4.40	11.16	212	
09:54	26.19	100	8.72	0.211	524.0	3.78	11.10	200	
09:59	26.19	90	8.70	0.210	447.0	3.66	10.62	184	
10:04	26.19	90	8.70	0.209	401.0	3.54	10.76	168	
10:09	26.22	90	8.68	0.207	335.0	3.30	11.16	151	
10:14	26.23	90	8.68	0.207	300.0	3.24	11.02	133	
10:19	26.23	90	8.68	0.207	270.0	3.06	11.06	111	
10:24	26.23	90	8.68	0.206	250.0	2.96	11.18	97	
10:29	26.23	90	8.69	0.206	220.0	2.86	11.04	81	
10:34	26.21	90	8.68	0.206	200.0	2.77	11.18	69	
10:39	26.22	90	8.70	0.207	190.0	2.77	10.91	57	
10:44	26.21	90	8.70	0.206	180.0	2.65	11.30	46	
10:49	26.21	90	8.70	0.206	170.0	2.63	11.32	39	
10:54	26.22	90	8.70	0.206	160.0	2.63	11.39	32	
10:59	26.22	90	8.71	0.205	140.0	2.58	11.49	26	
11:04	26.23	90	8.71	0.205	130.0	2.57	11.44	22	
11:09	26.22	90	8.72	0.206	120.0	2.59	11.28	20	
11:14	26.25	90	8.72	0.205	120.0	2.57	11.58	17	
11:19	26.25	90	8.71	0.205	110.0	2.56	11.55	15	

CALCULATIONS

SIGNATURE(S): James Olsen

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3 **WELL ID.:** 03MW061
PROJECT NUMBER: 845 **DATE:** 3/13/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
11:24	26.30	90	8.72	0.207	100	2.61	11.40	14	
11:29	26.33	90	8.71	0.204	100	2.57	11.94	13	
11:34	26.39	90	8.70	0.204	95	2.58	11.98	13	
11:39	26.38	90	8.71	0.204	95	2.58	12.13	12	
11:44									
11:49	Will not sustain pump Rate talked with office Will purge dry and come back tomorrow for sample								
1146	Purging Dry was begun								
1227	Purging Dry was completed								

CALCULATIONS

SIGNATURE(S): James Dunn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW075
Sample Location: 03MW075
Sampled By: CM/JC
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/19/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 13:23	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo2 Pump	Clear	6.16	0.559	11.72	0.00	7.44	179	10.55

PURGE DATA:

Date: 3/19/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	See	low	Flow	purge	Data	Sheet		
Monitor Reading (ppm): 6.2								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 10.51								
Static Water Level (WL): 46.33								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 12:06								
End Purge (hrs): 13:21								
Total Purge Time (min): 75								
Total Vol. Purged (gal/L): 4.6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4°C	1 liter amber glass	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 40 ft depth

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	James Chen
—	—	

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 845

WELL ID.: 03MW07S
DATE: 3/19/2008

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
12:06	10.51	200	6.50	0.503	38	10.34	9.68	312	~~10.51~~ JC 3/19/08
12:11	10.55	200	6.20	0.487	31	9.10	10.38	290	Pump was set
12:16	10.55	200	6.15	0.487	25	8.50	11.00	248	at 40 ft depth
12:21	10.55	210	6.15	0.494	22	8.40	11.13	235	
12:26	10.55	210	6.15	0.535	17	8.25	11.36	220	
12:31	10.55	210	6.15	0.545	13	8.10	11.43	210	
12:36	10.55	240	6.16	0.552	9.4	7.94	11.55	199	
12:41	10.55	240	6.16	0.556	6.9	7.83	11.53	193	
12:46	10.55	240	6.16	0.555	5.14	7.82	11.62	188	
12:51	10.55	240	6.16	0.555	3.33	7.71	11.76	185	
12:56	10.55	240	6.16	0.556	1.89	7.63	11.86	182	
13:01	10.55	240	6.17	0.557	1.17	7.61	11.86	180	
13:06	10.55	240	6.17	0.558	0.43	7.56	11.78	179	
13:11	10.55	240	6.16	0.559	0.14	7.51	11.75	179	
13:16	10.55	240	6.16	0.559	0.10	7.46	11.74	179	
13:21	10.55	240	6.16	0.559	0.00	7.44	11.72	179	

CALCULATIONS

SIGNATURE(S): James Chen

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Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW085
Sample Location: 03MW085
Sampled By: CM / JC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/12/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1459	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi Flo 2 Pump	Clear	5.44	0.151	12.01	0.0	10.57	~~234~~	21.21

PURGE DATA:

Date: 3/12/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	See	low	Flow	Purge	Data	Sheets		
Monitor Reading (ppm): 0.2								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 69.47								
Static Water Level (WL): 20.69								
Two Screen Vol's (gal/L): 9.78								
Start Purge (hrs): 1417								
End Purge (hrs): 1452								
Total Purge Time (min): 155								
Total Vol. Purged (gal/L): 6.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	1
1,4-Dioxane	4°C	1 Liter Amber Glass	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 50 Feet

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 845

WELL ID.: 03MW03S
DATE: 3/2/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
12:17	20.64	200	5.46	0.154	16.00	11.23	10.83	259	55 ft depth
12:22	21.21	200	5.54	0.156	21.00	11.30	11.04	221	(pump ran 5 sec)
12:27	21.21	200	5.44	0.157	21.30	11.64	11.30	203	
12:32	21.20	180	5.46	0.158	20.50	11.72	11.35	201	
12:37	21.24	180	5.45	0.156	15.40	11.69	11.40	203	
12:42	21.21	150	5.44	0.156	17.60	11.70	11.22	238	Thermister cut off 12:43
12:52	21.16	150	5.43	0.156	13.10	11.62	11.26	203	Thermister set again 12:47
12:57	21.17	150	5.42	0.156	6.50	11.51	11.68	208	
13:02	21.16	150	5.42	0.156	3.15	11.46	11.90	212	
13:07	21.16	150	5.43	0.155	2.56	11.21	12.37	215	
13:12	21.16	150	5.45	0.156	1.82	11.18	11.96	216	
13:17	21.16	150	5.44	0.156	0.98	11.21	11.17	218	
13:22	21.16	150	5.45	0.156	0.53	10.98	11.97	220	
13:27	21.16	150	5.45	0.154	1.35	10.83	12.57	220	
13:32	21.16	150	5.46	0.155	0.2	11.07	11.85	222	
13:37	21.16	150	5.46	0.154	0.0	10.71	12.64	223	
13:42	21.16	150	5.46	0.153	0.0	10.55	12.78	224	
13:47	21.16	150	5.46	0.154	0.0	10.69	11.96	225	
13:52	21.16	150	5.45	0.153	0.0	10.45	12.60	224	
13:57	21.20	150	5.44	0.152	0.0	10.54	11.85	227	
14:02	21.21	150	5.44	0.152	0.0	10.45	12.06	228	
14:07	21.21	200	5.44	0.152	0.0	10.38	12.33	230	
14:12	21.21	200	5.44	0.152	0.0	10.42	12.09	231	
14:17	21.21	200	5.44	0.153	0.0	10.42	12.16	231	

CALCULATIONS

SIGNATURE(S): James Chen

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 845

WELL ID.: 03MW085
DATE: 3/12/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
14:22	21.21	200	5.44	0.153	0.0	10.47	12.16	233	pump was set at
14:27	21.21	180	5.44	0.152	0.0	10.49	11.79	232	
14:32	21.21	150	5.45	0.153	0.0	10.56	11.94	233	55 ft depth
14:37	21.21	150	5.45	0.152	0.0	10.54	12.59	233	
14:42	21.21	150	5.45	0.152	0.0	10.56	11.95	235	
14:47	21.21	150	5.44	0.152	0.0	10.60	11.95	236	
14:52	21.21	150	5.44	0.151	0.0	10.57	12.01	234	

CALCULATIONS

SIGNATURE(S): James Olsen

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: ____
[] QA Sample Type: ____

Sample ID No.: 03MW08D
Sample Location: 03MW08D
Sampled By: CM / JC
C.O.C. No.: ____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3/12/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1700	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi Flo 2 Pump	Clear	7.17	01269	12.67	1.70	6.43	96	23.75

PURGE DATA:

Date: 3/12/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	6.58	0.285	12.05	4.6	12.36	~~282.5~~	23.75
Monitor Reading (ppm): 21.2								
Well Casing Diameter & Material	See	Low	Flow	Purge	Data	Sheet		
Type: 2" PVC								
Total Well Depth (TD): 175.05								
Static Water Level (WL): 23.75								
Two Screen Vol's (gal/L): 3.36								
Start Purge (hrs): 15:45								
End Purge (hrs): 16:58								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 5.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2
TAL Metals	HNO3	500 ml Poly	1
Dissolved Metals	HNO3	500 ml Poly	1
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4°C	1 Liter Amber	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 160 ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): James Chen

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 845

WELL ID.: 03MW08D
DATE: 3/12/2008

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
15:48	23.75	250	6.58	0.265	4.6	12.80	12.65	203	Pump set at
15:53	23.78	250	6.90	0.266	3.0	10.51	12.66	158	160 ft depth
15:58	23.76	250	6.98	0.267	8.57	10.54	11.94	172	
16:03	23.76	300	7.02	0.267	8.71	10.00	12.17	139	
16:08	23.77	300	7.06	0.268	10.75	9.57	12.09	105	
16:13	23.79	300	7.09	0.270	9.64	9.13	12.12	95	
16:18	23.77	300	7.12	0.270	6.66	8.60	12.44	88	
16:23	23.78	300	7.14	0.270	5.30	8.17	12.45	84	
16.28	23.78	300	7.15	0.270	4.08	7.95	12.47	83	
16:33	23.78	300	7.15	0.270	3.76	7.62	12.53	83	
16:38	23.78	300	7.16	0.270	3.17	7.34	12.53	82	
16:43	23.78	300	7.16	0.270	2.89	7.17	12.33	83	
16:48	23.78	300	7.16	0.270	2.00	6.83	12.45	84	
16:53	23.78	300	7.16	0.270	1.80	6.57	12.60	86	
16:58	23.78	300	7.17	0.269	1.70	6.43	12.67	86	

CALCULATIONS

SIGNATURE(S): James Chen

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Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: Irrigation Well Golf Course
[] QA Sample Type:

Sample ID No.: 03IMW01-20080319
Sample Location: 03IW01
Sampled By: CM
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA: JC

Date: 03/19/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 0923	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bottle Water	clear	6.55	0.455	10.52	2.32	3.22	238	

PURGE DATA:

Date: 03/19/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump								
Monitor Reading (ppm):								
Well Casing Diameter & Material Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	4
TAL Metals	HNO3	500 ml Poly	2
Dissolved Metals	HNO3	500 ml Poly	2
Hexavalent Chromium	4 C	1 Liter Poly	0
1,4-Dioxane	4°C	1 Liter Amber Glass	4

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.: DUP-03
Assigned Time 1523

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW01S-20081016
Sample Location: 03MW01S
Sampled By: CM/DW
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/16/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1405	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Rediflo-2 Pump	LT BROWN	5.24	0.154	13.0	11.26	5.84	230	25.50

PURGE DATA:

Date: 10/16/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Rediflow-2 Pump	Initial	5.37	0.160	14.1	16.1	5.41	202	
Monitor Reading (ppm): 0.0	0.5 VOL	5.33	0.160	16.0	9.4	5.50	202	25.82
Well Casing Diameter & Material	1.0 VOL	5.31	0.160	14.2	2.7	4.62	223	26.62
Type: 4" PVC	1.5 VOL	5.25	0.162	13.3	5.9	5.17	226	27.60
Total Well Depth (TD): 32.00	2.0 VOL	5.26	0.162	13.2	2.3	5.21	230	28.00
Static Water Level (WL): 23.91	2.5 VOL	5.21	0.157	12.4	4.2	5.80	236	30.00
One Casing Volume(gal/L): 5.28	3.0 VOL	5.21	0.156	13.6	5.3	5.70	228	31.10
Start Purge (hrs): 1220	3.5 VOL	5.20	0.155	13.9	3.7	5.74	229	31.72
End Purge (hrs): 1330								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 24								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	Z

OBSERVATIONS / NOTES:

1330 purged the well dry will wait for recovery to sample to 75% initial volume or 25.85

1400 Recovered to 25.50 feet will take reading and sample

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

Sample ID No.: 03MW01SEL-20081017
Sample Location: 03MW15E
Sampled By: CMJDW
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

SAMPLING DATA:

Date: 10/17/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1145	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Flow Method	clear	5.98	0.170	12.8	1.9	5.44	211	23.65'

PURGE DATA:

Date: 10/17/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Peristaltic Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material		(See	Low	Flow	Purge	Data	Sheet)	
Type: 2" PVC								
Total Well Depth (TD): 80.85'								
Static Water Level (WL): 23.28								
Two Screen Vol's (gal/L): 6.52								
Start Purge (hrs): 1000								
End Purge (hrs): 1140								
Total Purge Time (min): 100								
Total Vol. Purged (gal/L): 7.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	4

OBSERVATIONS / NOTES:

Vertical Pump Placement = 70'

Circle if Applicable:

MS/MSD

Duplicate ID No.: DUP-01

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 112G00845

WELL ID.: 03MW01SE
DATE: 10/17/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
1000	23.26	200	5.69	0.347	3.5	4.76	13.4	264	
1005	23.62	200	5.89	0.209	2.7	6.85	13.1	243	
1010	23.62	200	6.09	0.192	1.5	6.00	13.1	215	
1015	23.62	200	6.18	0.185	0.0	5.42	13.0	208	
1020	23.62	200	6.23	0.185	0.0	5.79	13.0	209	
1025	23.65	200	6.26	0.186	0.0	5.97	12.9	210	
1030	23.65	200	6.26	0.185	1.8	5.35	12.9	205	
1035	23.65	200	6.26	0.185	2.5	5.30	12.9	205	
1040	23.65	200	6.22	0.179	2.6	5.33	12.9	205	
1045	23.65	200	6.19	0.177	2.0	5.39	12.9	206	
1050	23.65	200	6.15	0.174	2.0	5.45	13.0	207	
1055	23.65	200	6.13	0.173	1.7	5.44	13.0	208	
1100	23.65	200	6.13	0.173	1.7	5.45	13.0	209	
1105	23.65	200	6.15	0.173	1.7	5.42	13.0	208	
1110	23.65	200	6.12	0.173	1.7	5.45	13.0	208	
1115	23.65	200	6.09	0.171	1.5	5.47	12.9	209	
1120	23.65	200	6.01	0.171	1.3	5.45	12.9	209	
1125	23.65	200	5.98	0.171	1.5	5.45	12.9	210	
1130	23.65	200	6.04	0.170	1.9	5.45	12.7	209	
1135	23.65	200	5.98	0.170	1.5	5.47	12.8	211	
1140	23.65	200	5.98	0.170	1.9	5.44	12.8	211	

CALCULATIONS

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW015E-20081017
Sample Location: 03MW015E
Sampled By: CM/DW
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/17/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1410	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Straw Method	clear	6.00	0.166	12.8	1.1	5.95	226	

PURGE DATA:

Date: 10/17/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Peristaltic Pump	Initial	5.69	0.397	13.4	35	9.76	264	23.26'
Monitor Reading (ppm): 0.0	0.5 VOL	6.11	0.173	12.9	1.5	5.45	209	23.65'
Well Casing Diameter & Material	1.0 VOL	6.15	0.172	14.1	3.7	7.65	211	23.65'
Type: 2" PVC	1.5 VOL	6.08	0.170	13.2	4.8	5.77	210	24.12'
Total Well Depth (TD): 80.85'	2.0 VOL	6.01	0.165	13.3	2.0	6.16	220	24.15'
Static Water Level (WL): 23.28	2.5 VOL	6.02	0.166	13.5	2.8	6.16	222	24.13'
One Casing Volume(gal/L): 9.38	3.0 VOL	6.00	0.166	12.8	1.1	5.95	226	24.10'
Start Purge (hrs): 1000								
End Purge (hrs): 1405								
Total Purge Time (min): 245								
Total Vol. Purged (gal/L): 30								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

50' = pump depth

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Daniel Whalen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW01I-20081017
Sample Location: 03MW01I
Sampled By: DW/CM
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10-17-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1625	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method:	clear	7.32	.255	12.4	3.4	.484	202	

PURGE DATA:

Date: 10/17/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: RediFlo2	0	5.25	.270	13.03	2.6	6.05	262	clear
Monitor Reading (ppm): 0	55	7.32	.252	13.74	2.4	6.25	206	"
Well Casing Diameter & Material	110	7.20	.250	14.52	2.1	5.53	189	"
Type: @ 4" PVC	130	7.82	.248	14.79	1.8	5.20	181	"
Total Well Depth (TD): 180.6								
Static Water Level (WL): 13.34			purged DRY					
One Casing Volume(gal/L): 109								
Start Purge (hrs): 0937								
End Purge (hrs): 1123								
Total Purge Time (min): 106								
Total Vol. Purged (gal/L): 130								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

initial purge rate 2.5 gpm screen interval 159'-179'
1024 flow = 1.5 gpm wl = 97'
1337 wl = 89'
1046 turn up flow to 1.25 gpm wl = 125'
1113 flow = 1 gpm wl = 143'
1123 purged dry wl = 159'

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	David Anderson

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW02S-20081016
Sample Location: 03MW02S
Sampled By: CM/DW
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/16/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1625	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Rediflo-2 Pump	clear	5.17	0.140	17.22	0.10	4.35	244	

PURGE DATA:

Date: 10/16/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Rediflo-2 Pump	Initial	6.63	0.143	17.23		6.46	221	
Monitor Reading (ppm): 0.0	0.5 Vol	5.81	0.150	17.15	9.2	4.48	229	
Well Casing Diameter & Material	1.0 Vol	5.29	0.147	17.32	2.5	4.08	236	
Type: 4" PVC	1.5 Vol	5.21	0.142	17.25	0.55	4.49	239	
Total Well Depth (TD): 24.00	2.0 Vol	5.17	0.141	17.25	0.30	4.13	240	
Static Water Level (WL): 12.56	2.5 Vol	5.17	0.140	17.24	0.35	4.20	240	
One Casing Volume(gal/L): 7.41	3.0 Vol	5.16	0.139	17.22	0.10	4.28	242	
Start Purge (hrs): 1555	3.5 Vol	5.17	0.140	17.22	0.16	4.35	244	
End Purge (hrs): 1620								
Total Purge Time (min): 25								
Total Vol. Purged (gal/L): 30								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

pump depth = 16'

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW02SE-20081017
Sample Location: 03MW02SE
Sampled By: CM/DW
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Date: 10/17/08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1555								
Method: RediFlo 2	clear	6.86	.249	14.2	0.30	6.34	184	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Date: 10/17/08								
Method: RediFlo-2 Pump								
Monitor Reading (ppm): 0.0	——	SEE	LOW	FLOW	PURGE	DATA	SHEET	——
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 67.00								
Static Water Level (WL): 52.19								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 1455								
End Purge (hrs): 1555								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 3.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	✓

OBSERVATIONS / NOTES:

Vertical Pump Placement = 62'

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Donald Waller

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 112G00845

WELL ID.: 03MW02SF
DATE: 10/17/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
1455	12.93	225							START
1500	12.94	225	6.65	.251	3.2	5.06	14.3	222	clear
1505	12.96	225	6.71	.252	2.1	5.61	14.2	212	
1510	12.97	225	6.79	.252	1.2	6.10	14.0	207	
1515	12.98	225	6.86	.252	0.95	6.25	14.5	209	
1520	13.01	225	6.85	.253	0.85	7.02	14.4	199	
1525	13.01	225	6.86	.252	0.75	6.73	14.3	194	
1530	13.01	225	6.86	.252	0.65	6.51	14.2	188	
1535	13.01	225	6.86	.251	0.60	6.45	14.2	187	
1540	13.01	225	6.86	.250	0.40	6.34	14.2	186	
1545	13.01	225	6.86	.250	0.35	6.31	14.2	186	
1550	13.01	225	6.86	.250	0.30	6.26	14.2	184	
1555	13.01	225	6.86	.249	0.30	6.34	14.2	184	

CALCULATIONS

SIGNATURE(S): Donald Whalen

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW02IL
Sample Location: 03MW02I
Sampled By: DW/XC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/20/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1105	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: RediFlo2	Clear	7.22	0.229	14.27	0.30	7.86	164	

PURGE DATA:

Date: 10/20/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Other
Method: RediFlo2		See	Low	Flow	Purge	Data	Sheet	
Monitor Reading (ppm): 0								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 146.1								
Static Water Level (WL): 4.22								
One Casing Volume(gal/L):								
Start Purge (hrs): 0947								
End Purge (hrs): 1100								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL	2 x 40 ml	✓

OBSERVATIONS / NOTES:

Vertical pump placement: 141'

Circle if Applicable:

MS/MSD

Duplicate ID No.: DUP-05

Signature(s):

Donald Whalen

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NASJRB Willow Grove Site 3
PROJECT NUMBER: 00845

WELL ID.: OSMW02F
DATE: 10/20/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0947	4.32	175							START
0950	4.28	~~175~~ 175	5.60	0.230	3.8	6.69	13.66	291	clear
0955	4.28	200	5.92	.231	4.2	7.48	13.87	281	
1000	4.28	200	6.16	.230	2.4	7.65	13.97	259	
1005	4.28	200	6.37	.230	1.8	7.73	14.01	233	
1010	4.28	200	6.54	.229	1.2	7.64	14.04	220	
1015	4.28	200	6.71	.228	0.75	7.58	14.11	209	
1020	4.28	200	6.82	.228	0.55	7.48	14.14	196	
1025	4.28	200	6.94	.227	0.50	8.13	14.17	189	
1030	4.28	200	6.94	.227	0.45	8.13	14.17	185	
1035	4.28	200	7.00	.227	0.40	8.10	14.16	180	
1040	4.28	200	7.06	0.227	0.40	8.03	14.20	175	
1045	4.28	200	7.10	.226	0.40	7.98	14.21	173	
1050	4.28	200	7.14	.227	0.40	7.91	14.21	170	
1055	4.28	200	7.17	.227	0.40	7.89	14.23	168	
1100	4.28	200	7.22	.229	0.30	7.86	14.27	164	

SIGNATURE(S): Daniel Schulz

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3
Project No.: 00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: ____
[] QA Sample Type: ____

Sample ID No.: 03MW02I
Sample Location: 03MW02I
Sampled By: DW/XC
C.O.C. No.: ____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/20/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1225	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: Redi-Flo2 pump	Clear	7.45	0.227	13.08	0.10	7.52	183	

PURGE DATA:

Date: 10/20/2008	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Other
Method: Redi-Flo2 Pump	Initial	7.31	0.235	13.36	0.15	7.57	182	
Monitor Reading (ppm): 0	12	7.31	0.231	13.19	0.10	7.82	189	
Well Casing Diameter & Material	23	7.35	0.228	13.04	0.10	7.65	177	
Type: 2" PVC	35	7.38	0.228	13.05	0.05	8.00	174	
Total Well Depth (TD): 146.10	46	7.39	0.227	13.13	0.05	7.39	167	
Static Water Level (WL): 4.22	58	7.41	0.227	13.12	0.05	7.53	167	
One Casing Volume(gal/L): 23.13	69	7.45	0.227	13.08	0.10	7.52	183	
Start Purge (hrs): 1114								
End Purge (hrs): 12:25								
Total Purge Time (min): 71								
Total Vol. Purged (gal/L): 69								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL	2 x 40 ml	✓

OBSERVATIONS / NOTES:

Vertical pump placement: 141 feet

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Donald W Baker

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3
Project No.: 00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW03S
Sample Location: 03MW03S
Sampled By: DW/KC
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/20/08 Time: 1600	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Other NA
Method: Redi-Flo 2 pump	CLEAR	6.65	.291	14.20	0.00	2.14	46	

PURGE DATA:

Date: 10/20/2008	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Other
Method: Redi-Flo2 Pump	0 gal.	6.86	.324	14.07	0.25	2.59	75	clear
Monitor Reading (ppm): 0	~~10~~ 5	6.72	.316	14.07	0.20	5.50	69	"
Well Casing Diameter & Material	10	6.80	.313	14.10	0.25	4.65	58	"
Type: 4" PVC	15	6.69	.310	14.11	0.25	2.00	46	"
Total Well Depth (TD): 10.2 (20)	20	6.72	.306	14.12	0.25	2.31	38	"
Static Water Level (WL): 3.62	25	6.70	.301	14.17	0.25	1.96	38	"
One Casing Volume(gal/L): 4.3 (16.4)	30	6.67	.293	14.22	0.25	2.22	43	"
Start Purge (hrs): 1515	35	6.65	.291	14.20	0.00	2.14	46	"
End Purge (hrs): 1600								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L): 35								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL	2 x 40 ml	✓

OBSERVATIONS / NOTES:

Vertical pump placement: 7'
purge rate = 1.25 gpm
wl = 4.40' TOC (constant)

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Donald Whalen

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3
Project No.: 00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW03SL
Sample Location: 03MW03S
Sampled By: PW/RC
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/20/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1500	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: Low Flow	clear	6.70	0.350	14.52	0.25	0.85	-33	

PURGE DATA:

Date: 10/20/2008	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Other
Method: Redi-Flo2 Pump								
Monitor Reading (ppm): 0	———	SEE LOW FLOW PURGE DATA SHEET						———
Well Casing Diameter & Material								
Type: 4" PVC								
Total Well Depth (TD): 10.2								
Static Water Level (WL): 3.62								
One Casing Volume(gal/L):								
Start Purge (hrs): 1330								
End Purge (hrs): 1455								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL	2 x 40 ml	✓

OBSERVATIONS / NOTES:

Vertical pump placement: 8'

total depth of well (10.2') does not match original depth (20')

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Donald Wlaka

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NASJRB Willow Grove Site 3
PROJECT NUMBER: 00845

WELL ID.: 03MW035
DATE: 10/20/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1330	3.62	400							START
1335	3.70	350	7.15	.292	1.8	1.29	13.77	71	
1340	3.69	400	6.76	.298	1.0	(1.0)	14.25	4	
1345	3.69	400	6.71	0.307	0.91	0.99	14.32	-5	
1350	3.69	400	6.69	0.312	0.80	0.95	14.32	-8	
1355	3.69	400	6.68	0.317	0.70	0.95	14.32	-13	
1400	3.69	400	6.68	0.320	0.50	0.91	14.37	-12	
1405	3.69	450	6.67	0.320	0.50	0.91	14.55	-15	
1410	3.70	450	6.68	0.325	0.45	0.89	14.45	-19	
1415	3.70	450	6.68	0.329	0.40	0.88	14.41	-22	
1420	3.70	450	6.68	0.331	0.35	0.88	14.41	-24	
1425	3.70	450	6.69	0.335	0.30	0.88	14.42	-26	
1430	3.70	450	6.69	0.339	0.30	0.88	14.49	-27	
1435	3.70	450	6.69	0.343	0.25	0.87	14.50	-29	
1440	3.70	450	6.70	0.345	0.25	0.88	14.52	-31	
1445	3.70	450	6.70	0.348	0.25	0.86	14.57	-31	
1450	3.70	450	6.70	0.349	0.25	0.86	14.54	-32	
1455	3.70	450	6.70	0.350	0.25	0.85	14.52	-33	

SIGNATURE(S): _____

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove Site 3
Project No.: 00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW035I-20081021
Sample Location: 03MW035I
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/21/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 10:10	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: Redi-Flo2 Pump	Clear	6.46	0.306	12.1	0.0	9.36	328	

PURGE DATA:

Date: 10/21/2008	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Other
Method: Redi-Flo2 Pump	0	6.5	0.300	11.8	0.0	5.92	331	
Monitor Reading (ppm): 0	0.5 VOL	6.47	0.303	12.0	0.0	9.02	332	
Well Casing Diameter & Material	1.0 VOL	6.47	0.305	12.1	0.0	10.49	331	
Type: 2" PVC	1.5 VOL	6.40	0.305	12.1	0.0	9.44	329	
Total Well Depth (TD): 80'	2.0 VOL	6.46	0.306	12.1	0.0	9.60	328	
Static Water Level (WL): flowing	2.5 VOL	6.45	0.306	12.1	0.0	9.40	328	
One Casing Volume(gal/L): 13	3.0 VOL	6.46	0.306	12.1	0.0	9.36	328	
Start Purge (hrs): 0947								
End Purge (hrs): 10:10								
Total Purge Time (min): 23								
Total Vol. Purged (gal/L): 46								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL	2 x 40 ml	✓

OBSERVATIONS / NOTES:

Vertical pump placement: 10 ft

Purge Flow Rate: 2 gal/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald W Kalen

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3
Project No.: 00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW03I
Sample Location: 03MW03I
Sampled By: DW/XC
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/21/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 12:05	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: Redi-Flo2 Pump	Clear	7.52	0.266	12.1	0.0	8.26	314	

PURGE DATA:

Date: 10/21/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Other
Method: Redi-Flo2 Pump	Initial	5.24	0.341	10.6	0.0	9.19	345	
Monitor Reading (ppm): 0	0.5 Vol	6.43	0.267	12.1	0.0	9.29	322	
Well Casing Diameter & Material	1.0 Vol	6.64	0.274	12.1	0.0	8.31	317	
Type: 4" PVC	1.5 Vol	7.25	0.271	12.1	0.0	8.30	314	
Total Well Depth (TD): 168.5	2.0 Vol	7.41	0.268	12.0	0.0	8.77	316	
Static Water Level (WL): 0	2.5 Vol	7.49	0.268	12.0	0.0	8.13	319	
One Casing Volume(gal/L): 110	3.0 Vol	7.52	0.266	12.1	0.0	8.26	314	
Start Purge (hrs): 0906								
End Purge (hrs): 12:05								
Total Purge Time (min): 109								
Total Vol. Purged (gal/L): 330								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL	2 x 40 ml	✓

OBSERVATIONS / NOTES:

Vertical pump placement: Flowing artesian well.

Purge Flow Rate: 2 gal/min.

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Donald Weber

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

Sample ID No.: 03MW04 S-20081016
Sample Location: 03MW04S
Sampled By: DW
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

SAMPLING DATA:

Date: 10/16/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1435	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo 2 Pump	clear	6.28	.474	15.36	9	6.18	134	

PURGE DATA:

Date: 10/16/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2	0	5.75	.588	16.79	412	6.42	223	Brown
Monitor Reading (ppm): 0	8.5	6.27	.565	16.30	>1000	5.35	225	Brown
Well Casing Diameter & Material	17	6.34	.523	16.02	820	6.98	221	"
Type: 4" PVC	25.5	6.42	.516	15.66	443	7.23	222	"
Total Well Depth (TD): 36.5 TOC	34	6.27	.499	15.32	80	6.49	177	lt. Brown
Static Water Level (WL): 10.53	42.5	6.29	.487	15.26	24	6.32	137	"
One Casing Volume (gal/L): 17	51	6.26	.484	15.14	14	6.03	135	clear
Start Purge (hrs): 1315	60	6.27	.477	15.16	10	6.21	126	"
End Purge (hrs): 1435	68	6.28	.475	15.22	10	6.13	131	"
Total Purge Time (min): 80	76	6.28	.474	15.36	9	6.18	134	"
Total Vol. Purged (gal/L): 76								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	✓

OBSERVATIONS / NOTES:

Initial flow = 1 gpm pump depth = 14'
1324 wl = 13.6' water very turbid; sediment is very light, coagulated (organic?)
1355 wl = 13.83

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Donald W Kalen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

Sample ID No.: 03MW4SI-20081014
Sample Location: 03MW4SI
Sampled By:
C.O.C. No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/14/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1515	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi flo-2 Pump	Clear	5.94	0.424	12.1	1.6	8.06	270	

PURGE DATA:

Date: 10-14-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	0	6.82	0.423	15.10	11.42	6.27	247	
Monitor Reading (ppm): 0	0.5 Vol	6.18	0.426	12.3	11.2	8.28	260	
Well Casing Diameter & Material	1.0 Vol	6.05	0.420	12.1	2.9	8.05	267	
Type: 2" PVC	1.5 Vol	6.01	0.425	12.1	2.7	8.35	270	
Total Well Depth (TD): 80'	2.0 Vol	5.97	0.424	12.1	2.0	7.97	272	
Static Water Level (WL): 1.70	2.5 Vol	5.95	0.424	12.1	2.1	8.07	272	
~~Two~~ ~~Screen~~ One Well Vol's (gal/L): 12.7	3.0 Vol	5.93	0.423	12.1	2.0	8.02	270	
Start Purge (hrs): 1450	3.5 Vol	5.94	0.424	12.1	1.6	8.06	270	
End Purge (hrs): 1513								
Total Purge Time (min): 23								
Total Vol. Purged (gal/L): 50								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	✓

OBSERVATIONS / NOTES:

Vertical Pump Placement = 70'

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	David W. Baker

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW45IL-20081014
Sample Location: 03MW45E
Sampled By: CM/DW
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/14/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1715	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi flow 2 PUMP	C/BW	5.92	.424	13.9	2.3	7.46	178	

PURGE DATA:

Date: 10/14/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump								
Monitor Reading (ppm): 0.0	—	SEE Low Flow PURGE DATA SHEET						
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 80.								
Static Water Level (WL): 2.25								
Two Screen Vol's (gal/L): 6.4								
Start Purge (hrs): 1550								
End Purge (hrs): 1710								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 7.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 70'

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3 **WELL ID.:** 03MW45I

PROJECT NUMBER: 112G00845 **DATE:** 10/14/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
1550	2.25	350	6.05	0.428	22.7	7.79	13.0	199	
1555	2.25	350	5.96	0.420	1.5	7.31	14.4	201	
1600	2.25	350	5.93	0.414	0.5	7.17	15.8	201	
1605	2.25	350	5.93	0.427	1.7	8.11	13.4	194	
1610	2.25	350	5.93	0.425	0.9	7.93	13.4	196	
1615	2.25	350	5.92	0.424	2.0	7.68	13.3	197	
1620	2.25	350	5.92	0.424	2.2	7.50	13.3	198	
1625	2.25	350	5.93	0.424	3.1	7.49	13.3	199	
1630	2.25	350	5.92	0.424	3.3	7.49	13.4	197	
1635	2.25	350	5.92	0.424	3.1	7.46	13.7	191	
1640	2.25	350	5.92	0.424	3.9	7.45	13.9	184	
1645	2.25	350	5.92	0.424	3.7	7.43	14.0	185	
1650	2.25	350	5.92	0.424	2.9	7.44	14.0	181	
1655	2.25	350	5.92	0.424	2.5	7.44	14.0	179	
1700	2.25	350	5.92	0.424	2.1	7.44	14.0	179	
1705	2.25	350	5.92	0.424	3.0	7.46	13.9	178	
1710	2.25	350	5.92	0.424	2.3	7.46	13.9	178	

CALCULATIONS

SIGNATURE(S): Donald W Lobo

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW4E-20081014
Sample Location: 03MW4E
Sampled By: CM/DW
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Date: 10/14/08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1410								
Method: Bailer Bottle	clear	6.56	0.318	12.6	2.5	6.79	300	

PURGE DATA:

Date: 10/14/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump	Initial	5.87	0.323	12.4	3.3	7.16	340	
Monitor Reading (ppm): 0.0	0.5 vol	6.11	0.314	11.9	2.5	7.82	338	
Well Casing Diameter & Material	1.0 vol	6.31	0.311	12.0	1.1	6.75	332	
Type: 4" PVC	1.5 vol	6.47	.316	12.8	1.6	8.07	306	
Total Well Depth (TD): 168	2.0 vol	6.56	0.318	12.7	1.9	6.73	306	
Static Water Level (WL): 0	2.5 vol	6.55	0.316	12.5	1.6	6.87	304	
Two Screen Vol's (gal/L): 110	3.0 vol	6.57	0.318	12.4	2.1	6.56	302	
Start Purge (hrs): 1130	3.5 vol	6.56	0.318	12.6	2.5	6.79	300	
End Purge (hrs): 1410								
Total Purge Time (min): 160								
Total Vol. Purged (gal/L): 390								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Vertical Pump Placement =
168
x0.653
109.72 ft

Flow rate = 2.5 gal/per min
1 volume is 45 minutes
1/2 volume is 23 minutes

Well was Flowing.

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	Daniel Wheeler

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW055-20081016
Sample Location: 03MW055
Sampled By: DW
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10-16-08 / Time: 1015	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
Method: Redi Flo 2 Pump	Clear	4.47	.187	14.63	0.85	7.30	294	

PURGE DATA:

Date: 10-16-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi Flo 2	0	4.49	.251	14.85	11	8.62	275	clear
Monitor Reading (ppm): 0	3.5	4.52	.193	14.96	8.9	8.13	281	"
Well Casing Diameter & Material	7	4.51	.191	14.97	5.4	7.64	284	"
Type: 4" PVC	10.5	4.51	.191	14.67	1.6	7.27	287	"
Total Well Depth (TD): 40.4	14	4.50	.189	14.60	1.5	7.30	291	"
Static Water Level (WL): 29.35	17.5	4.48	.187	14.57	1.9	7.37	295	"
One Casing Volume (gal/L): 7.2	21	4.48	.187	14.60	1.6	7.38	295	"
Start Purge (hrs): 0940	24.5	4.48	.189	14.62	1.5	7.39	297	"
End Purge (hrs): 1010	28	4.47	.187	14.63	0.85	7.30	294	↓
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): 28								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	✓

OBSERVATIONS / NOTES:

pump depth = 25 ft
purge rate = 1 gpm

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Donald Whalen

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW05I-20081016
Sample Location: 03MW05I
Sampled By: CM/DW
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/16/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1050	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Rediflo-2 Pump	Clear	5.90	0.152	15.2	1.1	7.73	164	

PURGE DATA:

Date: 10/16/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Rediflo-2 Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material Type: 2" PVC		(See Low Flow Purge Data Sheet)						
Total Well Depth (TD): 94.00								
Static Water Level (WL): 28.55								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 0940								
End Purge (hrs): 1045								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L): 3.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 89'

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 112G00845

WELL ID.: 03MW05I
DATE: 10/16/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
0940	28.85	250	5.68	0.161	65	7.38	14.2	172	
0945	29.00	250	5.77	0.159	16	7.42	14.4	151	
0950	28.87	250	5.84	0.158	9.2	7.70	14.9	155	
0955	28.86	150	5.85	0.157	5.1	7.71	15.0	159	
1000	28.86	150	5.86	0.156	2.6	7.55	15.0	160	
1005	28.85	150	5.87	0.154	2.6	7.58	15.0	161	
1010	28.85	200	5.88	0.154	2.8	7.53	15.1	162	
1015	28.85	200	5.88	0.153	2.4	7.55	15.1	162	
1020	28.85	200	5.89	0.153	4.3	7.75	15.1	153	
1025	28.85	200	5.88	0.152	3.0	7.73	15.2	155	
1030	28.85	200	5.89	0.152	2.0	7.74	15.2	158	
1035	28.85	200	5.90	0.152	1.7	7.73	15.2	161	
1040	28.85	200	5.91	0.152	1.2	7.75	15.2	163	
1045	28.85	200	5.90	0.152	1.1	7.73	15.2	164	
1050	sample	03MW05I-20081016			was	collected			

CALCULATIONS

SIGNATURE(S): _____

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

Sample ID No.: 03MW06F-20081015
Sample Location: 03MW06F
Sampled By: RW
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Date: 10/15/08								
Time: 1725								
Method: Redi Flo2 Pump	clear	4.67	.239	17.89	0.80	8.43	297	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Date: 10/15/08								
Method: Redi-Flo2 Pump								
Monitor Reading (ppm): 0	—	SEE	Low	Flow	PURGE	DATA	SHEET	—
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 38.5								
Static Water Level (WL): 34.49								
Two Screen Vol's (gal/L): 3.2								
Start Purge (hrs): 1615								
End Purge (hrs): 1720								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L): 6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 31'

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Donald Nichols

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 112G00845

WELL ID.: 03MW06S
DATE: 10-15-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
1615	34.49	200							START
1620	34.55	200	4.54	.224	56	9.53	17.10	254	
1625	34.65	400	4.67	.233	44	5.45	19.87	248	
1630	34.63	400	4.42	.239	34	8.72	19.22	274	
1635	34.60	400	4.46	.240	27	8.53	19.60	278	
1640	34.63	350	4.48	.238	19	8.58	19.67	281	
1645	34.63	300	4.53	.243	15	8.16	19.09	279	
1650	34.63	300	4.57	.242	11	8.59	19.74	271	
1655	34.63	300	4.56	.243	6.3	8.78	17.96	289	
1700	34.63	300	4.59	.239	2.8	8.70	18.10	294	
1705	34.63	300	4.62	.239	2.3	8.65	17.47	296	
1710	34.63	300	4.63	.238	1.8	8.62	17.49	296	
1715	34.63	300	4.65	.238	1.2	8.56	17.49	296	
1720	34.63	300	4.67	.239	0.80	8.43	17.49	297	

CALCULATIONS

SIGNATURE(S): Donald Whalen

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW06SF-20081015
Sample Location: 03MW06SF
Sampled By: DW
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/15/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1535	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: RediFlo2	clear	4.59	.127	16.79	0.70	8.52	266	

PURGE DATA:

Date: 10/15/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump								
Monitor Reading (ppm): 0	—	SEE	Low	Flow	PURGE	DATA	SHEET	—
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 86.3								
Static Water Level (WL): 32.49								
Two Screen Vol's (gal/L): 3.2								
Start Purge (hrs): 1435								
End Purge (hrs): 1530								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 81'

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Donald Whalen

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 112G00845

WELL ID.: 03MW065I
DATE: 10-15-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
1435									START
1440	32.53	250	4.94	.192	9.0	8.15	16.15	257	
1445	32.53	250	4.74	.146	5.0	8.73	16.28	236	
1450	32.53	250	4.70	.138	4.7	8.76	16.56	243	
1455	32.53	250	4.68	.138	3.6	8.59	16.64	248	
1500	32.53	250	4.66	.139	2.9	8.55	16.64	252	
1505	32.53	250	4.62	.139	2.3	8.51	16.69	257	
1510	32.53	250	4.60	.134	1.45	8.57	16.76	260	
1515	32.53	250	4.58	.130	1.10	8.54	16.81	262	
1520	32.53	250	4.57	.129	0.90	8.52	16.88	264	
1525	32.53	250	4.58	.127	0.85	8.61	16.88	266	
1530	32.53	250	4.59	.127	0.70	8.52	16.89	266	

CALCULATIONS

SIGNATURE(S): Daniel Wilson

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845
CM 10/15/08
[X] Domestic Well Data
[ ] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: 03MW06E-2008 1015
Sample Location: 03MW06E
Sampled By: CM / DW
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 10/15/08 Time: 1705	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
Method: Redi flo 2 Pump	clear	7.76	0.269	14.5	14	5.04	198	44.20'

PURGE DATA:

Date: 10/15/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi flo 2 Pump	Initial	7.77	0.267	15.7	80	9.04	187	33.90'
Monitor Reading (ppm):	0.5 vol	7.83	0.264	15.7	35	4.57	176	64.10'
Well Casing Diameter & Material	1.0 vol	7.93	0.263	15.6	25	5.26	175	98.40'
Type: 2" PVC	1.5 vol	7.87	0.263	15.9	21	4.92	174	122.50'
Total Well Depth (TD): 150.00	2.0 vol	7.91	0.264	15.9	21	5.84	175	143.70'
Static Water Level (WL): 33.90								
One Casing Volume(gal/L): 18.9								
Start Purge (hrs): 1500								
End Purge (hrs): 1545								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L): 45								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Pump Placement = 145'
1545 purged the well dry will wait for recovery to 75% of former volume or 62.90 feet
1700 water level back to 44.20 feet will sample

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): David Kahler

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

Sample ID No.: 03MW06[illegible]-20081015
Sample Location: 03MW06[illegible]
Sampled By: CM/DW
C.O.C. No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/15/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1450	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi Flo2 Pump	clear	7.86	0.257	15.9	45	3.87	169	

PURGE DATA:

Date: 10/15/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2" PVC		(See Low Flow Purge Data Sheet)						
Total Well Depth (TD): 150.00								
Static Water Level (WL): 32.68								
Two Screen Vol's (gal/L): 3.26								
Start Purge (hrs): 1315								
End Purge (hrs): 1445								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 4.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 145'

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Donald W Haben

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 112G00845

WELL ID.: 03MW06I
DATE: 10/15/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
1315	31.20	150	7.74	0.263	17	6.81	16.8	183	Clear No odor or Sheen
1320	33.49	150	7.83	0.262	12	6.06	17.8	184	
1325	33.80	150	7.88	0.262	10	5.54	18.4	183	
1330	34.04	150	7.92	0.264	500	5.43	16.9	187	Red Brown Silt
1335	34.43	150	7.91	0.262	500	4.56	17.0	184	
1340	34.76	150	7.92	0.261	500	4.37	16.8	179	
1345	34.89	150	7.91	0.261	500	4.30	16.9	178	
1350	35.02	150	7.92	0.260	500	4.17	16.6	177	
1355	35.09	150	7.91	0.259	400	4.10	16.9	176	
1400	35.10	150	7.90	0.259	180	4.02	16.7	175	
1405	35.12	150	7.88	0.259	120	3.96	16.5	174	
1410	35.14	150	7.87	0.258	85	3.92	16.3	173	
1415	35.15	150	7.86	0.258	74	3.89	16.2	172	
1420	35.15	150	7.86	0.258	68	3.85	16.2	171	
1425	35.16	150	7.86	0.257	60	3.84	16.4	170	
1430	35.15	150	7.86	0.257	60	3.86	15.9	169	
1435	35.16	150	7.86	0.257	55	3.88	15.9	167	
1440	35.16	150	7.86	0.257	48	3.90	16.0	169	
1445	35.16	150	7.86	0.257	45	3.87	15.9	169	
1450	Sample 03MW06I-L-20081015 was collected								

CALCULATIONS

SIGNATURE(S): David Wheeler

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove Site 3
Project No.: 00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: ___
[] QA Sample Type: ___

Sample ID No.: 03MW07S
Sample Location: 03MW07S
Sampled By: DW/KC
C.O.C. No.: ___
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/21/2008	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 14:30	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: Redi-Flo2 Pump	Clear	6.04	0.510	16.37	0.40	5.73	171	

PURGE DATA:

Date: 10/21/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Other
Method: Redi-Flo2 Pump								
Monitor Reading (ppm): 0	—	SEE	LOW	FLOW PURGE	DATA	SHEET		—
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 46.3								
Static Water Level (WL): 12.41								
One Casing Volume(gal/L):								
Start Purge (hrs): 1310								
End Purge (hrs): 1425								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 4.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL	2 x 40 ml	✓

OBSERVATIONS / NOTES:

Vertical pump placement: 40 ft depth

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	Donald Whalen

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NASJRB Willow Grove Site 3
PROJECT NUMBER: 00845

WELL ID.: OSMW07S
DATE: 10/21/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
13:10	12.48	350	5.74	0.538	43	6.29	14.74	222	start
13:15	12.50	350	5.77	0.525	40	5.99	15.36	187	
13:20	12.46	210	5.84	0.512	31	6.32	15.91	177	
13:25	12.46	220	5.86	0.518	20	5.89	15.63	167	
13:30	12.46	220	5.88	0.513	11	5.85	16.00	163	
13:35	12.46	220	5.90	0.513	5.5	5.81	16.05	164	
13:40	12.46	220	5.92	0.513	4.0	5.80	16.05	164	
13:45	12.46	220	5.94	0.513	2.2	5.84	15.99	165	
13:50	12.46	220	5.96	0.509	1.8	5.79	16.30	166	
13:55	12.46	220	5.97	0.510	1.3	5.79	16.29	167	
14:00	12.46	220	5.99	0.515	1.2	5.92	15.91	170	
14:05	12.46	220	6.00	0.510	0.90	5.89	15.98	170	
14:10	12.46	220	6.01	0.510	0.75	5.86	16.04	170	
14:15	12.46	220	6.03	0.509	0.65	5.74	16.29	171	
14:20	12.46	220	6.03	0.510	0.55	5.72	16.33	170	
14:25	12.46	220	6.04	0.510	0.40	5.73	16.37	171	

SIGNATURE(S): Xinjian Chen

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[X] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW085
Sample Location:
Sampled By: FW/CM
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/15/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1030	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: 2" Redi Flo Pump	Clear	5.20	.289	15.7	0.84	10.62	261	

PURGE DATA:

Date: 10/15/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: 2" Redi Flo	0	4.64	.381	15.1	58	10.82	268	cloudy
Monitor Reading (ppm): 0	3 gal	5.32	.262	15.0	18	10.73	219	
Well Casing Diameter & Material	6.5	5.36	.272	15.3	8.8	10.64	210	clear
Type: 2" PVC	10	5.30	.287	15.4	7.1	10.42	217	↓
Total Well Depth (TD): 69.55	13	5.23	.290	15.5	4.2	10.41	238	↓
Static Water Level (WL): 29.52	16	5.22	.289	15.6	3.2	10.42	247	↓
One Casing Volume(gal/L): 6.5	19.5	5.24	.290	15.6	1.9	10.42	252	↓
Start Purge (hrs): 0931	23	5.20	.289	15.8	1.3	10.46	257	↓
End Purge (hrs): 1030	26	5.20	.289	15.7	0.84	10.62	261	↓
Total Purge Time (min): 59								
Total Vol. Purged (gal/L): 26								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

pump depth = 50'

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Daniel Wheeler

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW08D
Sample Location:
Sampled By: RW/CM
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10-15-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1335	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Redi-Flo Pump	Clear	6.92	.365	15.7	3.7	2.52	131	

PURGE DATA:

Date: 10/15/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi-Flo2 Pump								
Monitor Reading (ppm): 0	—	SEE LOW FLOW PURGE DATA SHEET —						
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 173								
Static Water Level (WL): 30.80								
Two Screen Vol's (gal/L): 3.2								
Start Purge (hrs): 1100								
End Purge (hrs): 1230								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Vertical Pump Placement = 160'

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Donald Klaben

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 112G00845

WELL ID.: 03MW08D
DATE: 10-15-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
1100	30.80	150							START PURGING
1105	30.82	150	6.45	.362	120	4.46	15.9	243	
1110	30.82	150	6.76	.376	800	2.69	14.5	224	
1115	30.82	150	6.78	.374	550	2.37	14.8	215	
1120	30.82	150	6.81	.372	220	2.27	15.3	203	
1125	30.82	150	6.85	.370	175	2.38	15.3	192	
1130	30.82	150	6.86	.369	140	2.45	15.2	187	
1135	30.82	150	6.87	.367	100	2.49	15.2	179	
1140	30.82	150	6.88	.367	70	2.53	15.2	173	
1145	30.82	150	6.89	.366	50	2.57	15.2	166	
1150	30.82	150	6.90	.365	31	2.58	15.3	160	
1155	30.82	150	6.90	.365	22	2.58	15.3	156	
1200	30.82	150	6.90	.364	17	2.58	15.3	152	
1205	30.82	150	6.91	.363	15	2.58	15.4	148	
1210	30.82	150	6.91	.363	12.3	2.60	15.4	142	
1215	30.82	150	6.91	.364	10	2.59	15.5	138	
1220	30.82	150	6.91	.364	9.6	2.58	15.5	135	
1225	30.82	150	6.92	.365	8.7	2.52	15.7	131	

CALCULATIONS

SIGNATURE(S): Donald W Lake

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Irrigation Well
[] QA Sample Type: _____

Sample ID No.: 33IWO1-20081013
Sample Location: IWO1
Sampled By: CM/DW
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Date: 10/13/08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Sal
Time: 1015								
Method: Sample Bottles	clear	6.25	0.575	13.1	3.3	9.03	287	0.0

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:				NA				
Total Well Depth (TD):								
Static Water Level (WL):								
Two Screen Vol's (gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	4

OBSERVATIONS / NOTES:

Vertical Pump Placement = N/A

Circle if Applicable:

MS/MSD

Duplicate ID No.: Assigned Time: 0000
DUP-03

Signature(s):

Donald Wlaben

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW03S20090401
Sample Location: 03MW3S
Sampled By: VSICM
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4/1/09 Time: 1235	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
Method: Rediflo-2 Pump	clear	6.82	0.223	10.1	0.4	5.29	209	

PURGE DATA:

Date: 4/1/09	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Rediflo-2 Pump	Initial	7.12	0.311	9.9	17.2	4.59	264	
Monitor Reading (ppm): 0.0	0.5 Vol	7.13	0.256	9.9	7.7	3.54	255	
Well Casing Diameter & Material	1.0 Vol	7.01	0.237	9.9	2.3	4.68	234	
Type: 4" PVC	1.5 Vol	6.91	0.236	10.0	2.6	4.77	220	
Total Well Depth (TD): 21.40	2.0 Vol	6.85	0.227	10.1	1.3	5.15	214	
Static Water Level (WL): 5.15	2.5 Vol	6.82	0.227	10.1	0.6	5.18	210	
One Casing Volume(gal/L): 1.64	3.0 Vol	6.82	0.223	10.1	0.2	5.26	211	
Start Purge (hrs): 1150	3.5 Vol	6.82	0.223	10.1	0.4	5.29	209	
End Purge (hrs): 1235								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L): 45								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

The flow rate was 1 gallon Per Minute

Root mat was found at 9.60 Feet. Water Level probe would not go through. The pump punched through total depth was 21.40 Feet

Circle if Applicable:

MS/MSD

Duplicate ID No.: 03Dup02 20090401
Assigned Time = 0000

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03MW03SI 20090401
Sample Location: 03MW03SI
Sampled By: VS/CM
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-1-09	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1338	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Artesian Flow	Clear	7.38	0.276	12.1	0.0	6.14	219	

PURGE DATA:

Date: 4/1/09	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi Flo2 Pump	Initial	7.20	0.278	12.0	0.0	7.97	221	
Monitor Reading (ppm): 0.0	0.5 Vol	7.32	0.276	12.2	0.0	6.33	219	
Well Casing Diameter & Material	1.0 Vol	7.34	0.277	12.1	0.0	6.38	219	
Type: 2" PVC	1.5 Vol	7.43	0.266	12.1	0.0	7.96	226	
Total Well Depth (TD): 90.00	2.0 Vol	7.38	0.279	12.1	0.0	6.09	223	
Static Water Level (WL): -0-	2.5 Vol	7.38	0.277	12.1	0.0	6.13	220	
One Casing Volume(gal/L): 13.04	3.0 Vol	7.38	0.276	12.1	0.0	6.14	219	
Start Purge (hrs): 1250								
End Purge (hrs): 1338								
Total Purge Time (min): 48								
Total Vol. Purged (gal/L): 48								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

80
103
240
480
30
13040

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW03E20090401
Sample Location: 03MW03E
Sampled By: VS/CM
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4/11/09 Time: 1555	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
Method: Redi Flo-2 Pump	Clear	8.89	0.297	12.8	0.0	6.82	167	

PURGE DATA:

Date: 4/11/09	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi Flo-2 Pump	Initial	8.30	0.328	12.4	0.3	7.60	205	
Monitor Reading (ppm): 0.0	0.5 Vol	9.52	0.306	12.7	0.0	6.69	168	
Well Casing Diameter & Material	1.0 Vol	9.24	0.301	12.7	0.0	6.87	166	
Type: 4" PVC	1.5 Vol	9.04	0.299	12.8	0.0	6.81	168	
Total Well Depth (TD): 170.00	2.0 Vol	8.95	0.299	12.8	0.0	6.85	167	
Static Water Level (WL): -0-	2.5 Vol	8.91	0.298	12.8	0.0	6.87	168	
One Casing Volume(gal/L): 111.01	3.0 Vol	8.89	0.297	12.8	0.0	6.82	167	
Start Purge (hrs): 1355								
End Purge (hrs): 1555								
Total Purge Time (min): 120								
Total Vol. Purged (gal/L): 360								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Flow rate of 3 gpm

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

Sample ID No.: 03MW04S L0090402
Sample Location: 03MW04S
Sampled By: VS/CM
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

SAMPLING DATA:

Date: 4/2/09	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 0955	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Rediflo-2 Pump	clear	6.92	0.429	13.1	3.9	7.43	194	

PURGE DATA:

Date: 4/2/09	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Rediflo-2 Pump	Initial	6.83	0.424	11.8	30.5	7.81	196	
Monitor Reading (ppm): 0.0	0.5 Vol	6.76	0.422	12.3	227.9	8.28	289	
Well Casing Diameter & Material	1.0 Vol	6.89	0.427	12.7	46.8	7.56	271	
Type: 4" PVC	1.5 Vol	6.92	0.430	12.2	11.4	7.50	239	
Total Well Depth (TD): 37.00	2.0 Vol	6.90	0.430	12.8	14.5	7.53	222	
Static Water Level (WL): 13.62	2.5 Vol	6.93	0.429	13.0	6.5	7.39	207	
One Casing Volume(gal/L): 15.24	3.0 Vol	6.82	0.429	13.1	3.9	7.43	194	
Start Purge (hrs): 0830								
End Purge (hrs): 0955								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 45								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

The flow rate was 0.5 gpm. The initial volume from the well was a dark brown in color with what appeared to be an algae type material. The water had no odor or sheen present. The water began to clear after 1 volume was removed from the well

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW045E20090402
Sample Location: 03MW045E
Sampled By: VS/CM
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-2-09 / Time: 1045	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
Method: Redi-Flow pump	clear	6.95	0.415	12.1	0.4	7.45	172	

PURGE DATA:

Date: 4/2/09	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redflo-2 Pump	Initial	7.03	0.417	11.9	1.4	7.10	149	
Monitor Reading (ppm): 0.0	0.5 Vol	6.98	0.417	12.0	0.5	7.60	151	
Well Casing Diameter & Material	1.0	7.00	0.419	12.1	3.4	7.51	159	
Type: 2" PVC	1.5	6.97	0.417	12.0	0.7	7.53	165	
Total Well Depth (TD): 81.00	2.0	6.98	0.417	12.1	0.4	7.50	169	
Static Water Level (WL): 4.61	2.5	6.96	0.415	12.1	0.4	7.47	171	
One Casing Volume(gal/L): 12.45	3.0	6.95	0.415	12.1	0.4	7.45	172	
Start Purge (hrs): 1005								
End Purge (hrs): 1045								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 40								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Flow Rate = 1 gpm water clear no odor or sheen

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW04I 20090402
Sample Location: 03MW04I
Sampled By: VS/CM
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4/2/09	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1110	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Rediflo-2 Pump	clear	7.30	0.346	12.1	0.4	7.07	138	

PURGE DATA:

Date: 4/2/09	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Rediflo-2 Pump	Initial	6.76	0.424	11.0	0.4	7.32	277	
Monitor Reading (ppm): 0.0	0.5 Vol	7.11	0.339	11.9	0.5	7.44	270	
Well Casing Diameter & Material	1.0 Vol	7.22	0.329	12.0	0.5	6.97	243	
Type: 4" PVC	1.5 Vol	7.19	0.345	12.0	0.4	7.05	193	
Total Well Depth (TD): 170.00	2.0 Vol	7.24	0.346	12.1	0.4	7.09	164	
Static Water Level (WL): -0-	2.5 Vol	7.29	0.346	12.1	0.4	7.10	145	
One Casing Volume(gal/L): 111.01	3.0 Vol	7.30	0.346	12.1	0.4	7.07	138	
Start Purge (hrs): 0810								
End Purge (hrs): 1110								
Total Purge Time (min): 180								
Total Vol. Purged (gal/L): 360								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

Flow rate is 2 gpm. The water was clear with no odor or sheen present

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Willow Grove JRB Site 3
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 03MW02S20090402
Sample Location: 03MW02S
Sampled By: CM/DS
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4/02/09 Time: 1210	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TBD
Method: Redi flo-2 Pump	clear	6.22	0.647	14.9	0.0	7.15	200	

PURGE DATA:

Date: 4/2/09	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: Redi flo-2 pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material Type: 2" PVC	(See Low Flow Purge Data sheet)							
Total Well Depth (TD): 46.92								
Static Water Level (WL): 12.94								
Two Screen Vol's (gal/L): 3.28								
Start Purge (hrs): 1105								
End Purge (hrs): 1205								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 4.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	6

OBSERVATIONS / NOTES:

Vertical Pump Placement = 42 feet BTOC
Flowrate 250 ml/min No draw down water clear with no odor or sheen present

Circle if Applicable:

(MS/MSD) Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Willow Grove JRB Site 3
PROJECT NUMBER: 112G00845

WELL ID.: 03MW07S20090402
DATE: 4/21/09

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Vertical Pump Placement Other Comments
1105	12.94	250	5.97	0.640	15.1	6.52	13.0	235	42 FT BTOC
1110	13.00	300	6.02	0.623	8.6	8.92	13.7	228	
1115	12.98	250	6.11	0.631	0.7	8.53	14.0	216	
1120	12.98	250	6.14	0.650	0.2	8.36	14.1	207	
1125	12.98	250	6.16	0.655	0.0	8.11	14.5	202	
1130	12.98	250	6.18	0.648	0.0	7.96	14.5	200	
1135	12.98	250	6.19	0.646	0.0	7.82	14.7	200	
1140	12.98	250	6.21	0.645	0.0	7.60	14.9	200	
1145	12.98	250	6.21	0.645	0.0	7.55	14.8	200	
1150	12.98	250	6.22	0.645	0.0	7.42	14.9	200	
1155	12.98	250	6.22	0.646	0.0	7.34	14.9	200	
1200	12.99	250	6.21	0.644	0.0	7.19	15.0	200	
1205	12.94	250	6.22	0.647	0.0	7.15	14.9	200	
1210	Sample	03MW07S20090402			MS/MSD was collected				

CALCULATIONS

SIGNATURE(S): _____

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASJRB Willow Grove
Project No.: 112G00845

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: 03IWO1 20090401
Sample Location: 03IWO1
Sampled By: VS/CM
C.O.C. No.: _____
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4/1/09	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TBD
Time: 1025	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Artesian Well	clear	6.52	0.745	12.7	0.0	6.48	273	

PURGE DATA:

Date: N/A	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	TBD
Method: N/A								
Monitor Reading (ppm): N/A								
Well Casing Diameter & Material Type: N/A								
Total Well Depth (TD): N/A								
Static Water Level (WL): N/A								
One Casing Volume(gal/L): N/A								
Start Purge (hrs): N/A								
End Purge (hrs): N/A								
Total Purge Time (min): N/A								
Total Vol. Purged (gal/L): N/A								

Artesian Well

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCL	40 ml VOA Vials	2

OBSERVATIONS / NOTES:

The well is under artesian pressure used by the golf course for irrigation. The water discharges to the unnamed tributary

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove Site 3
Project No.: 112G02014

Sample ID No.: 03MW095
Sample Location: 03MW095
Sampled By: VST
C.O.C. No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 2/17/10	Color	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~	~~Other~~
Time: 1435	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%)	ORP
Method: CROS	CLEAR	6.41	0298	11.68	1.50	8.31	—	191

PURGE DATA:

Date: 2/17/10	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	~~Other~~ ORP
Method: pump	0.5	9.89	0.328	11.32	32.8	8.32	—	141
Monitor Reading (ppm): 0	1.0	7.65	0.324	11.80	7.06	8.25	—	182
Well Casing Diameter & Material	1.5	6.93	0.310	11.74	4.38	8.28	—	188
Type: PVC 2"	2.0	6.65	0.306	11.78	2.52	8.29	—	191
Total Well Depth (TD): 33.34	2.5	6.52	0.303	11.78	0.92	8.30	—	192
Static Water Level (WL): 9.95	3.0	6.41	0.298	11.68	DNO	8.31	—	191
One Casing Volume(gal/L): 3.8								
Start Purge (hrs): 1327								
End Purge (hrs): 1435								
Total Purge Time (min): 68								
Total Vol. Purged (gal/L): 12								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl	40ml GLASS	✓9

OBSERVATIONS / NOTES:

Collected enough sample for MS/MSD

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

J Tomaszewski

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS JRB Willow Grove Site 3
Project No.: 112G02014

Sample ID No.: 03MW098 ~~DUP~~ BS
Sample Location: 03MW098 ~~DUP~~ BS
Sampled By: JST
C.O.C. No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	~~Other~~
Date: 2/17/10	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%)	ORP
Time: 1540								
Method: GRAB	cloudy	6.12	0.137	5.77	250	11.64	—	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	~~Other~~ ORP
Date: 2/17/10								
Method: PUMP	1	5.75	0.176	13.10	205	13.18	—	239
Monitor Reading (ppm): 0	3	6.12	0.137	5.77	250	11.64	—	231
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 11.80								
Static Water Level (WL): 10.85								
One Casing Volume(gal/L): 0.2								
Start Purge (hrs): 1510								
End Purge (hrs): 1540								
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): ~0.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 ml GLASS	✓ 6

OBSERVATIONS / NOTES:

INSUFFICIENT VOLUME FOR CONTINUOUS PUMPING. PUMPED DRY ALLOWED TO RECOVER TO PUMP INTAKE THEN PUMPED DRY

Circle if Applicable:

MS/MSD	Duplicate ID No.:
	DUP

Signature(s):

JS Tomaluzzo

APPENDIX D

TEST PIT DOCUMENTS

TEST PIT LOG

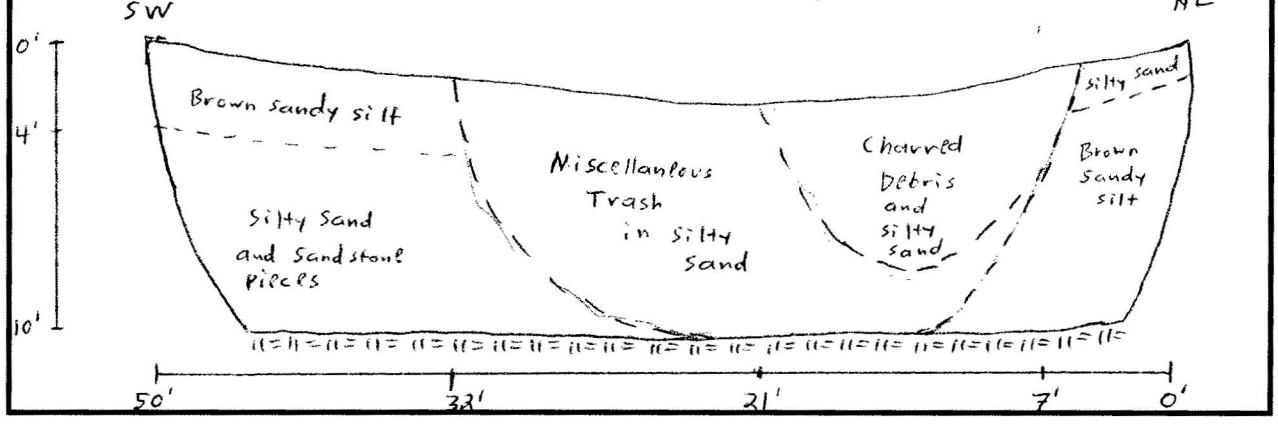
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP05
DATE: 4-30-07
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING Source (ppm)	 BZ (ppm)
		DK BRN SILTY SAND TOPSOIL	SM	MOIST, NO ODOR	0	0
1		Charred Trash, Ash, scrap metal, beer			0	0
		and soda bottles, corroded metal,			0	0
2		plastic utensils, asphalt, brick,			0	0
		ceramic, china, oil filter, electric			0	0
3		motor, vehicle headlamp, cinder blocks,			0	0
		styrofoam cups, wire spool, small			0	0
4		transformer, temporary tarmac, crushed			0	0
		empty 55-gal. drum, general shop waste			0	0
5					0	0
					0	0
6					0	0
					0	0
7			SM		0	0
					0	0
8					0	0
9					0	0
10						

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 50' long x 2.5' wide x 10' deep; Trash, charred debris encountered; No PID rdgs > Bkgd.;

PHOTO LOG:

TEST PIT LOG

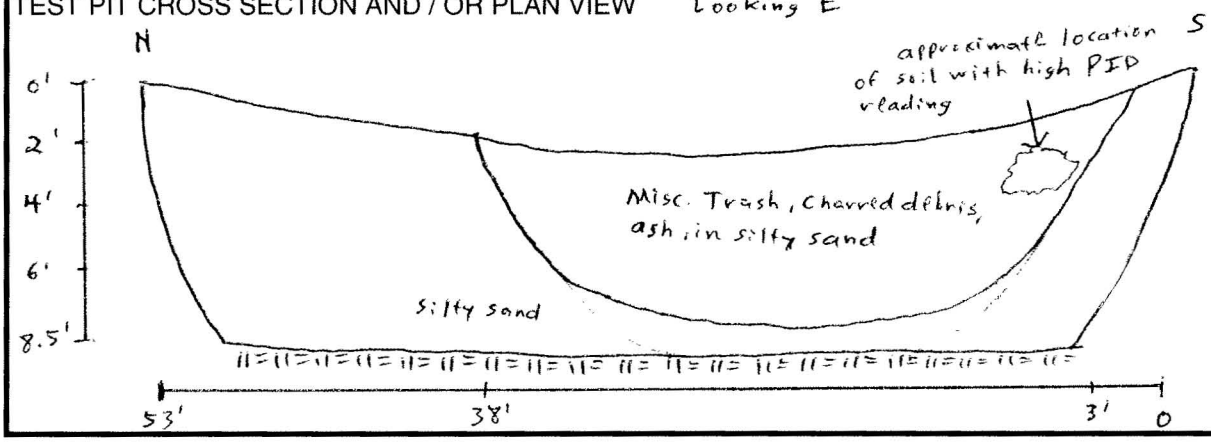
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP06
DATE: 5/10/07
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
		SILTY SAND, TRACE CLAY; MOIST.	SM		0	0
1		Miscellaneous TRASH, Charred debris, and			0	0
		ash mixed with silty sand; scrap			0	0
2		metal, crushed empty drum, muffler,		V. slight solvent	150	0
		JET engine manifold, glass fragments,		odor in small	0	0
3		china, + temporary tarmac (steel matting)		volume of soil in initial pile	0	0
		saw blade, chain, cinder blocks,		of excavated soil; no visible	0	0
4		steel post, bottles, Jars, wire,		staining or liquids	0	0
		pipe, steel cable		possibly associated with JET engine manifold.	0	0
5					0	0
					0	0
6					0	0
					0	0
7					0	0
					0	0
8					0	0
8.5					0	0
		FGR SANDSTONE BEDROCK				

TEST PIT CROSS SECTION AND / OR PLAN VIEW Looking E



REMARKS: 53' long x 2.5' wide x 8.5' deep. Elevated PID rdg (~150 ppm) encountered in small vol. of excavated soil from southern end of Pit.

PHOTO LOG:

TEST PIT LOG

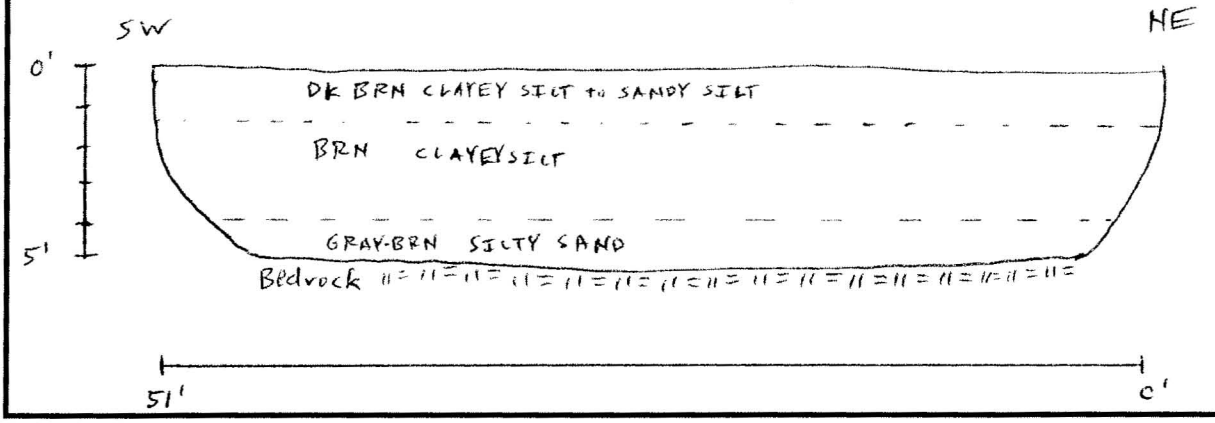
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP07
DATE: 5-2-07
GEOLOGIST: D. whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READIN Source (ppm)	 BZ (ppm)
		DK BRN CLAYEY SILT to SANDY SILT	ML	MOIST	0	0
1		SOME PLANT ROOTS		No odors	0	0
					0	0
2		BRN CLAYEY SILT, TR. to SOME SAND			0	0
					0	0
3					0	0
					0	0
4					0	0
		GRAY-BRN SILTY SAND and ROCK FRAGS	SM		0	0
5					0	0
	=11=11=	BRN-GRAY FGR SANDSTONE BEDROCK				

TEST PIT CROSS SECTION AND / OR PLAN VIEW Looking NW



REMARKS: No waste or Fill encountered; No PID vdgs. > Bkgd.
51' long x 2.5' wide x 5' deep

PHOTO LOG:

TEST PIT LOG

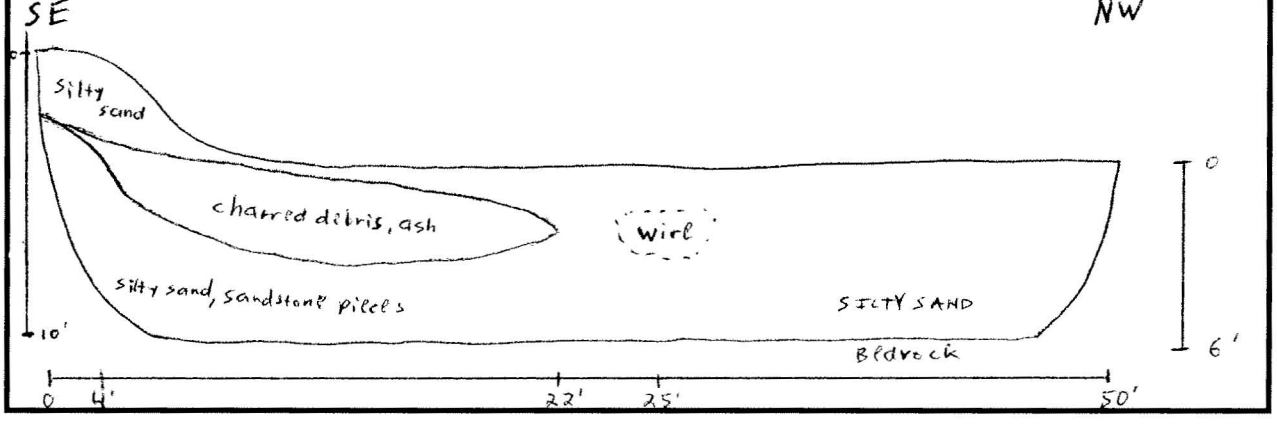
Page 1 of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP08
DATE: 5/2/07
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING Source (ppm)	 BZ (ppm)
		BRN SILTY SAND, MOIST	SM		0	0
1		MISC. TRASH, Charred debris, and		tree roots	0	0
		ash. Metal scrap, glass fragments,		throughout	0	0
2		soda and beer bottles, hose, springs,		No odors	0	0
		capacitor, temporary tarmac, china,			0	0
3		mop ringer, sonar buoy, asphalt			0	0
		pieces			0	0
4					0	0
					0	0
5					0	0
		BRN SILTY SAND			0	0
6					0	0
		FGR sandstone bedrock				

TEST PIT CROSS SECTION AND / OR PLAN VIEW Looking SW



REMARKS: Less waste on NE side of excavation; No PID rdgs. > Bkgd.
50' long x 2.5' wide x 6' to 10' deep

PHOTO LOG:

TEST PIT LOG

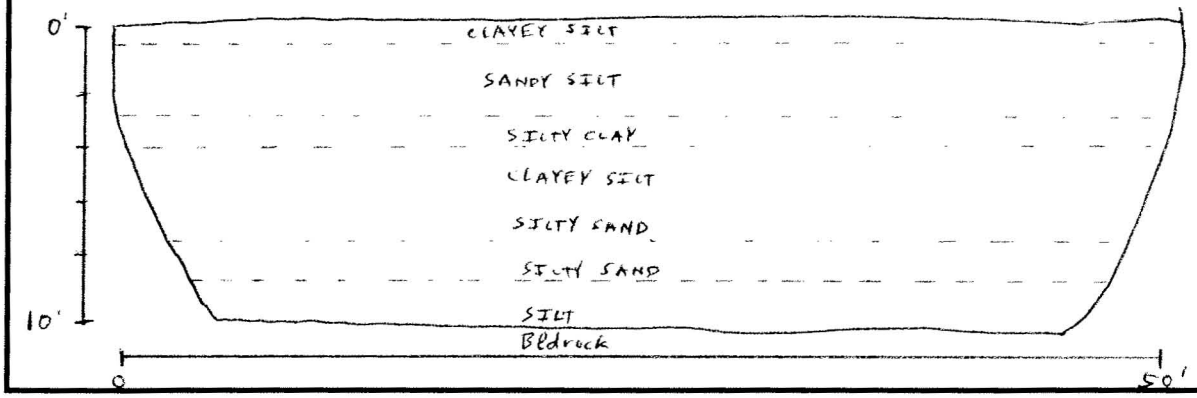
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP09
DATE: 5-2-07
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
		Dark BRN CLAYEY SILT	ML	MOIST, NO ODOR	0	0
1		BRN SANDY SILT			0	0
					0	0
2					0	0
					0	0
3					0	0
		Lt. BRN, Lt. GRY, YELLOW MOTTLED SILTY CLAY			0	0
4		RED-BRN CLAYEY SILT			0	0
					0	0
5					0	0
					0	0
6		BRN SILTY SAND, TR. CLAY			0	0
					0	0
7					0	0
8					0	0
9		BRN SILTY SAND, WEATHERED SANDSTONE FRAGMENTS			0	0
10		RED-BRN SILT and WEATHERED SILTSTONE FRAG			0	0
		SILTSTONE Bedrock				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: No WASTE or FILL encountered; No PID rdgs. > Bkgd.
weathered bedrock encountered 9.5' to 13' deep 50' long x 2.5' wide x 9-13' deep

PHOTO LOG:

TEST PIT LOG

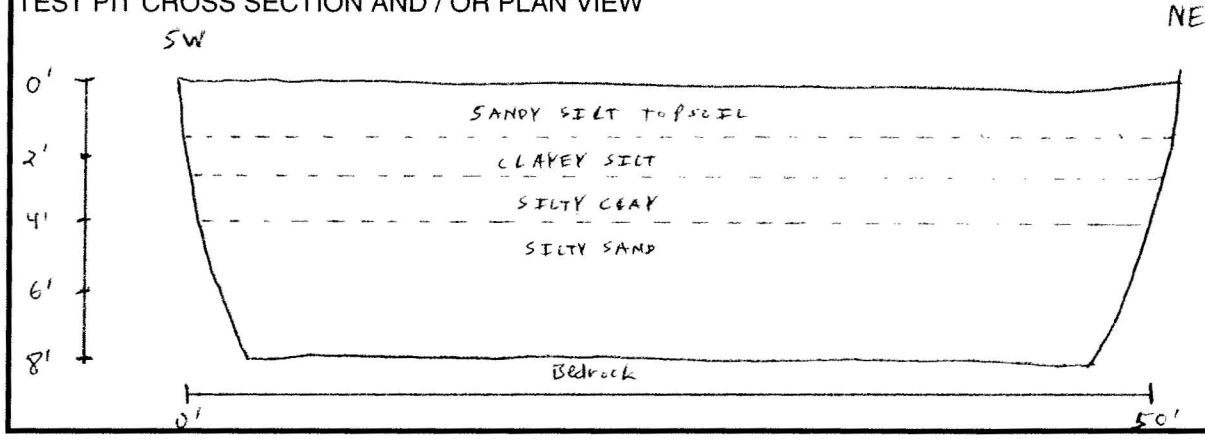
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP10
DATE: 5-3-07
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
		DARK BRN SANDY SILT TOPSOIL	ML/SM	MOIST, NO ODOR	0	0
1		↓	↓	↓	0	0
		↓	↓	↓	0	0
2		Lt. BRN CLAYEY SILT, some FGR SAND	ML	STIFF	0	0
				MOIST, NO ODOR	0	0
3		BRN SILTY CLAY		↓	0	0
			↓	↓	0	0
4		BRN SILTY SAND, TR. to some CLAY	SM	MOIST, NO ODOR	0	0
				↓	0	0
5					0	0
					0	0
6		BRN SILTY SAND and WEATHERED			0	0
		SANDSTONE FRAGMENTS			0	0
7					0	0
					0	0
8			↓	↓		
	=11=11=	BRN-GRY WEATHERED FGR SANDSTONE				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: Weathered bedrock 7' to 9' deep ; 50' long x 2.5' wide x 7' to 9' deep
No waste or fill encountered, No PID rdgs. > Bkgd.

PHOTO LOG:

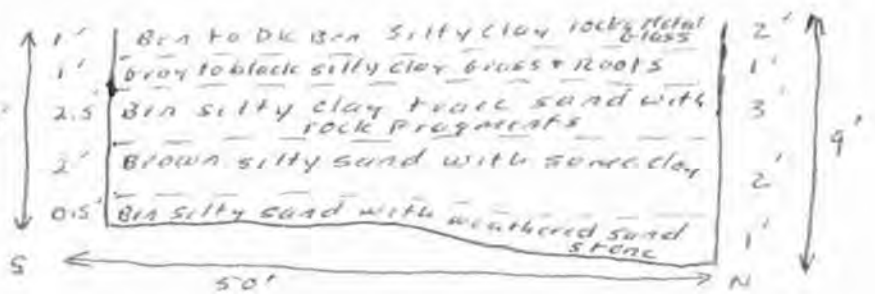
TEST PIT LOG

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP11
DATE: 05/04/07
GEOLOGIST: Chuck Meyer

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READIN: Source (ppm)	BZ (ppm)
1		Brown to Dark Brown Silty Clay		NO PID readings moist	0	0
2		with some Fill material (Rocks, Metal, Glass)			0	0
3		Gray to black silty clay with grass and roots and some pebbles		Slight Sulfur odor NO PID	0	0
4		Brown silty clay trace sand and		Moist NO	0	0
5		rock Fragments		PID or odors	0	0
6		↓		Present	0	0
7		Brown silty sand some clay		Moist No PID	0	0
8				or odors present	0	0
9		Brown silty sand with weathered sandstone Gray to Gray brown		Dry No PID or odor	0	0

TEST PIT CROSS SECTION AND / OR PLAN VIEW



1125 Test Pit 03TP11 was begun

REMARKS: 1155 Sample 03TP11-0304-01 collected 15 Feet North of south wall
1235 Sample 03TP11-0405-02 collected 32 feet North of South wall MS/MSD

PHOTO LOG:

1310 Test Pit 03TP11 was completed
1320 Test Pit 03TP11 began Back Fill
1415 Back Filling of 03TP11 was completed

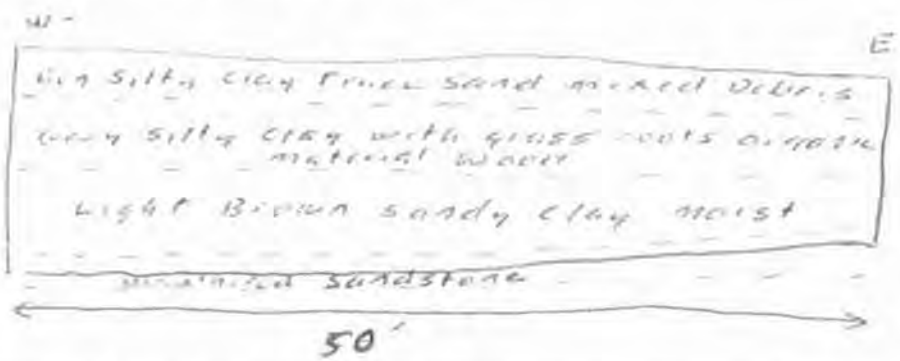
TEST PIT LOG

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP12
DATE: 5/4/07
GEOLOGIST: Chuck Meyer

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
0		Brown Silty Clay Trace Sand		Moist with	0	0
2		With mixed Fill Metal Glass		NO PID or	0	0
3	- - -	Wire auto parts		odor	0	0
4		Gray Silty Clay with grass		Moist NO PID	0	0
5	- - -	roots organic material wood		Sulfur odor	0	0
6		Light Brown Sandy Clay		Moist no odor	0	0
7				no PID reading	0	0
8					0	0
9		Gray to Brown Weathered Sand Stone Frag			0	0
	11=11.2					

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 0755 Test Pit Began
Sample 03TP12-0405-01 Taken 15 Feet East of Eastern end of the test pit at 4-5 feet Sample 03TP12-0304-02 Taken 35 ~~Feet East of the Eastern test pit end 03TP12-0406-03~~ was taken 27 Feet East of Eastern test Pit end

PHOTO LOG:

0925 Test Pitting completed
0935 Backfilling test pit was begun
1045 Back filling test pit was completed

TEST PIT LOG

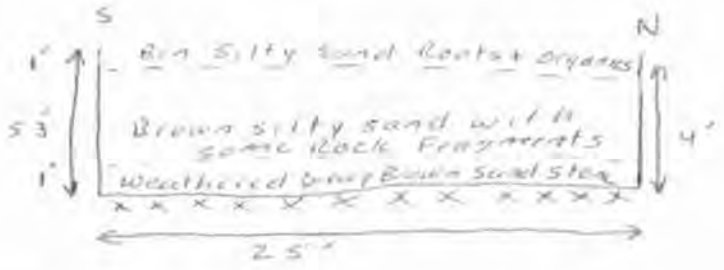
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP13
DATE: 5/4/07
GEOLOGIST: Chuck Meyer

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		Brown silty sand Topsoil with roots+organics			0	0
2		Brown silty sand with some			0	0
3		Rock Fragments			0	0
4					0	0
5		Gray Brown weathered sandstone			0	0

TEST PIT CROSS SECTION AND / OR PLAN VIEW



1500 Test Pit 03TP13 was begun

REMARKS: Sample 03TP13 0203-01 collected by CM from 3 to 4 Feet Sample brown silty sand with rock Fragments No waste was observed all native soil

PHOTO LOG:

1525 Test Pit 03TP13 was completed to 5 Feet backfilling was begun

1545 Back Filling of 03TP13 was completed

TEST PIT LOG

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP14
DATE: 05/04/07
GEOLOGIST: Chuck Meyer

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READIN: Source (ppm)	BZ (ppm)
1		Brown to Dark Brown Silty Clay		Moist with	0	0
2		with roots grass and Fill		no PID or	0	0
3		Material Metal Glass Ceramics		odors Present	0	0
4		Gray to Black silty clay with roots		Moist with roots and grass	0	0
5		Brown Silty clay with some		moist with no	0	0
6		Rock Fragments		PID or odors present	0	0

TEST PIT CROSS SECTION AND / OR PLAN VIEW

1555 Test Pit 03TP14 was begun

REMARKS: 1610 sample 03TP14-0203-01 was collected from 2-3 feet the sample was a dar brown silty clay with fill material

PHOTO LOG:

1615 Test Pit 03TP14 was completed backfilling was begun

1630 Backfilling of 03TP14 was complete

TEST PIT LOG

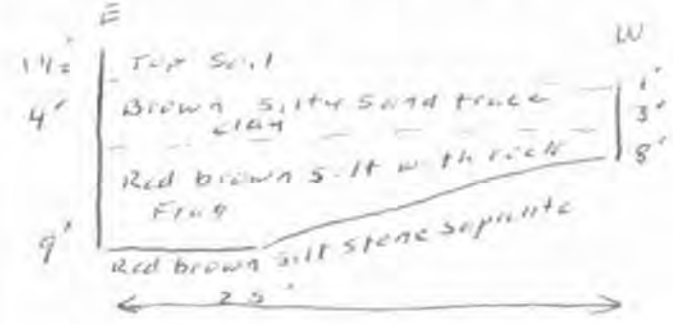
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP15
DATE: 5/7/07
GEOLOGIST: Chuck Wright

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
1		Brown Top Soil Silty Sand Roots		Roots & other organics	0	0
1.5				moist	0	0
1.5		Brown silty sand trace clay		Fine Roots	0	0
2.5		some small pebbles		moist	0	0
3.0				No odor	0	0
4.0					0	0
5.6		Red brown silty clay with		Rock Fragments	0	0
6.0		Rock fragments		moist	0	0
7.0				no odor	0	0
8.0					0	0
9.0		Red Brown silty clay Rock Frag			0	0
		Saprolite Red brown silt stone				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



0910 Test Pit began

REMARKS: Sample 03TP15-0.0-0.5-01 was collected by me from 4-5 feet 15 feet from western end of test pit

1005 Test Pit Back Filled

PHOTO LOG:

1030 Back filling to 03TP15 was completed

TEST PIT LOG

Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP16
DATE: 5/7/07
GEOLOGIST: Chuck Mills

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READIN: Source (ppm)	BZ (ppm)
1		Brown Sandy clay with trace		Moist with Roots No PID	0	0
2		Silt some rock fragments		Moist No odor No PID	0	0
3		and roots		Moist No odor No PID	0	0
4		Weathered sandstone		Dry No odor No PID	0	0

TEST PIT CROSS SECTION AND / OR PLAN VIEW

1230 03TP16 was begun

REMARKS: 1230 sample 03TP16-0102-01 + DUP-02 was collected by CM from 1-2 feet. The sample was a brown sandy clay trace silt and NO PID readings

PHOTO LOG:

1300 Test Pit was complete backfilling was begun

TEST PIT LOG

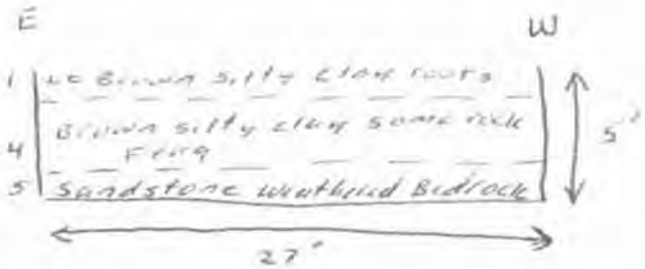
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP17
DATE: 5/7/07
GEOLOGIST: Chuck Meyer

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
1		LT Brown Silty clay trace sand		Moist Roots Organic Matter	0	0
2		Brown Silty clay trace sand		Moist no odor	0	0
3		some Rock Fragments		Moist no odor	0	0
4		Brown sandy clay Sandstone		Moist to dry no odor	0	0
5		Sandstone Weathered bedrock		Dry no odor	0	0
	11=11=					

TEST PIT CROSS SECTION AND / OR PLAN VIEW



1450 TP-17 was begun

REMARKS: 1510 Sample 03TP17-0304-01 was collected from 3 to 4 feet was a brown sandy clay soil

PHOTO LOG:

1525 TP-17 was completed total dipth was 5 feet west to east

1530 Back filling of TP-17 was begun

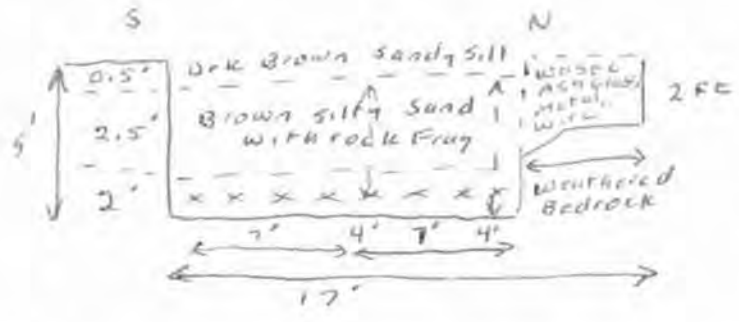
TEST PIT LOG

Tetra Tech NUS, Inc.

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: 2192
LOCATION: Site 3
TEST PIT NUMBER: 03TP18
DATE: 5/8/07
GEOLOGIST: Chuck Meyer

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
0.5	- - -	Brown Sandy silt roots vegitation			0	0
1.0		Brown silty sand no PID			0	0
2.0		reading waste material costing			0	0
3.0	- - -	End of trench Glass ash metal wire			0	0
4.0		Sandy silt with sandstone			0	0
5.0		Fragment going to weathered bedrock			0	0
	= = =					

TEST PIT CROSS SECTION AND / OR PLAN VIEW



Ordnance found at 17 feet east of western end of trench in 2 foot layer of charred material glass ash metal wire

1035 Operations stopped due to ordnance find by EM

1005 Test Pit 03TP18 was begun

REMARKS: 1025 Samples 03TP18-0203-01 + 03TP18-0203-04 (Dup-03) with an assigned time of 1045 were collected by EM from 2-3 Feet

PHOTO LOG:

1430 Test Pit 03TP18 was begun backfilling.

TEST PIT LOG

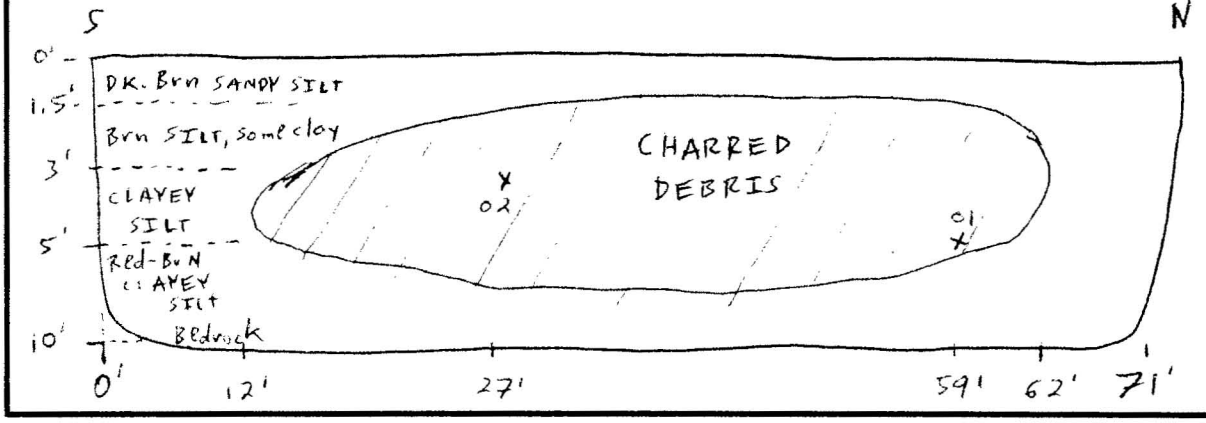
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP19
DATE: 1-12-09
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
0		Dark Brown SANDY SILT	SM	moist		
1.5					0	0
		Brown SILT, some CLAY	ML			
					0	0
		Debris: Concrete pieces, charred				
		wood, Marsden matting,			0	0
		bottles, china, scrap metal,				
		pipe, car wheel			0	0
					0	0
		Groundwater (perched)		WET		
		at ~7'			0	0
8'						
		Red-Brn CLAYEY SILT	ML		0	0
10		Bedrock				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 1495 collect sample 03TP19-0607-01
1440 collect sample 03TP19-0504-02

PHOTO LOG:

TEST PIT LOG

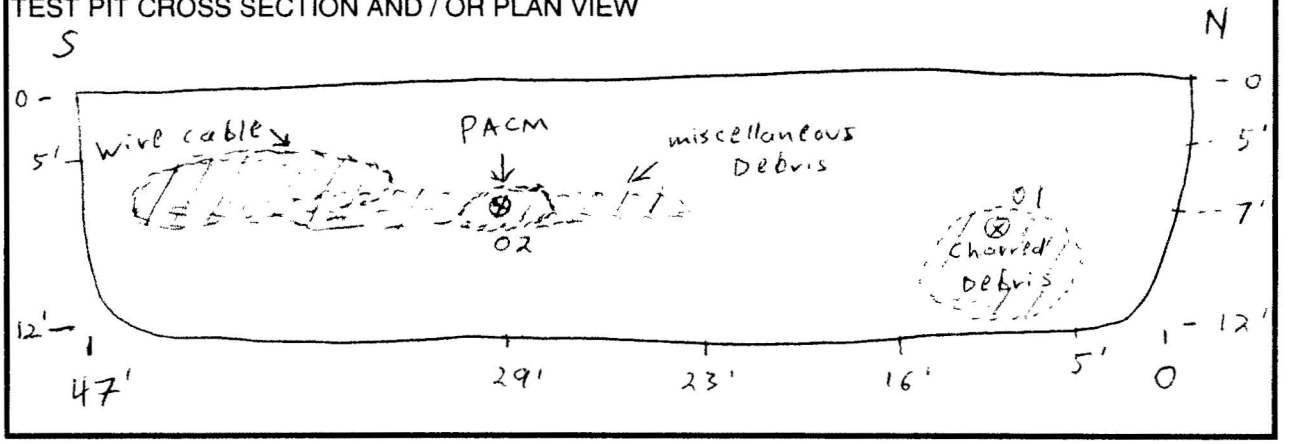
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP20
DATE: 1-12-09
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
0						
1		Brown CLAYEY SILT	ML	Moist	0	0
					0	0
5		steel cable, bottles, concrete, metal				
		Tiles (possibly asbestos containing material)			0	0
		Brown to Reddish Brown sandy				
		to CLAYEY SILT	ML		0	0
7'		charred debris: glass, metal,			0	0
		ceramic fragments				
					0	0
12					0	0
	TD-12'					

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 0940 collect sample 03TP20-0708-01
1030 collect sample 03TP20-0506-02

PHOTO LOG:

TEST PIT LOG

Page ___ of ___

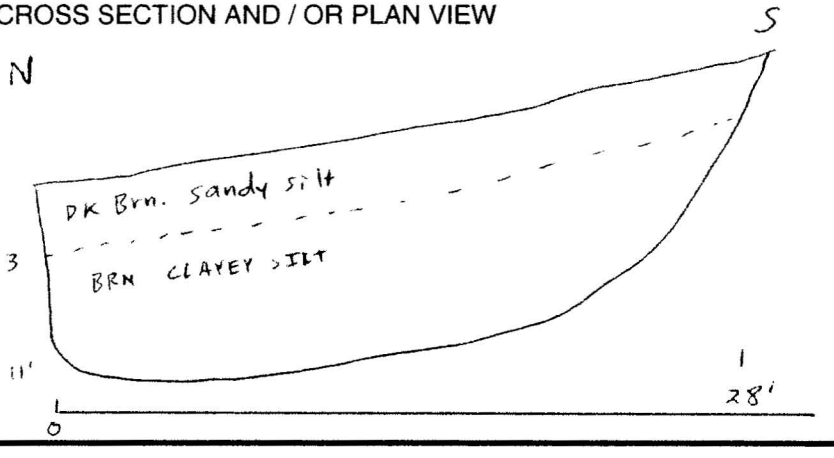
Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3

TEST PIT NUMBER: 03TP21A
DATE: 1-12-09
GEOLOGIST: D. Whalen

Depth (Ft.) 0	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READIN Source (ppm)	 BZ (ppm)
1		Dark Brown SANDY SILT	ML	moist	0	0
3		CLAYEY SILT	ML	stiff	0	0
5					0	0
7					0	0
9					0	0
11					0	0
	TD = 11'					

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: No waste encountered; NO SAMPLE collected.

PHOTO LOG:

TEST PIT LOG

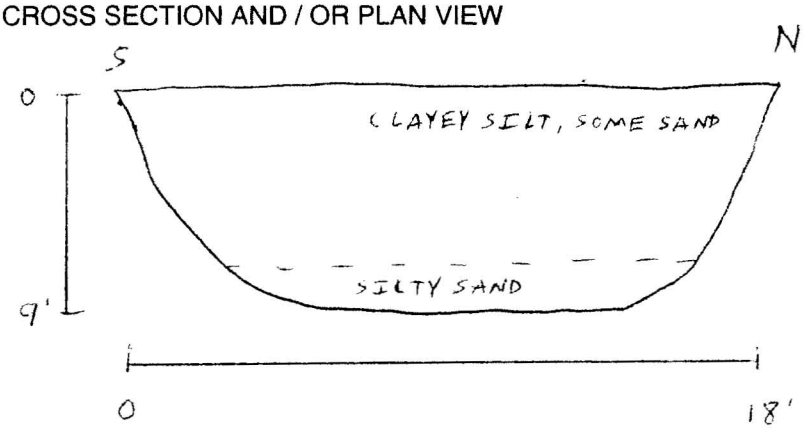
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03 TP21B
DATE: 1-12-09
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
0						
1		CLAYEY SILT, SOME SAND	ML	MOIST, NO ODOR		
2					0	0
3						
4					0	0
5						
6					0	0
7						
8		SILTY SAND	SM		0	0
9						

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: No waste encountered; NO sample collected.

PHOTO LOG:

TEST PIT LOG

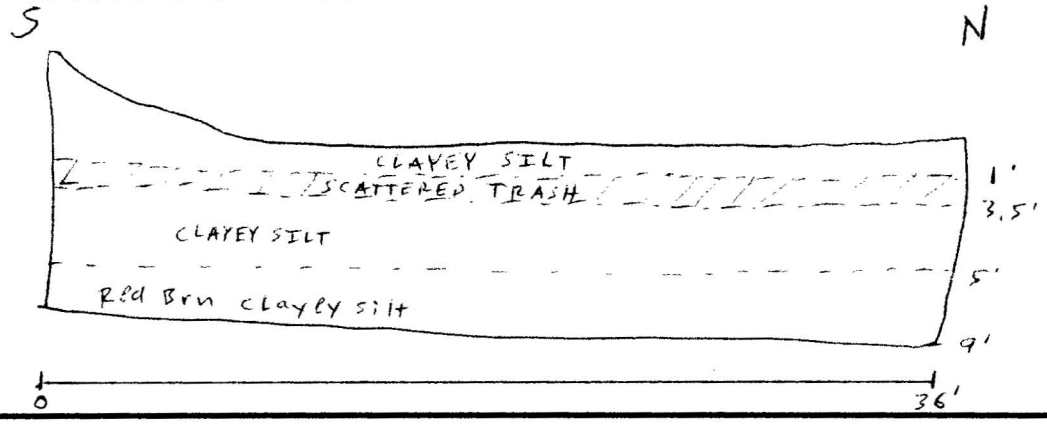
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP22
DATE: 1-14-09
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
0						
1		Brown CLAYEY SILT, some SAND	ML	Moist	0	0
2		scattered trash: plastic, styro-				
		foam, bottles in Brn SILTY SAND			0	0
		BRN CLAYEY SILT			0	0
					0	0
5		red BRN CLAYEY SILT				
					0	0
7		red CLAYEY SILT				
					0	0
9						
		Red SILTSTONE, weathered				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: No sample collected

PHOTO LOG:

TEST PIT LOG

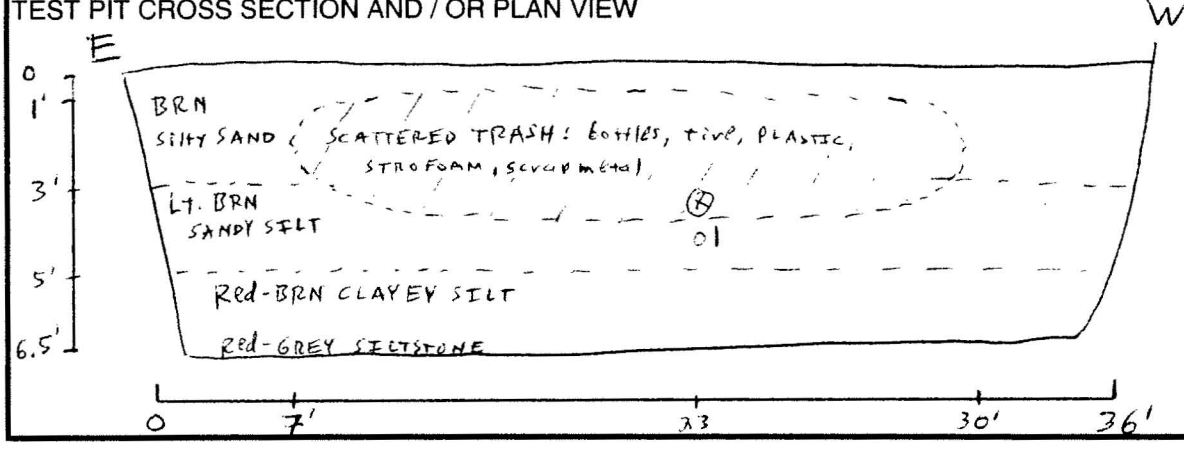
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP23
DATE: 1-13-09
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING Source (ppm)	 BZ (ppm)
0						
1		BROWN SILTY SAND	SM	MOIST	0	0
		SPARSE LAYER of TRASH: Bottles, TIRE,			0	
		Rubber MATT, PLASTIC, STYROFOAM, Scrap metal			0	0
		Lt. BRN SANDY SILT			0	
		↓	↓		0	
		↓	↓		0	0
5		Red-BRN CLAYEY SILT	ML		0	
		↓	↓		0	
		↓	↓		0	0
6.5		↓	↓	↓	0	
		Red-GRAY WEATHERED SILTSTONE	↓			

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 1350 Collect Sample 03TP23-0304-01

PHOTO LOG:

TEST PIT LOG

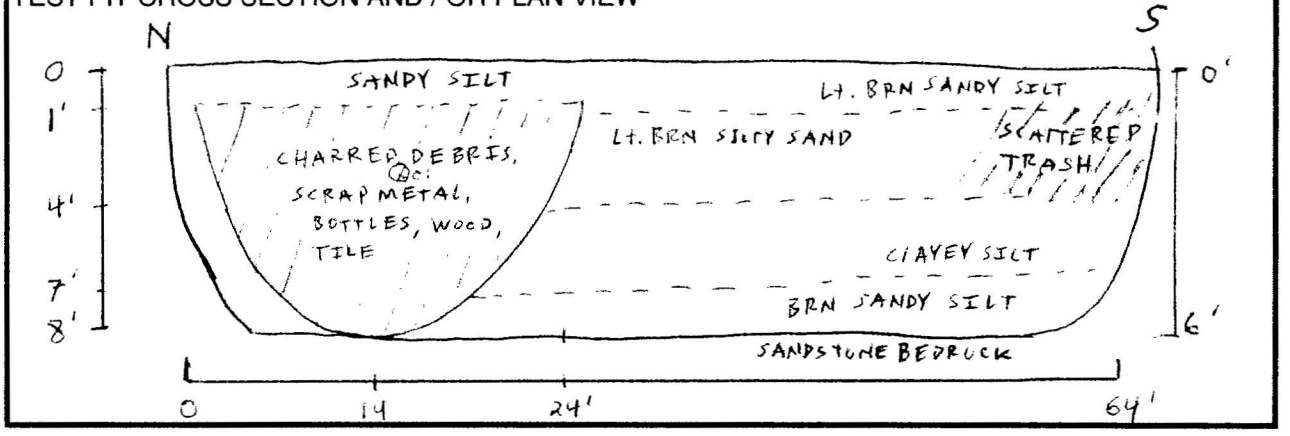
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP24
DATE: 1-13-09
GEOLOGIST: D. Whalen

Depth (Ft.) 0	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
		Lt. BROWN SANDY SILT	SM	MOIST		
					0	0
1		CHARRED TRASH; Bottles, pipe,				
		Tile, charred wood, light bulb,			0	0
		scrap metal.				
		SILTY SAND to			0	0
		SANDY SILT				
					0	0
4		CLAYEY SILT	ML		0	0
					0	0
7		SANDY SILT				
8					0	0
		Bedrock				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 1210 Collect sample 03TP24-0304-01

PHOTO LOG:

TEST PIT LOG

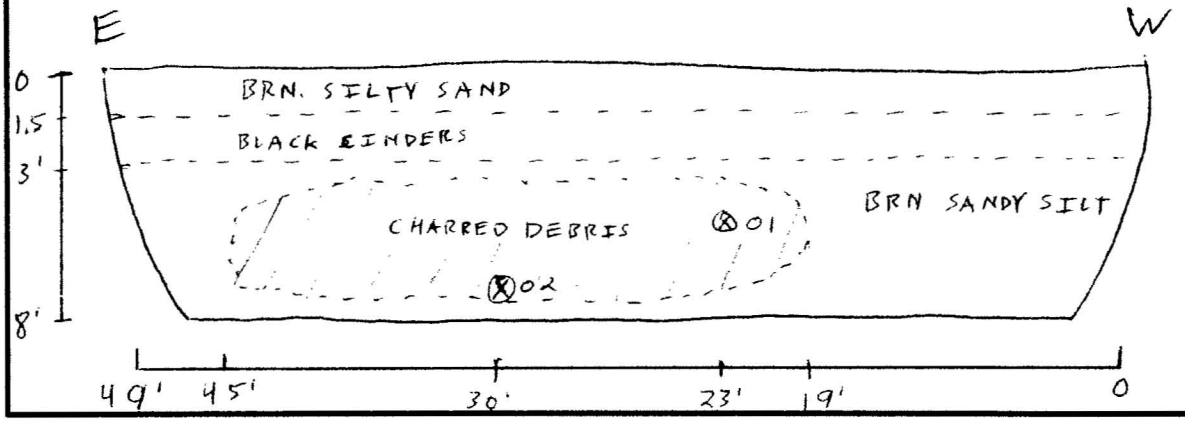
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP25
DATE: 1-13-09
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
0						
		Brown SILTY SAND	SM	MOIST	0	0
1.5		BLACK CINDERS/SLAG			0	0
3		Brown SANDY SILT				
		Charred debris: bottles, cans,		soil had		
		scrap metal, wire, cinders,		strong solvent	~500	0
		pipe, crushed drum remnants,		odor ~5',	↓	
		charred wood		possibly associated		
		↓		with crushed		
				drum, no staining	↓	0
7				observed		
				Perched water		
		↓		~7'		
8						0
		SANDSTONE Bedrock				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 0755 collect sample 03TP25-0506-01 (PID = 500 ppm)
0950 collect sample 03TP25-0607-02

PHOTO LOG:

TEST PIT LOG

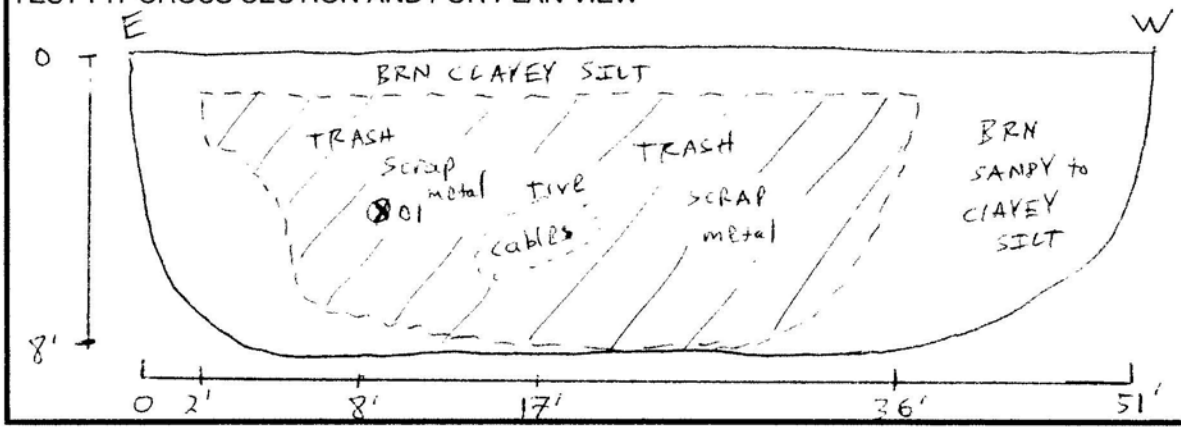
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP26
DATE: 1-14-09
GEOLOGIST: D. Whalen

Depth (Ft.) 0	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
1		Brown CLAYEY SILT	ML	MOIST	0	0
2		TRASH consisting of:				
		scrap metal, styro foam,			0	0
		Tire, pipe, wire,				
		rubber, ceramic			0	0
		empty crushed drum				
		Marsden matting,			0	0
		plastic wrapping, reinforced				
		concrete, shampoo bottle,			0	0
		beer bottles, cable in				
		Brown sandy SILT to silty			0	0
		SAND				
					0	0
8'		BEDROCK (GRAY SANDSTONE)				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 1045 Collect sample 03TP26-0506-01

PHOTO LOG:

TEST PIT LOG

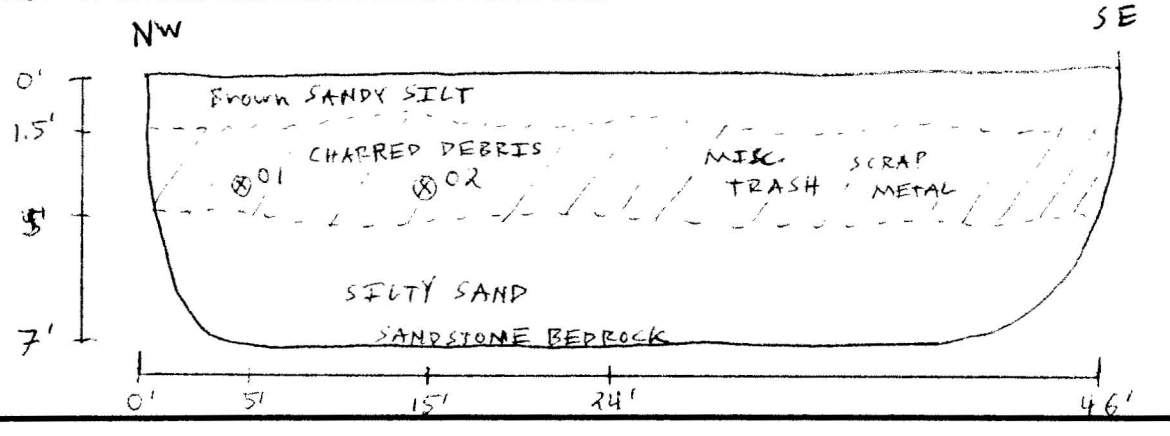
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP27
DATE: 1-15-09
GEOLOGIST: D. Whalen

Depth (Ft.) 0	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1'		Brown SANDY SILT	SM	MOIST	0	0
2	-----	SCRAP METAL				
		miscellaneous trash - bottles,			0	0
		styrofoam, crushed empty				
		drums, china, metal pipe,			0	0
		Marsden matting, aluminum				
		cans, plastic sheeting			0	0
6		BROWN SILTY SAND/SANDY SILT			0	0
7		SANDSTONE			0	0
	=:=:=:=	BEDROCK				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 0800 collect sample 03TP27-0304-01
0830 collect sample 03TP27-0304-02

PHOTO LOG:

TEST PIT LOG

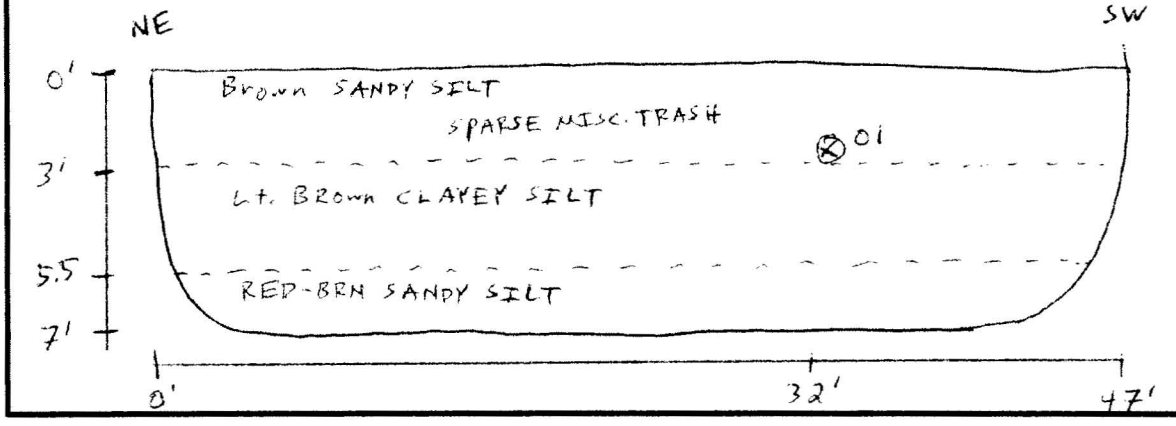
Tetra Tech NUS, Inc.

Page ___ of ___

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP28
DATE: 1-15-09
GEOLOGIST: D. whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
0						
1		Brown SANDY SILT	SM	Moist	0	0
		Sparse Trash - metal scrap,			0	0
		plastic, partially charred wood,				
		pipe, ceramic, rubber			0	0
3		Light Brown CLAYEY SILT	ML		0	0
5.5		RED-BROWN SANDY SILT			0	0
7		SANDSTONE BEDROCK			0	0

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: 1115 collect Sample 03TP28-0203-01

PHOTO LOG:

TEST PIT LOG

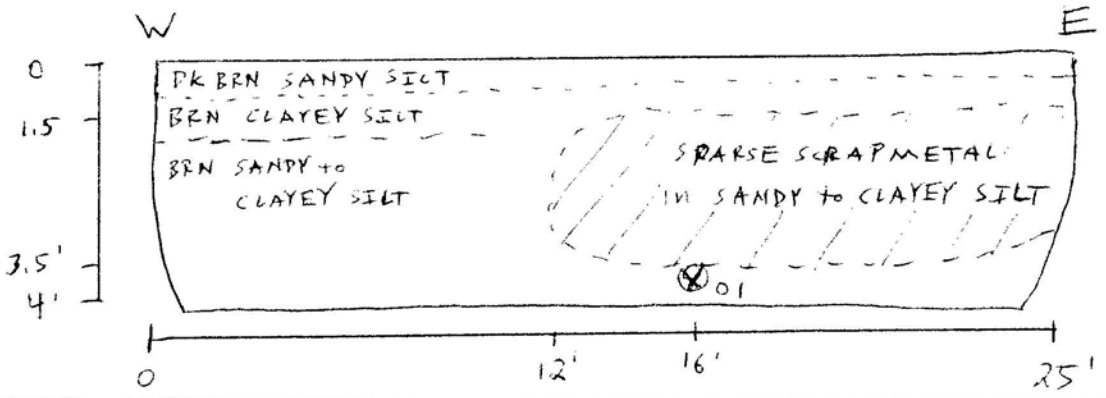
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP29
DATE: 1-14-09
GEOLOGIST: D. Whalen

Depth (Ft.) 0	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
1	-----	Dark Brown SANDY SILT	SM	MOIST	0	0
		BROWN CLAYEY SILT	ML	NO ODOR		
					0	0
1.5	----	Sparse waste/scrap metal				
		Temporary tarmac, cables,			0	0
		electric cabinet, tire				
		in SANDY to CLAYEY SILT			0	0
3.5	----					
		Brn SANDY to CLAYEY SILT	ML		0	0
4				▽		
	TD=4'					

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: Collect sample 03TP29-0304-01

PHOTO LOG:

TEST PIT LOG

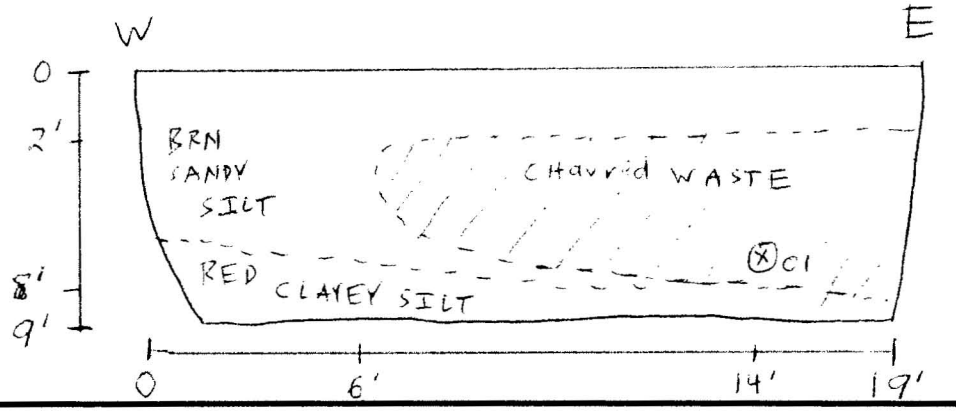
Page ___ of ___

Tetra Tech NUS, Inc.

PROJECT NAME: Site 3 LF Delineation
PROJECT NUMBER: 00845
LOCATION: Willow Grove Site 3
TEST PIT NUMBER: 03TP30
DATE: 1-14-09
GEOLOGIST: D. Whalen

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	BZ (ppm)
1		Brown SANDY to CLAYEY SILT	SM/ML	MOIST	0	0
		↓		↓		
2	----	↓			0	0
		Black charred waste -				
		soda bottles, scrap metal			0	0
		corroded metal scrap,				
		machinery parts, pipes,			0	0
		melted bottles, wire				
		↓			0	0
8	----	↓			0	0
		Red BROWN SILTY CLAY				
9				↓	0	0
	T.D = 9'					

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: Collect sample 03TP30-0506-01

PHOTO LOG:

APPENDIX E

EM SURVEY REPORT

Geophysical Survey Results

NAS JRB Willow Grove Site

Willow Grove, Pennsylvania

May 12, 2008

Prepared for:

Tetra Tech NUS, Inc.
234 Mall Boulevard, Suite 260
King of Prussia, Pennsylvania
19406-1433

Prepared by:

ADVANCED GEOLOGICAL SERVICES
3 Mystic Lane
Malvern, PA 19355

AGS Project No. 08-195-7

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1.0 Introduction

This report presents the findings of a geophysical investigation that was completed at the Naval Air Station Joint Reserve Base (NAS JRB) in Willow Grove, Pennsylvania. Currently, the Navy is conducting remedial investigations (RI) at two Installation Restoration (IR) program sites at the base, and further non-intrusive subsurface information is required to add to the site databases. The two sites include the Ninth Street Landfill (NSL) site and the Site Screening Area 12 (SSA12) site, which is comprised of two adjacent survey areas. The Ninth Street Landfill area is approximately 800 feet long by 500 feet wide (9.2 acres), and the terrain is gently-dipping to the west-northwest. There are several gullies, hummocks, and a shallow drainage swale that runs through the southwestern part of the site. There is a large playing field, picnic area, and wooded / vegetated section that are found at this location. This area was known to have received miscellaneous waste materials in the past, and recent trenching activities (May 2007) have confirmed this fact.

The SSA12 site includes two adjacent areas that are separated by a chain-link fence near the airfield. AGS has designated these areas as the SSA12 (Southwest) and the SSA12 (Northeast) for this report. The southwest area is approximately 800 feet long by 750 feet wide (13.8 acres), and the northeast area is 600 feet long by 200 feet wide (2.8 acres). Historic information has indicated that this area served as a waste disposal site, as well. AGS conducted this investigation during the period of April 7 through 11, 2008.

2.0 Objectives

The primary objective of the survey was to investigate the results of past landfill activities that may have altered the terrain in the survey areas. The specific purpose of the survey was to locate potential buried waste materials and to delineate the lateral extent of these materials. Some physical evidence of waste dumping is present in the form of suspicious mounds, linear depressions, and debris at the ground surface. In addition, areas of historical landfill activity are documented that required further investigation using geophysical methods. It is our understanding that some of the anomalies detected in our survey may be investigated at a later time with excavations or test pits.

3.0 Geophysical Investigation

3.1 Methodology

The electromagnetic conductivity (EM) method was chosen as the primary technique for meeting the project objectives. AGS anticipated that a strong or measurable electrical contrast would exist between native soils and areas containing buried metallic and non-metallic waste materials, buried 55-gallon storage drums, buried utilities, and

areas where subsurface conditions have been altered through the years.

The electromagnetic (EM) method uses the principle of electromagnetic induction to measure the variability of electrical conductivity of subsurface materials. Significant contrasts in the electrical properties between non-indigenous materials and surrounding soil enable accurate delineation of fill, buried materials, and air spaces. The large EM response to metal and waste materials makes this technique particularly well suited to identifying buried metal objects such as USTs, buried drums, pipelines, reinforced building foundations, or other metal components of buried structures, as well as wastes that possess a different electrical character than the surrounding soils. It is, however, equally sensitive to metal objects on the ground surface, and it is important to take careful field notes that indicate the position of surface metal to avoid mis-interpretation.

The EM-31 ground conductivity meter by Geonics was used to measure the presence of buried metal objects such as USTs, and to determine the electrical conductivity of the underlying soils. The EM-31 is a one-man, portable system that induces a sinusoidal, 9.8 kilohertz (kHz) signal into the ground. The transmitted signal induces eddy currents into the subsurface materials, which, in turn, generate a secondary magnetic field that is measured by the receiver coil. Two measurements are recorded at each station point; the in-phase response, which is measured in parts per thousand (ppt), and the quadrature response, which is measured in milliSeimens per meter (mS/m). For the interpretation of high-conductivity targets such as USTs, the in-phase response is more discriminative, although both modes are affected. Lower contrast targets such as clay layers, contaminant plumes, and waste disposal areas are better indicated with the quadrature response. The EM data can be viewed in contour or profile format, or the data can be acquired in a scan mode. AGS used a Trimble ProXRS Global Positioning System (GPS) concurrently with the EM31 survey.

3.2 Data Acquisition and Analysis

AGS completed a site walkover with Tetra Tech personnel prior to the initiation of the geophysical survey. The survey boundaries were shown to AGS field personnel, specific objectives of the investigation were re-iterated, and the schedule for completion of the work was discussed.

The field procedure for the EM survey involved (1) equipment setup, (2) before survey calibration and equipment checkout, (3) test run completion, and (4) production profile recording, where required. The EM data were collected at one second intervals along traverses spaced from 5-10 feet apart, depending on site conditions. The time interval corresponded to data stations spaced approximately every 2.5 feet along each traverse. The EM instrument was coupled with a Trimble Pro-XR global position system (GPS) such that each EM data point was assigned a corresponding GPS coordinate. This

equipment arrangement provided an accurate indication of existing subsurface conditions. The data were downloaded to a field computer and processed to provide preliminary EM quadrature and in-phase contour maps to assess data quality and to perform preliminary interpretations.

4.0 Survey Results and Interpretation

The geophysical survey results are presented on Figures 1 through 3 of this report. Figure 1 is an EM in-phase map of the NSL area, Figure 2 is an EM in-phase map of the SSA12 (Southwest) area, and Figure 3 is an in-phase map of the SSA12 (Northeast) area. AGS has annotated the significant anomalies on the maps, and have overlain the locations of various site features on the maps, in order to provide points of reference for future activities. AGS collected GPS data over the site features following our EM survey. A discussion of the buried anomalies and targets detected in this investigation is included in the following sections.

4.1 Ninth Street Landfill

Figure 1 shows the EM in-phase responses from the NSL area. AGS detected three large areas that indicated the presence of possible buried waste materials. These areas have been labeled in red as "A", "B", and "C" on the map, and the approximate extent of each area has been outlined with a red dotted line. Area "A" is located in the southwestern part of the survey area and its dimensions are approximately 400' long by 50' wide. It is a linear feature that runs from the northwest to the southeast, and possesses very strong EM signatures. The anomalous responses are both positive and negative, which is a function of the composition of the buried materials, amount and position of the buried materials, and the combined affects of the buried materials. The southeastern part of Area “A” does not possess the strong EM responses observed in the remaining sections of the anomaly, which suggests that the amount of buried metal is less here.

In the field, AGS noted the presence of a linear surface depression, which is coincident with Area “A”, where exposed metal debris was observed. The depression is approximately 110 feet long by 25 feet wide. A portion of this EM anomaly is due to the exposed metal debris in the surface depression, and the remaining part of the EM anomaly is due to buried metal objects, presumably within flat, re-graded areas that extend beyond the limits of the surface depression to the northwest and southeast. Based on the EM responses, surface topography, and observed debris, it is apparent that a man-made trench was constructed in the past, and debris was dumped into the trench at a later time.

Area "B" is an irregularly-shaped part of the survey area that is located to the northeast of Area “A”. This anomaly is approximately 200 feet long by 160 feet wide, and is located in an open, accessible landscape. Anomalies in Area “B” exhibit moderately-

strong, discontinuous EM responses that are evenly dispersed throughout the area limits. The character of these anomalies is very different from that of Area “A”, in that the responses are more subdued and of lower magnitude. Although the data indicates that dumping has probably occurred here, it appears that a lower amount of metal debris is present. AGS believes that the dominant wastes in Area “B” are more non-metallic in nature, and that they are spread out more thinly over its extent. The boundaries of this anomaly are well-defined on the EM contour map.

Area "C" is located to the southeast of area "B", next to the open grass field and exercise stations. It is approximately 140' long by 50' wide, and runs parallel to the access road. Some surface debris was observed within area "C", as shown on the map, however, it appears that an additional, significant amount of buried debris is also present beyond the surface materials. The EM responses are very strong here, which suggests that buried metal is present.

AGS detected two discrete, unknown anomalies in the northern part of the survey area. Unknown anomaly 1 is located between the volleyball court and the playground. It strongly suggests the presence of buried metal, as indicated by the high-magnitude EM responses. A second discrete, unknown anomaly, Anomaly 2, was found in a sparsely-wooded area to the southwest of the volleyball court. It exhibits moderately-strong EM values and covers an area of approximately 20' by 20'. Again, it appears that some buried metal is present at this location. AGS found two 55-gallon drum carcasses near the northern extent of area "A". Their locations are shown as a magenta "x" on the map.

Numerous man-made items at the ground surface caused anomalous EM responses. These included the sheds, playground, picnic tables, bike rack, discarded wire rope, and other miscellaneous objects.

4.2 Site Screening Area 12 (Southwest)

Figure 2 shows the EM in-phase responses from the SSA12 (Southwest) area. AGS detected four large areas that indicated the presence of buried waste materials. These areas have been labeled in red as "A", "B", "C", and "D" on the map, and the approximate extent of each area has been outlined with a red dotted line. Area "A" is located in the northwestern part of the survey area and its dimensions are approximately 80' long by 60' wide. It is an irregularly-shaped feature that possesses very strong EM signatures (both positive and negative). A portion of this anomaly is due to exposed metal debris, and the remainder is due to buried metal objects.

Area "B" is the most significant anomalous area observed on the map. It is an irregularly-shaped anomaly that exhibits strong deviations from the background values of approximately -0.5 to 0 ppt. It is approximately 250' long by 80' wide, and is oriented in a southwest-to-northeast manner. This area exhibits moderately-strong,

discontinuous EM responses, which suggests the presence of miscellaneous debris or waste materials. It appears that the area contains both metallic and non-metallic debris. The boundaries of area "B" are very well-defined.

Area "C" is located to the southeast of area "B", next to a large area of dense vegetation. It covers an area that is approximately 85' long by 50' wide, and exhibits very strong, negative in-phase values, which indicate buried metal sources. Some surface debris was observed within area "C", however, it appears that an additional, significant amount of buried debris is also present.

Area "D" is a smaller anomalous area to the north of areas "A" and "B". It is approximately 40' long by 20' wide, but strong EM responses are present that indicates the presence of metallic debris. It is between two densely-vegetated areas.

AGS detected six, strong, linear anomalies in the southern part of the survey area. Linear anomalies 1 through 4 are located near the southern boundary and are roughly parallel to one another. They are oriented in a southeast-to-northwest manner. Based on the EM signal strength, position, and orientation, it appears the anomalies may be related or have a similar nature and purpose. The EM responses suggest that these features are former buried trenches with possible piping. Linear anomalies 5 and 6 run roughly perpendicular to anomalies 1 through 4. Both are approximately 250' long, and appear to be related to anomalies 1 through 4. AGS believes these anomalies are due to trenches, as well. Anomaly 5 is somewhat wider than anomaly 6.

AGS detected numerous, discrete, man-made items that were both buried, and located at the ground surface. They appear as small, closed-contours on the EM map. They represent a minor amount of metal debris.

4.3 Site Screening Area 12 (Northeast)

AGS detected a single, large area in the eastern part of the survey area that indicated the presence of buried waste materials. The area has been labeled in red as "A" on the map, and the approximate extent of the area has been outlined with a red dotted line. Area "A" is located in the southeastern corner of the survey area and its dimensions are approximately 140' long by 75' wide. Anomaly "A" may extend to the northeast, southwest, and southeast of our survey area, because these boundaries are not apparent or well-defined on the map. Very strong EM values are present that indicates the presence of buried metal. The boundary between background materials and the metals is well-defined. AGS did not observe any metal objects at the ground surface here.

AGS detected a pipeline that extends from the transformer to the west. It exhibits a notable, linear EM response that runs across the map. It runs below an existing debris pile toward the access road.

AGS detected several small, discrete, anomalies that are probably due to the presence of minor, miscellaneous debris. They appear as small, closed-contours on the EM map.

5.0 Data Quality

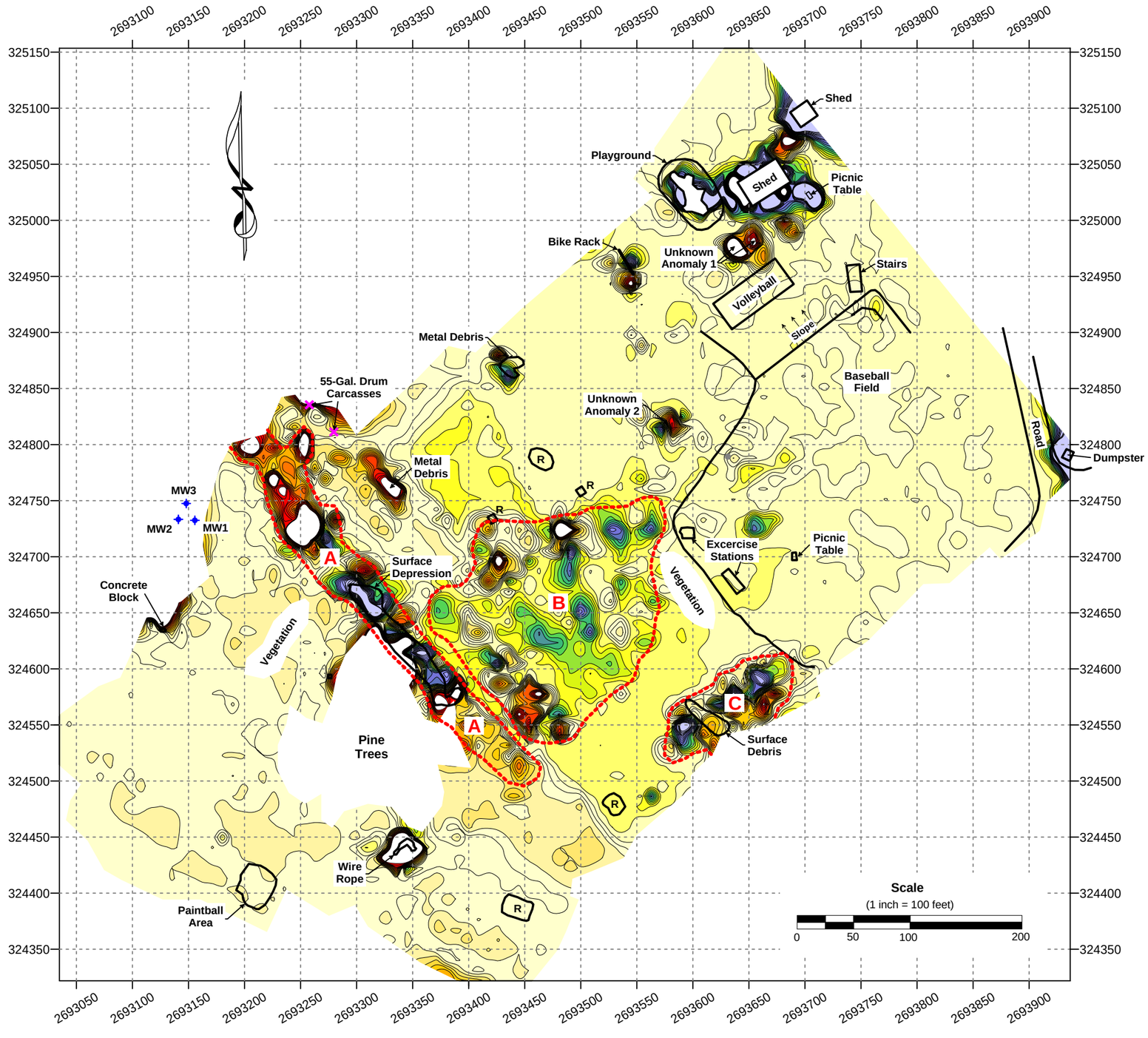
The EM conductivity data was of very good quality. The geophysical responses provided a significant amount of subsurface information and the range of values observed was consistent with that anticipated from the known and assumed subsurface conditions at the site.

6.0 Limitations

In general, there are limitations unique to the EM geophysical method employed for this investigation. These limitations include maximum depths of investigation for the EM method. Also, the method relies on a significant contrast in physical properties between the background soils and the object or feature of interest in order to detect it. The instrument also responds differently to above or below ground cultural features such as utilities, fences, and debris. These features may cause interference, which can limit the effective detection of other objects / features in the immediate vicinity.

7.0 Standard Care and Warranty

The scope of AGS' services for this project consisted of using geophysical techniques to characterize the shallow subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar techniques. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by AGS.



Legend

- A — Anomalous Area
- × — 55-Gallon Drum Carcass
- R — Wooden Reel

Notes

(1) An EM31 electromagnetic instrument and a Trimble ProXRS global positioning system (GPS) were used for the survey. Data from these instruments were combined to generate the contour map.The in-phase response is sensitive to the presence of buried metal objects. The instrument can penetrate to a depth of approximately 15 feet bgs. The contour interval for this figure is 0.5 ppt.

(2) AGS detected three large areas that indicated the presence of buried waste materials. These areas have been labeled in red as "A", "B", and "C" on the map, and the approximate extent of each area has been outlined with a red dotted line. Area "A" is located in the southwestern part of the survey area and its dimensions are approximately 400' long by 50' wide. It is a linear feature that runs from the northwest to the southeast, and possesses very strong EM signatures (both positive and negative). A portion of this anomaly is due to exposed metal debris within a surface depression, and the remainder is due to buried metal objects within the flat, re-graded portions of the same trench. Based on the EM responses, surface topography, and observed debris, it is apparent that a man-made trench was constructed in the past, and debris was dumped into the trench at a later time. Area "A" is very well defined on the map. Area "B" is an irregularly-shaped part of the survey area that exhibits moderately-strong, discontinuous EM responses. It is located in an open area to the northeast of are "A". The data indicates that dumping has occurred here, but it does not possess the same amount of metal debris as area "A". Although the data is not as strong as area "A", the boundaries of area "B" are also very well-defined. Area "B" is approximately 200' long by 160' wide. Area "C" is located to the southeast of area "B", next to the open grass field and excercise stations. It is approximately 140' long by 50' wide, and runs parallel to the access road. Some surface debris was observed within area "C", as shown on the map, however, it appears that an additional, significant amount of buried debris is also present. The EM responses are very strong here.

(3) AGS detected two discrete, unknown anomalies in the northern part of the survey area. Unknown anomaly 1 is located between the volleyball court and the playground. It strongly suggests the presence of buried metal, as indicated by the high-magnitude EM responses. A second discrete, unknown anomaly, Anomaly 2, was found in a sparsely-wooded area to the southwest of the volleyball court. It exhibits moderately-strong EM values and covers an area of approximately 20' by 20'. Again, it appears that some buried metal is present at this location.

(4) AGS found two 55-gallon drum carcasses near the northern extent of area "A". Their locations are shown as a magenta "x" on the map.

(5) Numerous man-made items at the ground surface caused anomalous EM responses. These included the sheds, playground, picnic tables, bike rack, discarded wire rope, and other miscellaneous objects.

(6) The depth of investigation for the EM unit was approximately 15 feet bgs.

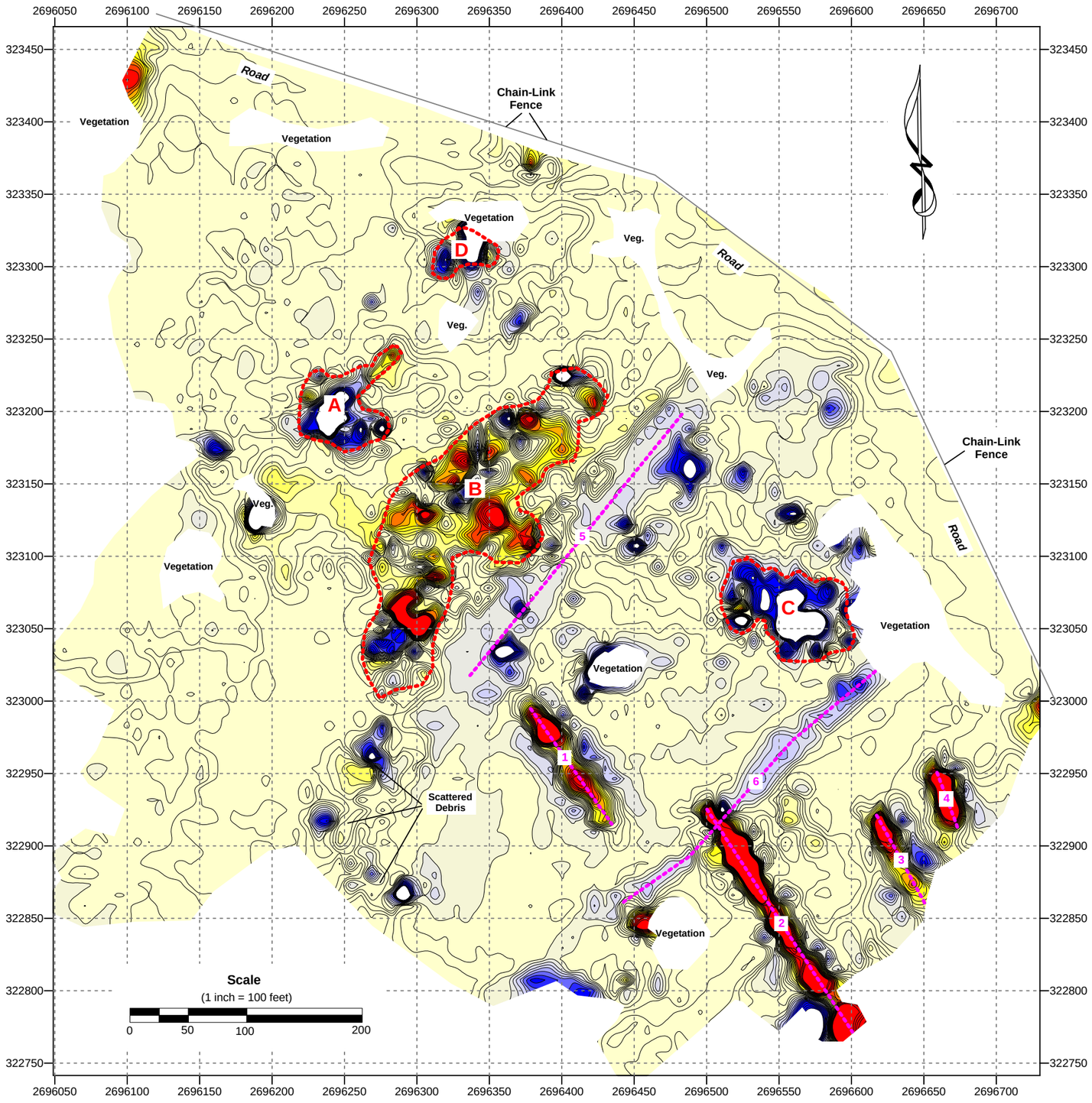
(7) The Pennsylvania State Plane coordinate system was used for this map.
System: U.S. State Plane 1983
Zone: Pennsylvania South 3702
Datum: NAD 1983 (Conus)
US Survey Feet

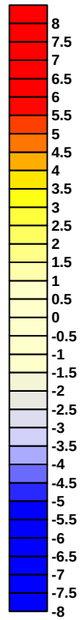
FIGURE 1
EM In-Phase Response Map, Buried Anomalies, and Site Features
Ninth Street Landfill Area
NAS JRB Willow Grove Site
Willow Grove, Pennsylvania

Tetra Tech NUS, Inc.
234 Mall Boulevard, Suite 260
King of Prussia, Pennsylvania

Date: May 12, 2008
AGS Reference: 08-195-1/pm

ADVANCED GEOLOGICAL SERVICES





Legend

A — Anomalous Area

Linear EM Anomaly

Notes

(1) An EM31 electromagnetic instrument and a Trimble ProXRS global positioning system (GPS) were used for the survey. Data from these instruments were combined to generate the contour map.The in-phase response is sensitive to the presence of buried metal objects. The instrument can penetrate to a depth of approximately 15 feet bgs. The contour interval for this figure is 0.5 ppt.

(2) AGS detected four large areas that indicated the presence of buried waste materials. These areas have been labeled in red as "A", "B", "C", and "D" on the map, and the approximate extent of each area has been outlined with a red dotted line. Area "A" is located in the northwestern part of the survey area and its dimensions are approximately 80' long by 60' wide. It is an irregularly-shaped feature that possesses very strong EM signatures (both positive and negative). A portion of this anomaly is due to exposed metal debris, and the remainder is due to buried metal objects. Area "B" is the most significant anomalous area observed on the map. It is an irregularly-shaped anomaly that exhibits strong deviations from the background values of approximately -0.5 to 0 ppt. It is approximately 250' long by 80' wide, and is oriented in a southwest-to-northeast manner. This area exibits moderately-strong, discontinuous EM responses, which suggests the presence of miscellaneous debris or waste materials. The boundaries of area "B" are very well-defined. Area "C" is located to the southeast of area "B". It is approximately 85' long by 50' wide, and exhibits very strong, negative in-phase values, which indicate metal sources. Some surface debris was observed within area "C", however, it appears that an additional, significant amount of buried debris is also present. The EM responses are very strong here. Area "D" is a smaller anomalous area to the north of areas "A" and "B". It is approximately 40' long by 20' wide, but strong EM responses are present that indicates the presence of metallic debris.

(3) AGS detected six, strong, linear anomalies in the southern part of the survey area. Linear anomalies 1 through 4 are located near the southern boundary and are roughly parallel to one another. They are oriented in a southeast-to-northwest manner. Based on the EM signal strength, position, and orientation, it appears the anomalies may be related or have a similar nature and purpose. The EM responses suggest that these features are former buried trenches with possible piping. Linear anomalies 5 and 6 run roughly perpendicular to anomalies 1 through 4. Both are approximately 250' long, and appear to be related to anomalies 1 through 4. AGS believes these anomalies are due to trenches, as well. Anomaly 5 is somewhat wider than anomaly 6.

(4) AGS detected numerous, discrete, man-made items that were both buried, and located at the ground surface. They appear as small, closed-contours on the EM map. They represent a minor amount of metal debris.

(5) The depth of investigation for the EM unit was approximately 15 feet bgs.

(6) The Pennsylvania State Plane coordinate system was used for this map.
System: U.S. State Plane 1983
Zone: Pennsylvania South 3702
Datum: NAD 1983 (Conus)
US Survey Feet

FIGURE 2

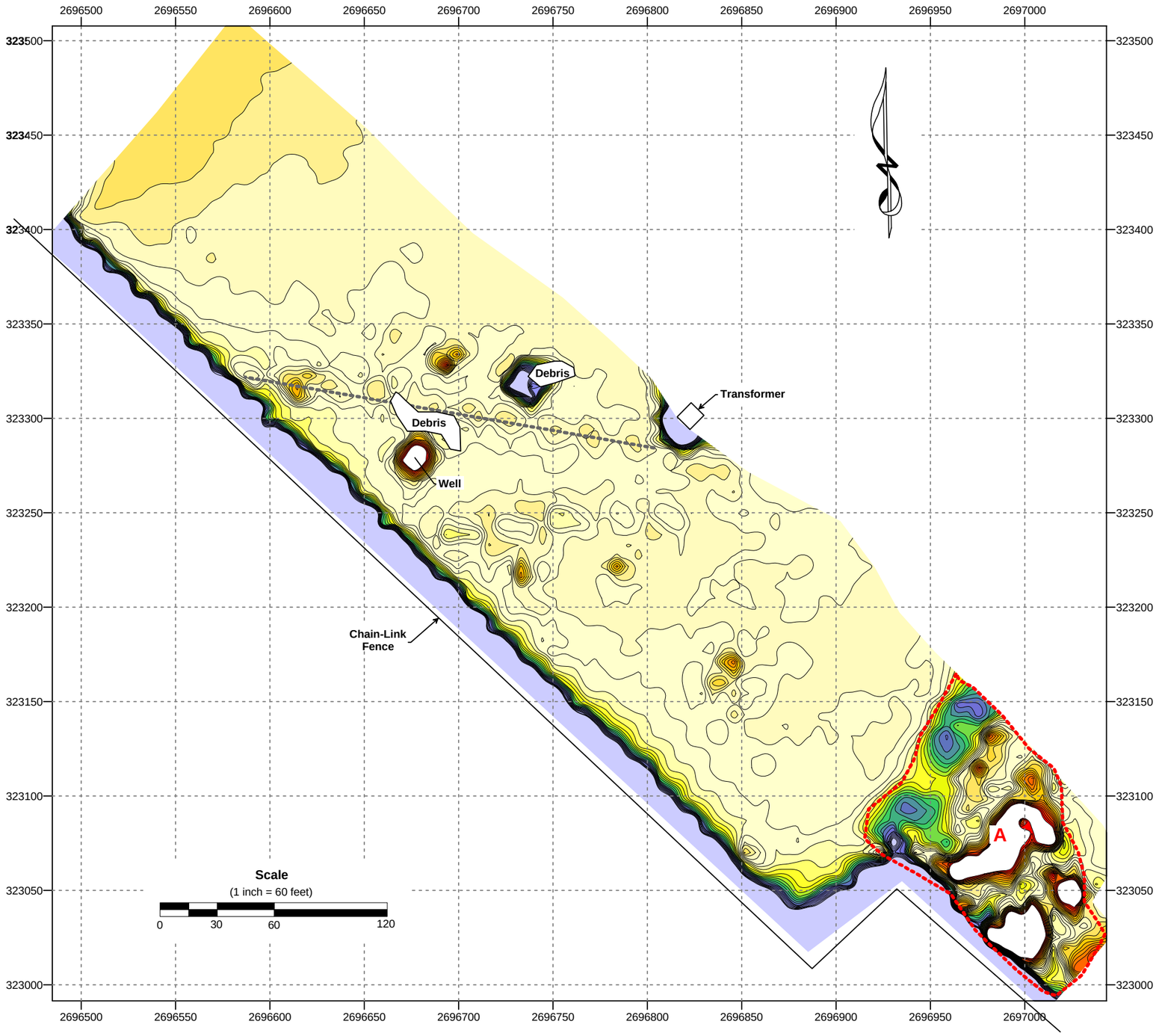
EM In-Phase Response Map, Buried Anomalies, and Site Features
Site Screening Area 12 (Southwest)
NAS JRB Willow Grove Site
Willow Grove, Pennsylvania

Tetra Tech NUS, Inc.
234 Mall Boulevard, Suite 260
King of Prussia, Pennsylvania

Date: May 12, 2008

AGS Reference: 08-195-1/pm

ADVANCED GEOLOGICAL SERVICES



Legend

A — Anomalous Area

Buried Pipeline

8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
-4.5
-5
-5.5
-6
-6.5
-7
-7.5
-8

In-Phase Responses (ppt)

Notes

(1) An EM31 electromagnetic instrument and a Trimble ProXRS global positioning system (GPS) were used for the survey. Data from these instruments were combined to generate the contour map.The in-phase response is sensitive to the presence of buried metal objects. The instrument can penetrate to a depth of approximately 15 feet bgs. The contour interval for this figure is 0.5 ppt.
(2) AGS detected a single, large area that indicated the presence of buried waste materials. The area has been labeled in red as "A" on the map, and the approximate extent of the area has been outlined with a red dotted line. Area "A" is located in the southeastern corner of the survey area and its dimensions are approximately 140' long by 75' wide. Anomaly "A" may extend to the northeast, southwest, and southeast of our survey area, because these boundaries are not apparent on the map. Very strong EM values are present that indicates the presence of buried metal. The boundary between background materials and the metals is well-defined. AGS did not observe any metal objects at the ground surface here.
(3) AGS detected a pipeline that extends from the transformer to the west. It exhibits a notable, linear EM response that runs across the map.
(4) AGS detected several small, discrete, anomalies that are probably due to the presence of minor, miscellaneous debris. They appear as small, closed-contours on the EM map.
(5) The depth of investigation for the EM unit was approximately 15 feet bgs.
(6) The Pennsylvania State Plane coordinate system was used for this map.
System: U.S. State Plane 1983
Zone: Pennsylvania South 3702
Datum: NAD 1983 (Conus)
US Survey Feet

FIGURE 3
EM In-Phase Response Map, Buried Anomalies, and Site Features
Site Screening Area 12 (Northeast)
NAS JRB Willow Grove Site
Willow Grove, Pennsylvania

Tetra Tech NUS, Inc.
234 Mall Boulevard, Suite 260
King of Prussia, Pennsylvania

Date: May 12, 2008
AGS Reference: 08-195-1/pm

ADVANCED GEOLOGICAL SERVICES

APPENDIX F

TEST PIT PHOTOGRAPHS

Photo TP05-1. View of test pit location, looking NW.

Photo TP05-02. Excavated debris.

Photo TP05-03. Excavator bucket containing soil/debris.

Photo TP05-04. View of northwest wall of test pit, showing buried debris.

Photo TP05-05. Sample 03TP05-0506-01.

Photo TP05-06. Northwest wall of test pit showing charred debris.

Photo TP05-07. Excavated debris.

Photo TP05-08. Excavated debris.

Photo TP05-09. View of test pit, looking NE.

Photo TP05-10. Excavated debris.

Photo TP05-11. Excavated crushed drums.

Photo TP05-12. View of test pit, looking NE.

Photo TP05-13. SE wall of test pit. Piece of temporary tarmac in foreground.

Photo TP05-14. View of completed excavation, looking NE.

Photo TP05-15. Sample 03TP05-0910-02.

Photo TP06-01. Excavated debris from southern half of test pit, looking southeast.

Photo TP06-02. Excavated soil/debris from southern half of test pit.

Photo TP06-03. Sample location 03TP06-0304-01, area of elevated PID readings.

Photo TP06-04. Excavated soil/debris, looking south.

Photo TP06-05. Sample 03TP06-0708-02.

Photo TP06-06. Sample 03TP06-0809-03.

Photo TP06-07. Test pit wall.

Photo TP06-08. Test pit wall.

Photo TP06-09. Test pit wall.

Photo TP06-10. Sample 03TP06-0607-04.

Photo TP06-11. View of completed test pit, looking southeast.

Photo TP07-01. View of test pit, looking northeast.

Photo TP07-02. Sample 03TP07-0304-01.

Photo TP07-03. View of test pit, looking southwest.

Photo TP07-04. Excavated soil pile.

Photo TP07-05. Sample 03TP07-0203-02.

Photo TP08-01. View of excavation, looking northeast.

Photo TP08-02. Sample 03TP08-0405-01.

Photo TP08-03. View of excavation, looking northwest.

Photo TP08-04. Southwestern wall of excavation, looking west, showing buried debris.

Photo TP08-05. Southwestern wall of excavation, looking south, showing layer of charred debris.

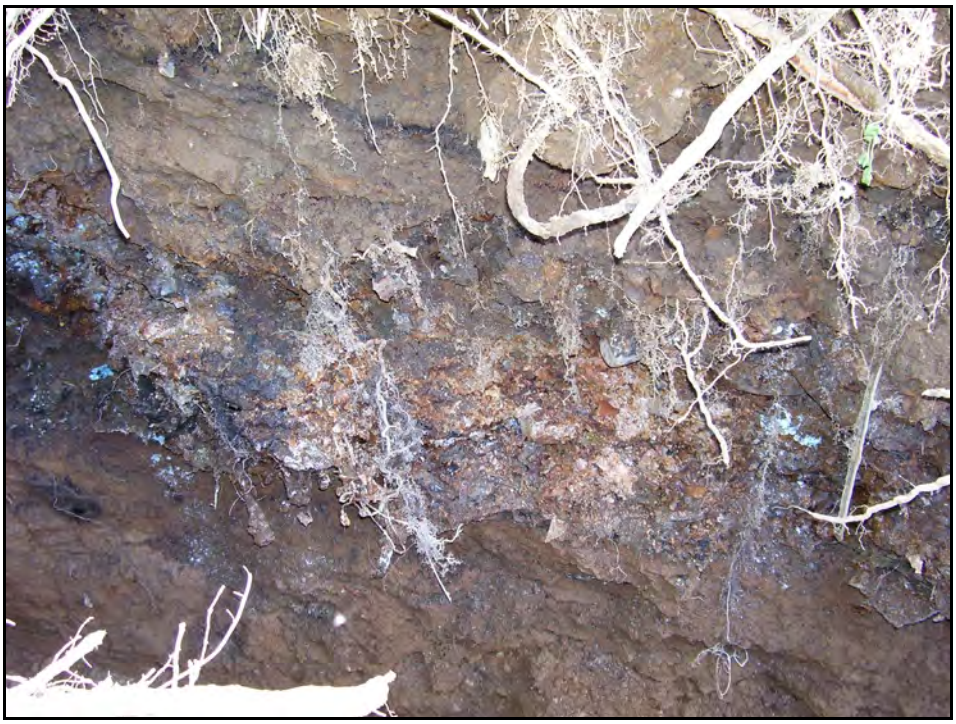


Photo TP08-06. Close-up of southwestern wall of excavation, showing layer of charred debris.

Photo TP08-07. View of excavation, looking southeast.

Photo TP08-08. Sample 03TP08-0304-02.

Photo TP08-09. View of excavation, looking south.

Photo TP08-10. Sample 03TP-08-0203-03.

Photo TP09-01. Start of excavation, looking southeast.

Photo TP09-02. View of eastern end of excavation.

Photo TP09-03. Excavated soil from eastern half of excavation.

Photo TP09-04. View of western half of excavation, looking west.

Photo TP09-05. North wall of western half of excavation.

Photo TP09-06. View of western half of excavation, looking northwest.

Photo TP10-01. Start of excavation, looking north.

Photo TP10-02. View of southwestern end of excavation, looking northeast.

Photo TP10-03. View of excavation, looking north.

Photo TP10-04. View of completed excavation, looking northeast.

Photo TP11-01. View of inside wall of excavation.

Photo TP11-02. Sample 03TP11-0304-01.

Photo TP11-03. View of excavation, looking north.

Photo TP12-01. View of inside wall of excavation, showing buried cable.

Photo TP12-02. View of completed excavation, looking northeast.

Photo TP12-03. View of excavated soil pile, looking north.

Photo TP12-04. View of excavated soil pile, looking west.

Photo TP12-05. Close-up view of excavated debris.

Photo TP13-01. View of excavation, looking southeast.

Photo TP13-02. View of excavation, looking southeast.

Photo TP13-03. View of excavation, looking south.

Photo TP14-01. Sample 03TP14-0203-01.

Photo TP14-02. View of excavated soil pile, looking south.

Photo TP14-03. View of excavation, looking northwest.

Photo TP15-01. View of excavation, looking southwest.

Photo TP15-02. Sample 03TP15-0405-01.

Photo TP15-03. View of excavated soil pile.

Photo TP16-01. Sample 03TP16-0102-01.

Photo TP16-02. View of inside of excavation, looking south.

Photo TP16-03. View of excavation, looking south.

Photo TP17-01. View of excavated soil pile.

Photo TP17-02. Sample 03TP17-0304-01.

Photo TP17-03. View of excavation, looking southwest.

Photo TP17-04. View of excavated soil pile.

Photo TP18-01. Start of excavation, looking southwest.

Photo TP18-02. Sample 03TP18-0203-01.

Photo TP18-03. View of “practice bomb”, uncovered during excavating.

Photo TP18-04. EOD personnel examining “practice bomb”.

Photo TP18-05. View of “practice bomb” after its removal from excavation.

Photo TP19-01. View of test pit, looking SE.

Photo TP19-02. Excavated debris.

Photo TP19-03. View of test pit sidewall showing burnt debris.

Photo TP20-01. View of excavation in progress, looking NE.

Photo TP20-02. Excavated debris.

Photo TP20-03. View of test pit looking NE, showing steel cable.

Photo TP20-04. Excavated debris.

Photo TP21a-01. View of test pit, looking north.

Photo TP21b-01. View of test pit, looking northwest.

Photo TP22-01. View of completed excavation, looking northwest.

Photo TP22-02. Test pit sidewall, showing thin layer of trash.

Photo TP23-01. View of test pit, looking north.

Photo TP23-02. View of test pit sidewall.

Photo TP24-01. View start of excavation, looking east, showing top of buried waste.

Photo TP24-02. View of excavation in progress, looking southwest.

Photo TP24-03. Excavator bucket full of charred debris.

Photo TP24-03. Excavated soil/debris pile.

Photo TP24-03. View of completed test pit looking northeast.

Photo TP24-03. View of completed test pit looking northeast.

Photo TP25-01. View of test pit looking southwest.

Photo TP25-02. Sample 03TP25-0506-01 (soil with elevated PID readings).

Photo TP25-03. Sample 03TP25-0607-02.

Photo TP25-04. View of test pit, showing drum remnants in area of high PID readings.

Photo TP25-05. View of completed test pit, looking southwest.

Photo TP26-01. View of completed test pit, looking southwest.

Photo TP26-02. View of test pit sidewall.

Photo TP26-03. Excavated soil/debris.

Photo TP27-01. View of completed test pit, looking northwest.

Photo TP27-02. View of excavated debris, looking north.

Photo TP27-03. Test pit sidewall.

Photo TP28-01. View of start of excavation, looking north.

Photo TP28-02. View of completed excavation, looking north.

Photo TP28-03. View of test pit sidewall, looking south.

Photo TP28-03. Excavated debris.

Photo TP29-01. Excavated debris.

Photo TP29-01. View of completed test pit, looking northwest.

Photo TP30-01. View of test pit sidewall, looking northwest.

Photo TP30-02. Excavated debris.

Photo TP30-03. View of completed test pit, looking northeast.

APPENDIX G

GEOPHYSICAL LOGS

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
840 Market Street
Lemoyne, Pennsylvania 17043-1586

September 12, 1997

Mr. James L. Colter
Department of the Navy
Northern Division
Naval Facilities Engineering Command
Environmental Restoration Branch
10 Industrial Highway, Mail Stop 82
Lester, Pennsylvania 19113

Dear Mr. Colter:

This draft report concerns work performed by Randall Conger as part of our hydrogeologic investigation at the Willow Grove Naval Air Station (NAS) in Horsham Township, Montgomery County, Pennsylvania. Enclosed are copies of the borehole geophysical logs, summaries of the heat-pulse-flowmeter measurements, and a diskette containing the digital log data.

Please review the manuscript for scientific and technical quality and overall adequacy. Please return review comments to this office by October 10, 1997.

Please note that all information in this report is provisional and subject to revision. Therefore, it should not be released for public information until Director's approval is obtained. A final version of this letter report will be provided to you after approval.

If you have any questions about the interpretation of the geophysical logs, or need additional information on geophysical logging or the logs run in these boreholes, please call me at 717-730-6947.

Sincerely,

Dennis Risser

Dennis Risser
Ground-Water Specialist

Enclosure

cc: Randall Conger
Ronald Sloto

EVALUATION OF GEOPHYSICAL LOGS, PHASE I, AT WILLOW GROVE NAVAL AIR STATION, MONTGOMERY COUNTY, PENNSYLVANIA

U.S. GEOLOGICAL SURVEY
Open-File Report 97-xxxx

prepared in cooperation with

U.S. DEPARTMENT OF THE NAVY

EVALUATION OF GEOPHYSICAL LOGS, PHASE I, AT WILLOW GROVE NAVAL AIR STATION, MONTGOMERY COUNTY, PENNSYLVANIA

by Randall W. Conger

U.S. GEOLOGICAL SURVEY
Open-File Report 97-xxxx

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U.S. DEPARTMENT OF THE NAVY

Lemoyne, Pennsylvania
1997

U.S. DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY

Gordon P. Eaton, Director

For additional information
write to:

District Chief
U.S. Geological Survey
840 Market Street
Lemoyne, Pennsylvania 17043-1586

Copies of this report may be
purchased from:

U.S. Geological Survey
Branch of Information Services
Box 25286
Denver, Colorado 80225-0286

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6. MG-1588 (05-MW-9S) 24

7. MG-1589 (05-MW-3I) 26

8. MG-1591 (05-MW-10S) 28

9. MG-1592 (05-MW-10I) 31

10. MG-1593 (02-MW-04S) 33

11. MG-1594 (02-MW-04I) 35

12. MG-1595 (03-MW-05I) 37

13. MG-1596 (03-MW-06S) 39

14. MG-1597 (03-MW-06I) 41

15. MG-1598 (02-MW-01I) 43

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CONVERSION FACTORS AND ABBREVIATIONS

Multiply	By	To obtain
inch (in.)	25.40	millimeter
mile (mi)	1.609	kilometer
foot (ft)	0.3048	meter
gallon per minute (gal/min)	0.00006309	cubic meter per second

Vertical datum: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929—a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

EVALUATION OF GEOPHYSICAL LOGS, PHASE I, AT WILLOW GROVE NAVAL AIR STATION, MONTGOMERY COUNTY, PENNSYLVANIA

by Randall W. Conger

ABSTRACT

Between April 1997 and June 1997, the U. S. Navy contracted Brown and Root Environmental, Inc., to drill approximately 20 monitor wells at the Willow Grove Naval Air Station, Horsham Township, Montgomery County, Pennsylvania. The purpose of the wells is to allow monitoring of water levels and sampling of contaminants in the shallow, intermediate, and deep water-bearing zones. The sampling will determine the horizontal and vertical distribution of any contaminated ground water migrating from known contaminant sources. Nine wells were drilled near the Fire Training Area (Site 5), five wells near the 9th Street Landfill (Site 3), four wells at the Antenna Field Landfill (Site 2), and three wells near Privet Road Compound (Site 1). Depths range from 73 to 167 feet below land surface.

The U. S. Geological Survey conducted borehole-geophysical and borehole-video logging for the purpose of identifying water-bearing zones so that the ideal intervals could be screened in each monitor well. Geophysical logs were run on a total of 21 wells. Video logs were run on 16 wells. A gamma log only was run on existing intermediate depth well MG-1590 (05-MW-1I) to provide information useful for stratigraphic correlation.

Caliper and video logs were used to locate fractures, inflections on fluid-temperature and fluid-resistivity logs indicated possible water-bearing fractures, and flowmeter measurements verified these locations. Single-point-resistance and natural-gamma logs provided information on stratigraphy. After interpretation of geophysical logs, video logs, and drillers notes, all wells were screened such that water-level fluctuations could be monitored and discrete water samples collected from shallow and intermediate water-bearing zones in each borehole.

INTRODUCTION

The Willow Grove Naval Air Station (NAS) is located in Montgomery County, Pennsylvania, on the U.S. Geological Survey (USGS) Ambler 7.5-minute topographic quadrangle map (fig. 1). In addition to its primary use as a reserve Naval Air Station, this 1,000-acre facility supports U.S. Marine and U.S. Army activities. The U.S. Air Force also has property holdings within the NAS boundary and shares common facilities with the NAS. Four major contaminated sites within the NAS (fig. 2) were identified as part of a Preliminary Assessment program (Halliburton NUS Environmental Corporation, 1993). A hydrogeological investigation is being conducted as part of the U.S. Navy's Installation Restoration Program to address ground-water contamination at these (and other) sites at the NAS. The U.S. Navy requested that the USGS provide technical assistance to their hydrological investigation. Specifically, the USGS was asked to conduct borehole-geophysical logging to identify water-bearing zones that could be monitored by properly completed wells.

FIGURE 1.—NEAR HERE.

FIGURE 2.—NEAR HERE.

Purpose and Scope

This report evaluates borehole-geophysical and borehole-video logs run by the USGS in 21 boreholes at the NAS from April 14, 1997, to June 5, 1997 (table 1 and fig. 1). The purpose of this report is to identify one or more water-bearing zones in each well on the basis of geophysical and video-log data. Caliper, natural-gamma, single-point-resistance, fluid-resistivity, fluid-temperature, and borehole-flow (heat-pulse-flowmeter) logs were run in 20 boreholes. Borehole-video logs were run in 16 boreholes. Natural-gamma only was run in borehole MG-1590 for the purpose of stratigraphic correlation. A cross-reference between the USGS borehole-identification numbers and Brown and Root Environmental, Inc. (B&R), borehole-identification numbers and a list of logs run in each borehole are shown in table 1.

TABLE 1.—NEAR HERE.

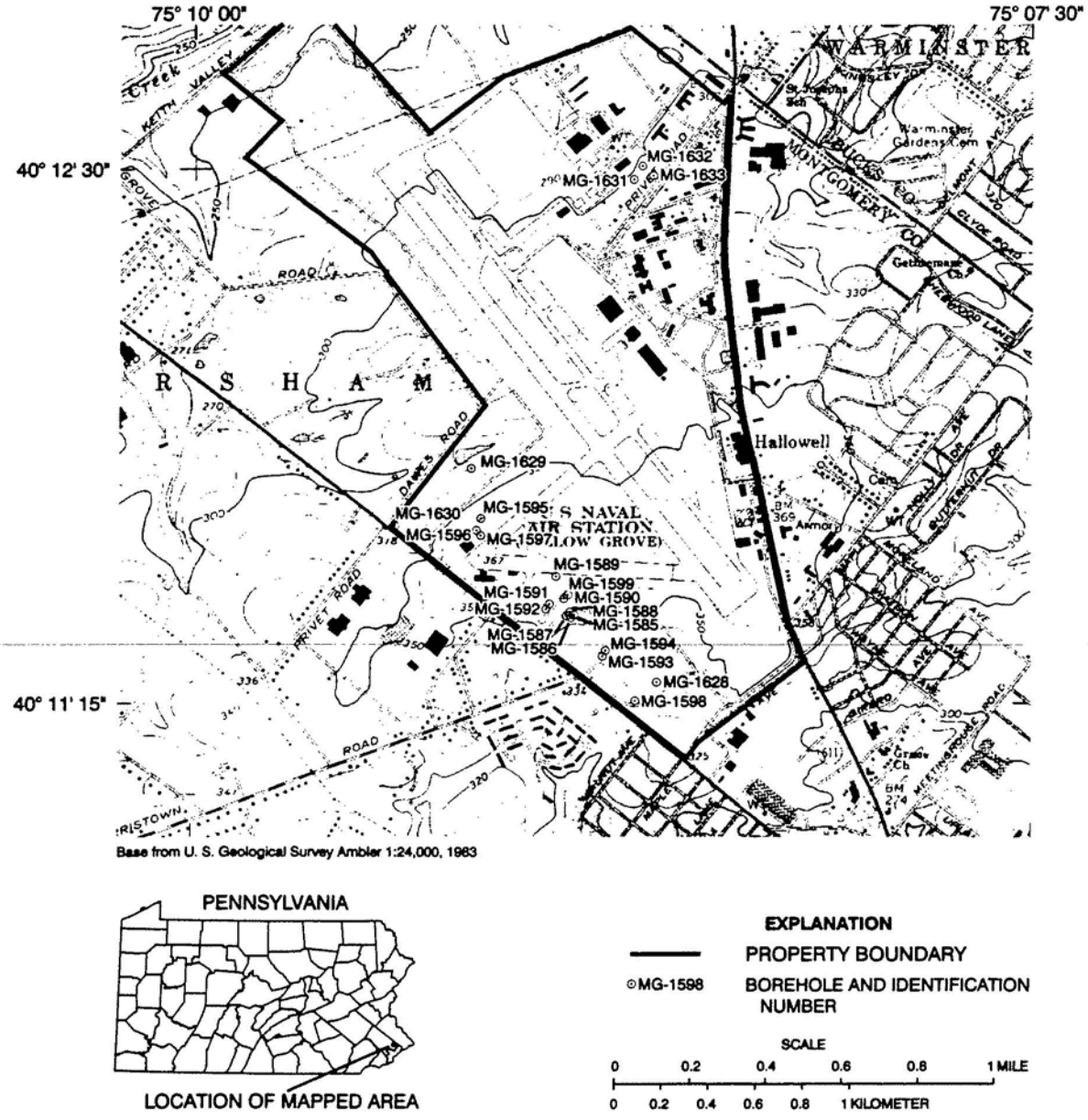

Figure 1. Location of the Willow Grove Naval Air Station, Montgomery County, Pennsylvania.

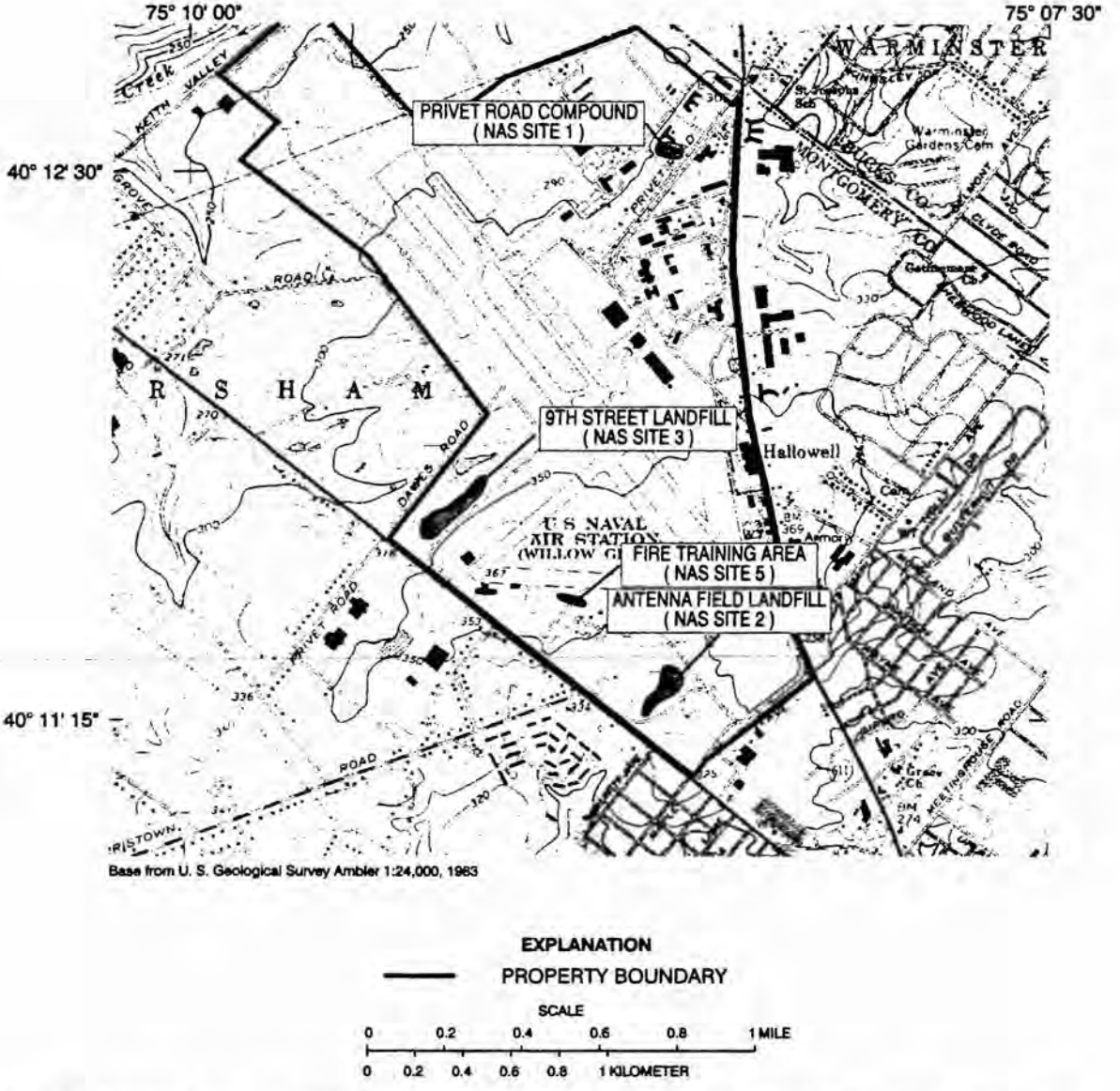

Figure 2. Location of four contaminated sites at the Willow Grove Naval Air Station, Montgomery County, Pennsylvania.

Table 1. *Boreholes logged at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[B, borehole-video log; C, caliper log; G, natural-gamma log; R, single-point-resistance log; F, fluid-resistivity log; T, fluid-temperature log; V, borehole-flow measurement]

USGS borehole-identification number	Brown and Root Environmental, Inc.	Depth logged (feet)	Geophysical logs run[1]
MG-1585	05-MW-8S	74	B, C, G, R, F, T, V
MG-1586	05-MW-8I	149	B, C, G, R, F, T, V
MG-1587	05-MW-9I	149	B, C, G, R, F, T, V
MG-1588	05-MW-9S	74	B, C, G, R, F, T, V
MG-1589	05-MW-3I	167	B, C, G, R, F, T, V
MG-1590	05-MW-1I	84	G
MG-1591	05-MW-10S	93	B, C, G, R, F, T, V
MG-1592	05-MW-10I	127	B, C, G, R, F, T, V
MG-1593	02-MW-04S	73	B, C, G, R, F, T, V
MG-1594	02-MW-04I	148	B, C, G, R, F, T, V
MG-1595	03-MW-05I	149	B, C, G, R, F, T, V
MG-1596	03-MW-06S	84	B, C, G, R, F, T, V
MG-1597	03-MW-06I	148	B, C, G, R, F, T, V
MG-1598	02-MW-01I	104	B, C, G, R, F, T, V
MG-1599	05-MW-01I	148	B, C, G, R, F, T, V
MG-1628	02-MW-03I	148	B, C, G, R, F, T, V
MG-1629	03-MW-02I	143	B, C, G, R, F, T, V
MG-1630	03-MW-07S	73	C, G, R, F, T, V
MG-1631	01-MW-03I	98	C, G, R, F, T, V
MG-1632	01-MW-01I	98	C, G, R, F, T, V
MG-1633	01-MW-08I	98	C, G, R, F, T, V

Location and Physiography

The NAS is located in the Gettysburg-Newark Lowlands Section of the Piedmont Physiographic Province. The site and surrounding area are underlain by sedimentary rocks of the Triassic age Stockton Formation. The Stockton Formation is subdivided into three units known as the lower arkose, middle arkose, and upper shale members (Rima and others, 1962). The middle arkose member is the lithologic unit cropping out at the site. At the NAS, this unit consists of fine- to medium-grained arkosic sandstone interbedded with red siltstone and mudstone. Quartz and feldspar are the dominant minerals.

The Stockton Formation is about 6,000 ft thick at the Bucks-Montgomery County border, with the middle arkose member accounting for 70 percent of the total thickness (Rima and others, 1962). Bedding in the Stockton Formation at the NAS strikes NE-SW and dips NW. Numerous faults are present in the Stockton. Most of these are small, normal faults with displacements of several feet. Vertical joints also are common. Ground-water storage and movement in the Stockton Formation occurs primarily within interconnected secondary porosity features—fractures, bedding planes, and joints (Sloto and others, 1995). Most deep wells penetrate several major water-bearing zones. Each major water-bearing zone generally has different hydraulic properties and a different hydraulic head; thus, wells penetrating more than one water-bearing zone are multiaquifer wells (Sloto and others, 1995). The hydraulic head in a multiaquifer well is a composite of the heads of the several water-bearing zones it includes. In areas where hydraulic head differs between water-bearing zones, water in a well flows in the direction of lower head (Sloto and others, 1995).

Ground water at the NAS originates from infiltration of precipitation and inflow of ground water from upgradient areas. Ground-water levels fluctuate with seasonal variations in recharge and also are influenced by pumping of nearby wells. Ground water in the upper part of the aquifer generally is under unconfined (water-table) conditions; ground water in the deeper part of the aquifer may be confined or partially confined, resulting in local artesian conditions.

Borehole-Geophysical Logs

Geophysical logs provide information on location of fractures (caliper and video log) and water-bearing and water-receiving zones, intervals of vertical borehole flow (fluid-resistivity and fluid-temperature logs), quantification of borehole flow (heat-pulse flowmeter logs), lithologic correlation (gamma and electric logs), and data on well construction (caliper and electric logs) where unknown.

Caliper logs provide a continuous record of average borehole diameter, which is related to fractures, lithology, and drilling technique. Caliper logs are used to identify fractures and possible water-producing openings and correct other geophysical logs for changes in borehole diameter. Correlation of caliper logs with fluid-resistivity and fluid-temperature logs is used to identify fractures, water-producing zones, water-receiving zones, and for measurement of water-velocity.

The natural-gamma or gamma log measures the natural gamma radiation (photons) emitted from all rocks. The most common emitters of gamma radiation are uranium-238, thorium-232, and their daughter elements and potassium-40. These radioactive elements are concentrated in clays by adsorption, precipitation, and ion exchange. Fine-grained sediments such as shale or siltstone usually emit more gamma radiation than sandstone, limestone, or dolomite. The gamma log can be run in or out of water or casing. However, casing does reduce the gamma response. The gamma log is used to correlate geologic units between wells (Keys, 1988).

The single-point-resistance log records the electrical resistance of a formation between the probe in a water-filled borehole below casing and an electrical ground at land surface. Generally, electrical resistance increases with formation grain size and decreases with borehole diameter, water-bearing fractures, and increasing dissolved-solids concentration of borehole water fluid. The single-point-resistance log is used to corollate geology between wells and may help identify formation water-bearing zones (Keys and MacCary, 1971).

Fluid resistivity is the inverse of fluid conductivity. The fluid-resistivity log measures the electrical resistivity of the water column in the well. The fluid-resistivity probe measures the resistivity of borehole water between electrodes in the probe. Fluid-resistivity logs reflect changes in the dissolved-solids concentration of the well water. Fluid-resistivity logs are used to identify water-producing and water-receiving zones and to determine intervals of vertical borehole flow. Water-producing and water-receiving zones are usually identified by distinct changes in resistivity. Intervals of vertical borehole flow usually are identified by a low-resistivity gradient between a water-producing and a water-receiving zone. Also, zones of salt water intrusion and some types of contaminant plumes can be identified.

Fluid-temperature logs provides a continuous record of the temperature of vertical variation in the water in a borehole. Temperature logs are used to identify water-producing and water-receiving zones and to determine zones of vertical borehole flow. Intervals of vertical borehole flow are characterized by little or no temperature gradient (Williams and Conger, 1990).

The direction and rate of borehole-water movement was determined by the use of a heat-pulse flowmeter. The heat-pulse flowmeter operates by heating a small sheet of water between two sensitive thermistors (heat sensors). A measurement of direction and rate is computed when a peak temperature is recorded by one of the thermistors. The range of flow measurement is about 0.01-1.5 gal/min in a 2- to 10-in. diameter borehole (Conger, 1996).

Some heat-pulse-flowmeter measurements may be influenced by (1) poor seal integrity between the borehole and heat-pulse flowmeter, and (2) contributions of water from storage within the borehole. If the seal between the borehole and flowmeter is not complete, some water can bypass the flowmeter, resulting in measurements of flow that are less than the actual rate. Although the heat-pulse flowmeter is a calibrated probe, the data are primarily used as a relative indicator to identify water-producing zones.

Borehole-television logging was conducted by lowering a waterproof camera down the borehole and recording the image on video tape. The depth indicated on the video log may not correspond exactly to the geophysical logs because of some minor slippage of the television cable.

EVALUATION OF BOREHOLE-GEOPHYSICAL LOGS

The locations of boreholes logged are shown on figure 1. The reference measuring point for all geophysical and video logs is in feet below land-surface. Depth of wells, casing lengths, and water levels at the time of logging are given in table 2.

Table 2. *Well depth, casing length, and depth to water for boreholes logged by the U.S. Geological Survey at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

USGS borehole-identification number	Brown and Root Environmental, Inc.	Depth of well below measuring point (feet)	Length of casing below measuring point (feet)	Depth to water below measuring point (feet)	Date water level measured
MG-1585	05-MW-8S	74	18	17.87	4/14/97
MG-1586	05-MW-8I	149	18	17.72	4/14/97
MG-1587	05-MW-9I	149	24	18.71	4/14/97
MG-1588	05-MW-9S	74	24	18.32	4/15/97
MG-1589	05-MW-3I	167	29	23.32	4/15/97
MG-1590	05-MW-1I	84	[1]84	20.73	4/15/97
MG-1591	05-MW-10S	93	19	18.78	4/15/97
MG-1592	05-MW-10I	127	19	19.24	4/16/97
MG-1593	02-MW-04S	73	30	27.08	4/29/97
MG-1594	02-MW-04I	148	24	24.34	4/29/97
MG-1595	03-MW-05I	149	27	24.60	4/29/97
MG-1596	03-MW-06S	84	25	28.24	4/30/97
MG-1597	03-MW-06I	148	20	No data	
MG-1598	02-MW-01I	104	13	37.00	4/30/97
MG-1599	05-MW-01I	148	24	21.51	5/15/97
MG-1628	02-MW-03I	148	13	12.44	5/15/97
MG-1629	03-MW-02I	143	13	8.52	5/15/97
MG-1630	03-MW-07S	73	14	10.97	6/5/97
MG-1631	01-MW-03I	98	19	9.66	6/5/97
MG-1632	01-MW-01I	98	25	11.62	6/5/97
MG-1633	01-MW-08I	98	25	11.38	6/5/97

[1] Well reconstructed with plastic screen.

MG-1585 (05-MW-8S)

The caliper log shows that the total depth of the borehole is 74 ft and that it is cased with 6-in.-diameter casing to 18 ft bls (below land surface) (fig. 3). The caliper log shows major fractures at 56, 59, and 69 ft bls and minor fractures at 32-33, 43, and 49-51 ft bls. The fluid-resistivity log shows changes in slope at 30, 44, 65, and 73 ft bls that correlate to fractures shown on the caliper log. Under ambient conditions, the heat-pulse flowmeter measured downward flow at 38, 46, and 54 ft bls and no flow at 26 and 66 ft bls (table 3). The borehole-video log shows the borehole water becomes cloudy abruptly at 66 ft bls which indicates that no borehole flow exists below that depth. The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 32-33 and 43 ft bls and moves downward. Most of the water then exits the borehole through fractures at 55-65 ft bls; a minor quantity of water exits the borehole at 49-51 ft bls. The drilling log shows that the largest water-producing zone in the borehole is at approximately 60 ft bls. A screen was placed at 26-36 and 55-65 ft bls to include the water-producing fractures at 32-33 and 60 ft bls.

FIGURE 3.—NEAR HERE.

Table 3. *Summary of heat-pulse-flowmeter measurements for borehole MG-1585 (05-MW-8S) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
26	No flow	
38	0.28	Down
46	.75	Down
54	.60	Down
66	No flow	

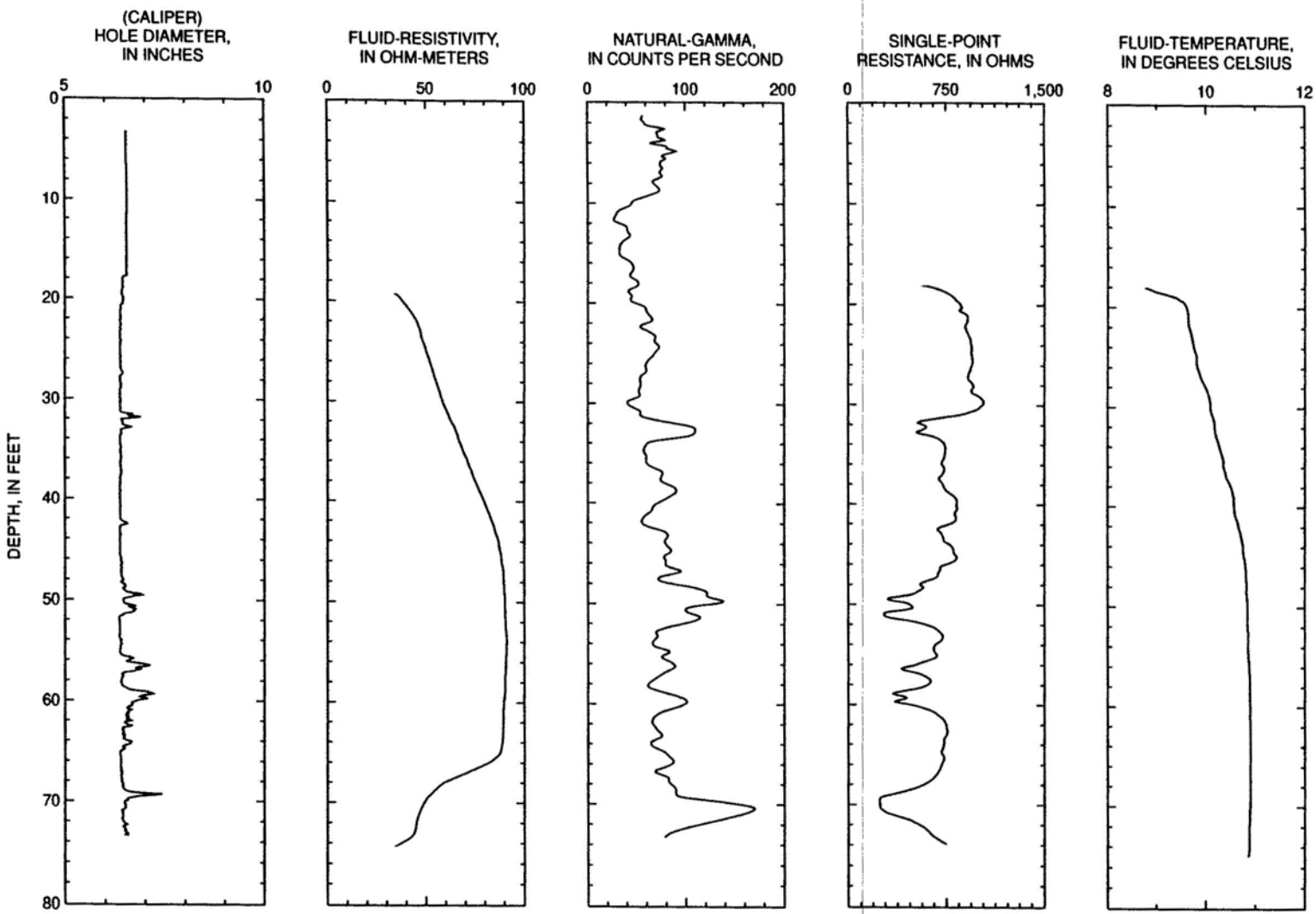

Figure 3. Borehole-geophysical logs for borehole MG-1585 (05-MW-8S), Willow Grove Naval Air Station.

MG-1586 (05-MW-8I)

The caliper log shows that the total depth of the borehole is 149 ft and that it is cased with 6-in.-diameter casing to about 18 ft bls. The caliper log show major fractures at 54-62 and 93-95 ft bls and numerous minor fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 22, 42, 108, and 133 ft bls that correlate to fractures on the caliper log. Also, the fluid-temperature log shows a change in slope at 42 and 60 ft bls that correlate to fractures on the caliper log. Under ambient conditions, the heat-pulse-flowmeter measurements indicated downward borehole flow at 36, 52, 88, and 102 ft bls (table 4). The borehole-video log shows that the borehole water becomes cloudy at 116 ft bls which indicates that no borehole flow exists below that depth. The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through the fractures at 20, 41, and 60 ft bls, moves downward, and exits the borehole at 93-95 and 104-116 ft bls. The drilling log shows that the greatest water-producing zone in the borehole is at approximately 93-95 ft bls. A screen was placed at 89-99 ft bls to include the fractures from 93-95 ft bls.

FIGURE 4.—NEAR HERE.

Table 4. *Summary of heat-pulse-flowmeter measurements for borehole MG-1586 (05-MW-8I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
36	0.96	Down
52	1.2	Down
88	1.5	Down
102	.90	Down

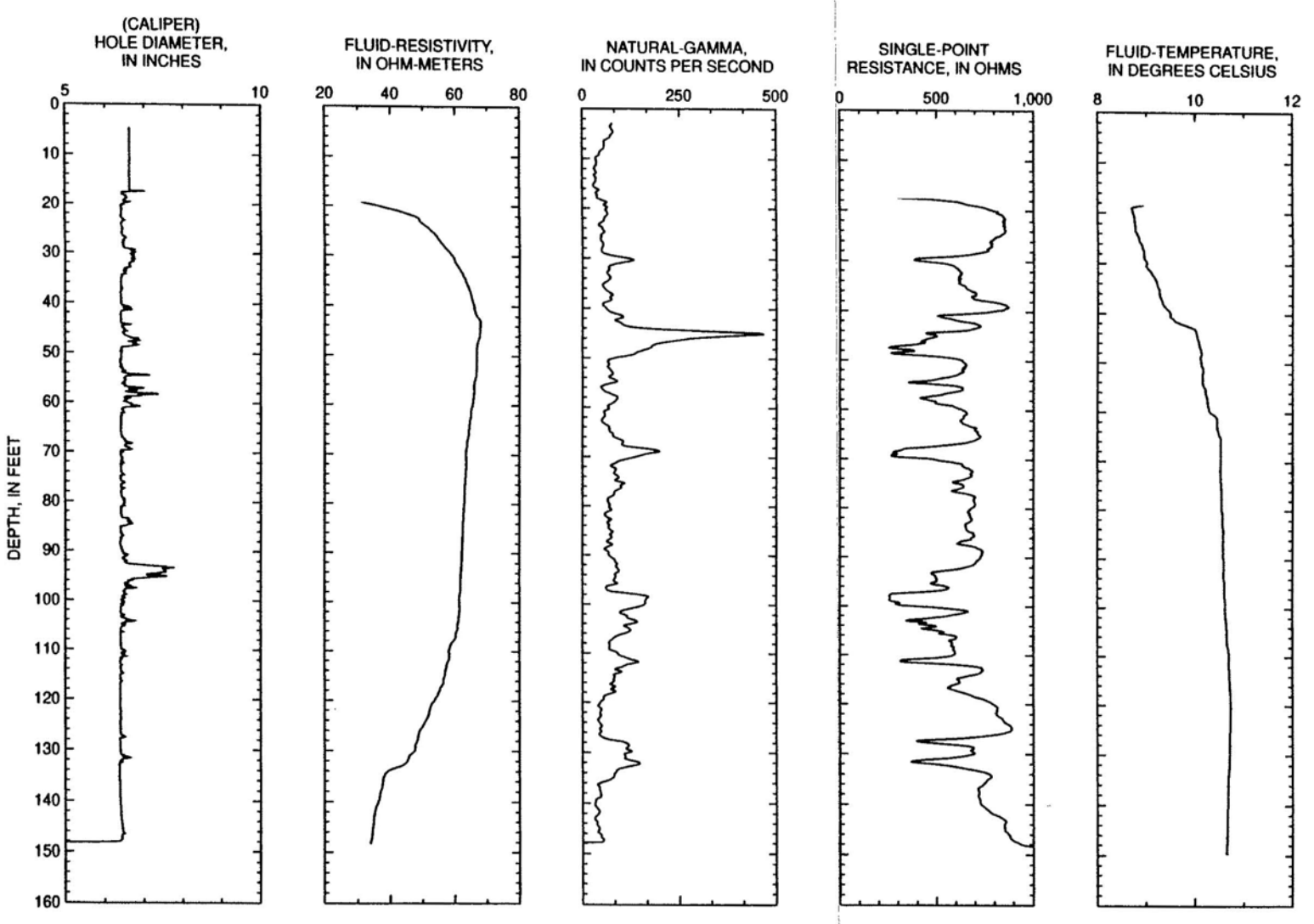

Figure 4. Borehole-geophysical logs for borehole MG-1586 (05-MW-8I), Willow Grove Naval Air Station.

MG-1587 (05-MW-9I)

The caliper log shows that the total depth of the borehole is 149 ft and that it is cased with 6-in.-diameter casing to 24 ft bls. The caliper log shows a major fracture at 70-74 ft bls plus numerous minor fractures throughout the open-hole interval. Also, the caliper log shows a constriction within the borehole at 101-103 ft bls that may be caused by the shifting of loose formation rock. The fluid-resistivity log shows changes in slope at 25, 42, 72, and 105 ft bls that correlate to fractures shown on the caliper log. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 35, 50, 66, 78, and 89 ft bls and no flow at 110 ft bls (table 5). The borehole-video log shows that the borehole water becomes cloudy abruptly at 120 ft bls indicating no borehole flow exists below that depth. The geophysical logs and the heat-pulse-flowmeter and video data indicate that water enters the borehole through fractures at 25 ft bls, moves downward, and exits the borehole through fractures at approximately 105 ft bls. The drilling log shows that the greatest water-producing zone in the borehole is at approximately 104-106 ft bls. A screen was placed at 96-106 ft bls to include the water-producing fractures at about 104-106 ft bls.

FIGURE 5.—NEAR HERE.

Table 5. *Summary of heat-pulse-flowmeter measurements for borehole MG-1587 (05-MW-9I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
35	1.5	Down
50	1.4	Down
66	1.5	Down
78	1.5	Down
89	1.5	Down
110	No flow	

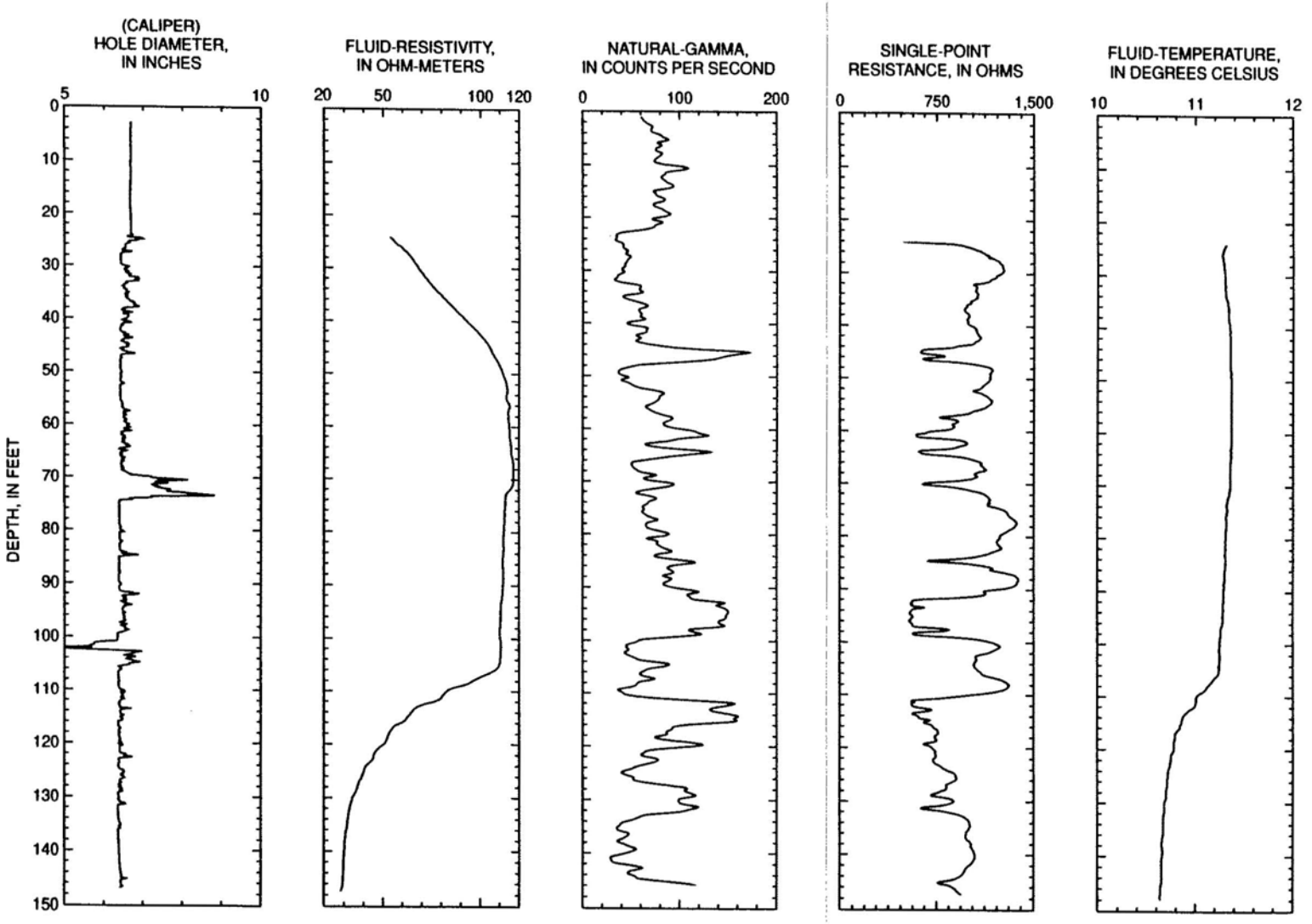

Figure 5. Borehole-geophysical logs for borehole MG-1587 (05-MW-9I), Willow Grove Naval Air Station.

MG-1588 (05-MW-9S)

The caliper log shows that the total depth of the borehole is 74 ft and that it is cased with 6-in.-diameter casing to 24 ft bls. The caliper log shows only minor fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 26, 38-40, and 70 ft bls that correlate to minor fractures shown on the caliper log. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 27, 36, 58, and 65 ft bls and no flow at 71 ft bls (table 6). The borehole-video log shows that the borehole water becomes cloudy at 71 ft bls indicating no borehole flow exists below that depth. The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures just below casing about 27 ft bls, moves downward, and exits the borehole through fractures at approximately 68-70 ft bls. The drilling log reports 2 gal/min of water is produced between 60-70 ft bls. A screen and sand pack was placed at 27-32 and 59-74 ft bls to include the water-producing fractures at 27 ft bls and between 60-70 ft bls.

FIGURE 6.—NEAR HERE.

Table 6. *Summary of heat-pulse-flowmeter measurements for borehole MG-1588 (05-MW-9S) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
27	0.86	Down
36	1.0	Down
58	.99	Down
65	.97	Down
71	No flow	No flow

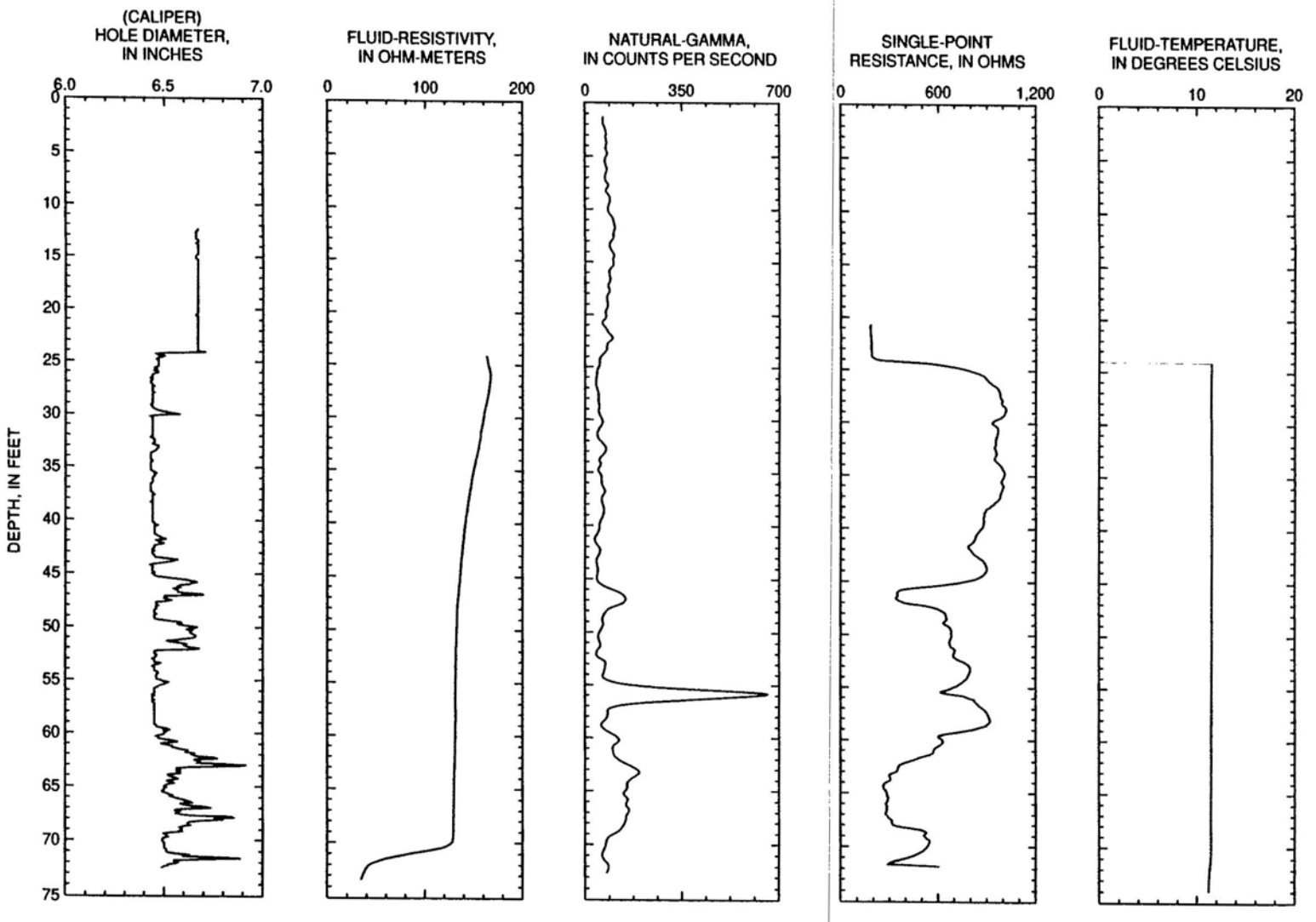

Figure 6. Borehole-geophysical logs for borehole MG-1588 (05-MW-9S), Willow Grove Naval Air Station.

MG-1589 (05-MW-3I)

The caliper log shows that the total depth of the borehole is 167 ft and that it is cased with 6-in.-diameter casing to 29 ft bls. The caliper log shows major fractures at 71-75 and 119-127 ft bls, plus numerous smaller fractures. Also, the caliper log shows a constriction within the borehole at 121 ft bls that may be caused by the shifting of loose formation rock. The fluid-resistivity and fluid-temperature logs show a change in slope at 39, 50, 132, 149, and 155 ft bls that correlate to minor fractures shown on the caliper log. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 45, 60, and 100 ft bls, upward flow at 138 and 152 ft bls and no flow at 160 ft bls (table 7). The borehole-video log shows the borehole water becomes cloudy at 158 ft bls indicating no borehole flow exists below that depth. The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at about 40 ft bls, moves downward, and exits the borehole through fractures at approximately 115-132 ft bls. Additional water is produced near the bottom at 154-156 ft bls, moves upward, and exits the borehole at 146-149 and 115-132 ft bls. The drilling log reports 30 gal/min of water is produced at 128 ft bls. A screen and sand pack were placed at 118-128 ft bls to capture the water-producing fractures at 128 ft bls.

FIGURE 7.—NEAR HERE.

Table 7. *Summary of heat-pulse-flowmeter measurements for borehole MG-1589 (05-MW-3I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
45	1.4	Down
60	1.3	Down
100	1.4	Down
138	0.09	Up
152	.13	Up
160	No flow	No flow

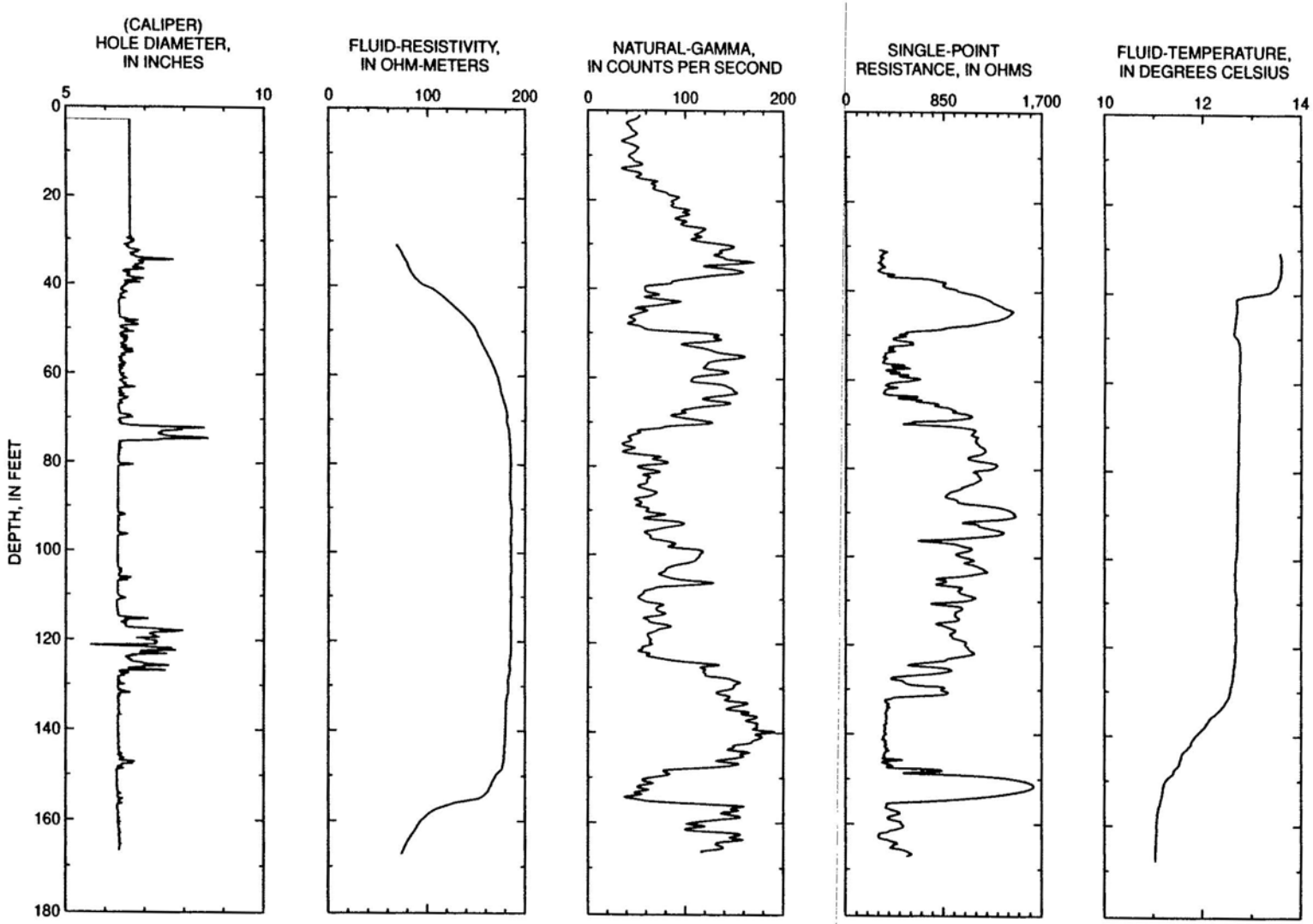

Figure 7. Borehole-geophysical logs for borehole MG-1589 (05-MW-3I), Willow Grove Naval Air Station.

MG-1590 (FTAW-1I)

This existing borehole was already screened. Therefore, only the gamma log was run for the purpose of stratigraphic correlation. The gamma log shows that the total depth of the borehole is 84 ft bls. The gamma log shows a large spike at 53-56 ft bls that indicates a distinct shale unit and that may be useful for correlation.

FIGURE 8.—NEAR HERE.

MG-1591 (05-MW-10S)

The caliper log shows that the total depth of the borehole is 93 ft and that it is cased with 6-in.-diameter casing to 19 ft bls. The caliper log shows numerous fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 28, 38, 86, and 90 ft bls. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 36, 44, 58, and 76 ft bls (table 8). The borehole-video log shows that the borehole water becomes cloudy at 86 ft bls indicating no borehole flow exists below that depth. The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 27-32 ft bls, moves downward, and exits the borehole through fractures at 54, 70, and 85 ft bls. Screens were placed at 22-32 and 79-94 ft bls to include the water-producing fracture at 28 ft bls and water-receiving fracture at 85 ft bls.

FIGURE 9.—NEAR HERE.

Table 8. *Summary of heat-pulse-flowmeter measurements for borehole MG-1591 (05-MW-10S) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
36	0.39	Down
44	.51	Down
58	.34	Down
76	.22	Down

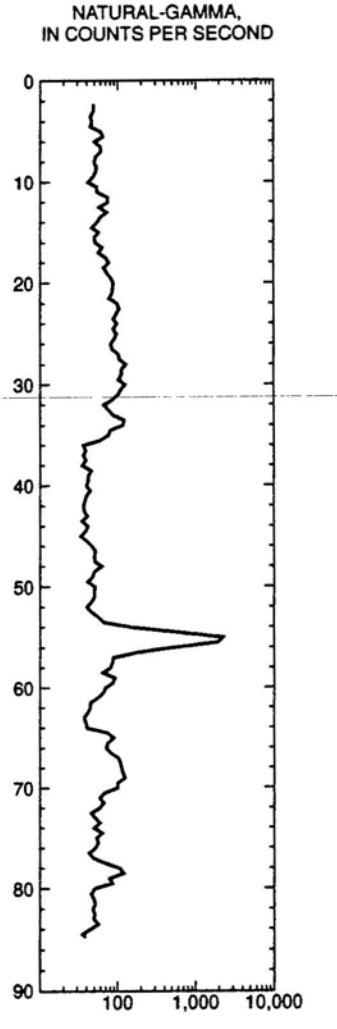

Figure 8. Natural-gamma log for borehole MG-1590 (05-MW-1I), Willow Grove Naval Air Station.

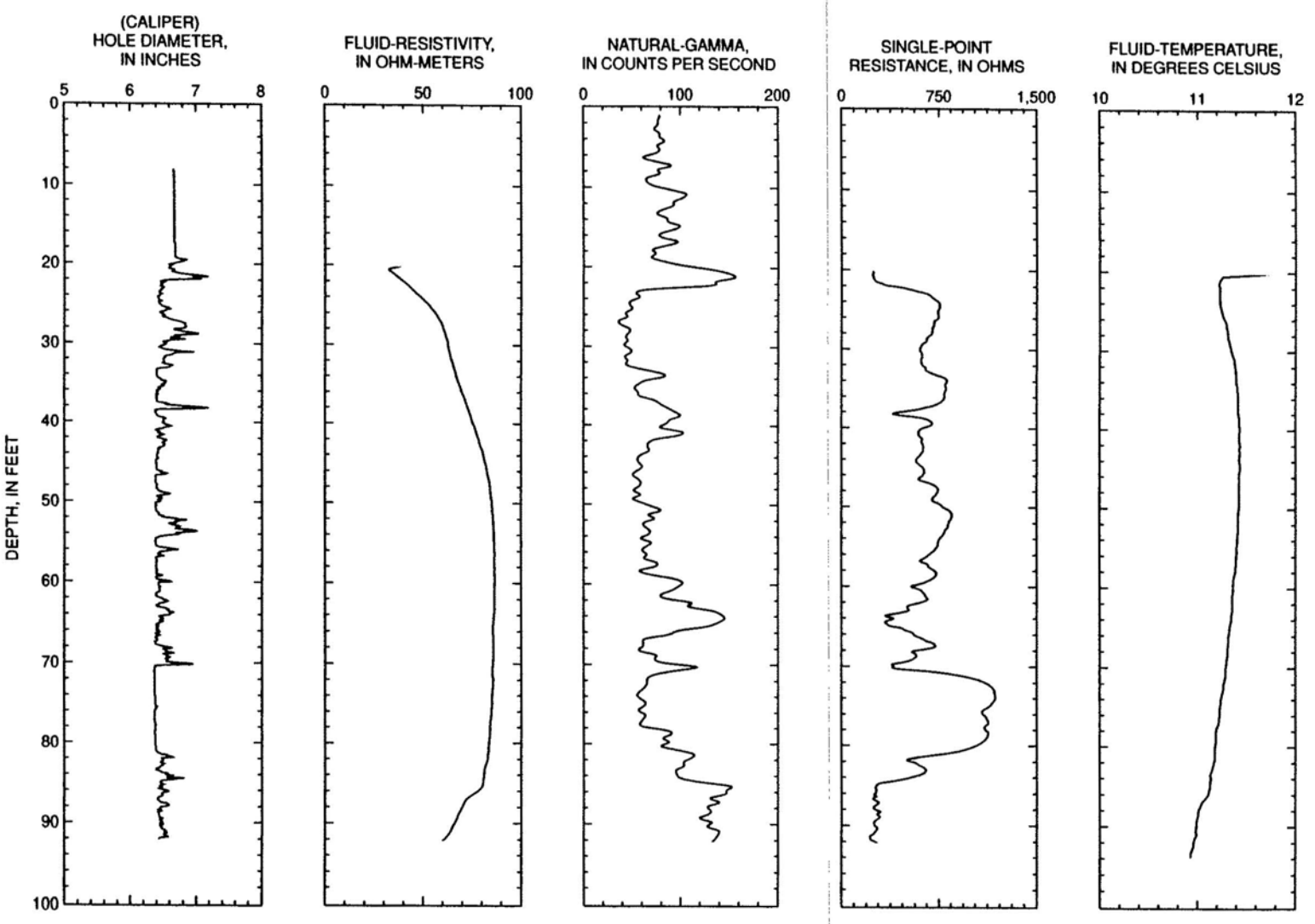

Figure 9. Borehole-geophysical logs for borehole MG-1591 (05-MW-10S), Willow Grove Naval Air Station.

MG-1592 (05-MW-10I)

The caliper log shows that the total depth of the borehole is 127 ft and that it is cased with 6-in.-diameter casing to 19 ft bls. The caliper log shows major fractures at 19-20, 27-30, 32-35, 74-77, and 98 ft plus numerous minor fractures throughout the open-hole interval. The fluid-resistivity and fluid-temperature logs show changes in slope at 32, 80, and 122 ft bls that correlate to fractures shown on the caliper log. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 42, 54, 66, 82, 92, 102, and 117 ft bls (table 9). The borehole-video log shows that the borehole water becomes cloudy at 121 ft bls indicating no borehole flow exists below that depth. The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at about 32 ft bls and at 74-77 and 98 ft bls, moves downward, and exits the borehole through fractures at 118-121 ft bls. The drilling log reports 4-9 gal/min of water production at 128 ft bls which is probably produced from the fractures at 118-121 ft bls. A screen was placed at 116-126 ft bls to include the water-producing fractures at 118-121 ft bls.

FIGURE 10.—NEAR HERE.

Table 9. *Summary of heat-pulse-flowmeter measurements for borehole MG-1592 (05-MW-10I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
42	0.12	Down
54	.13	Down
66	.13	Down
82	.47	Down
92	.62	Down
102	.80	Down
117	.74	Down

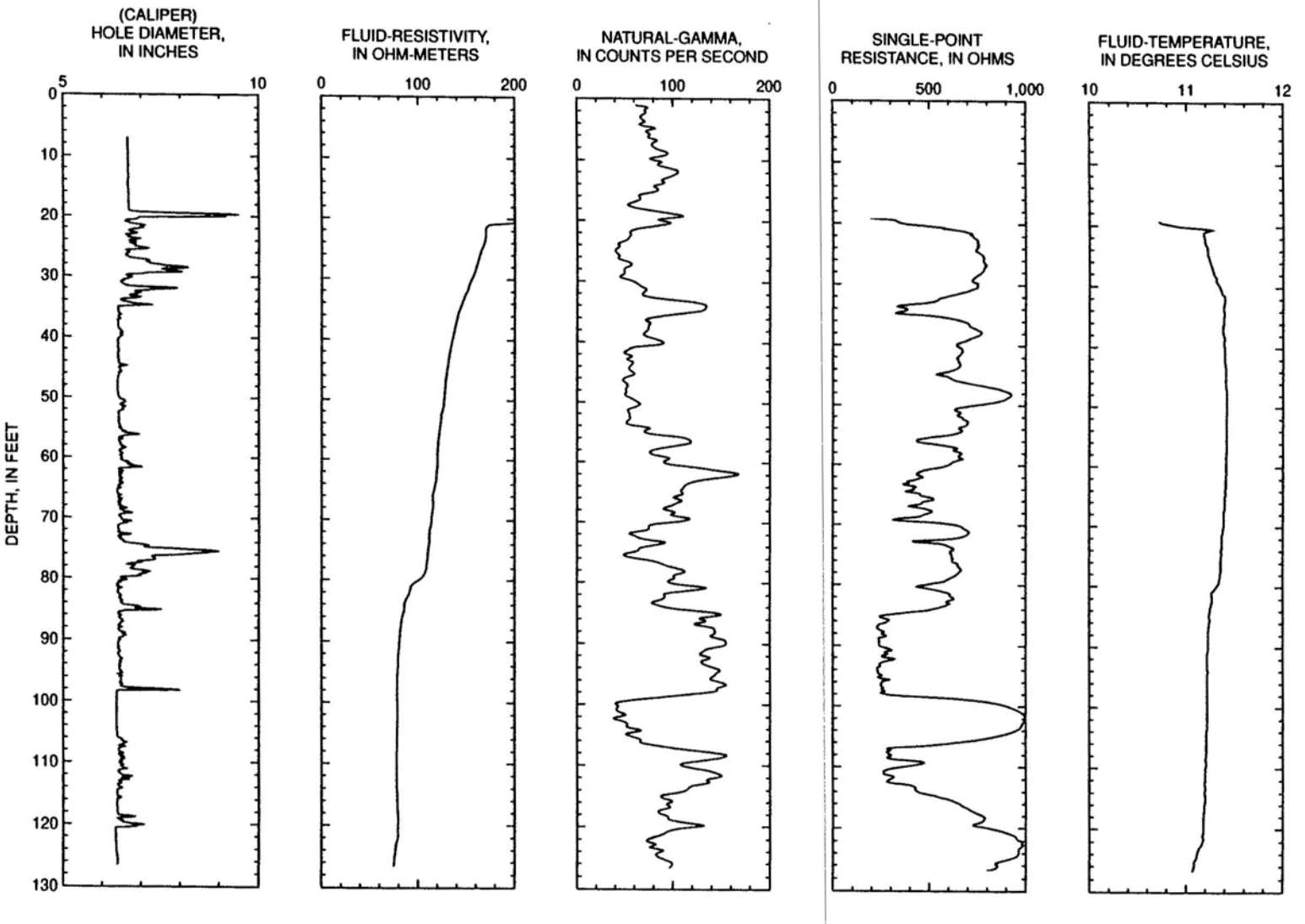

Figure 10. Borehole-geophysical logs for borehole MG-1592 (05-MW-10I), Willow Grove Naval Air Station.

MG-1593 (02-MW-04S)

The caliper log shows that the total depth of the borehole is 73 ft and that it is cased with 6-in.-diameter casing to 30 ft bls. The caliper log shows major fractures at 33 and 61 ft bls. The fluid-resistivity and fluid-temperature logs show a change in slope at 60 ft bls that correlates to a fracture shown on the caliper log. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 36 ft bls, upward flow at 50 ft bls, and no flow at 64 ft bls (table 10). The borehole-video log shows that the borehole water becomes cloudy beginning at 56 ft bls. The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 33 and 61 ft bls, moves downward and upward respectively, and exits the borehole through fractures at 38-48 ft bls. A screen was placed at 34-44 ft bls, and a sand pack was placed at 33-45 to capture the water-producing fracture at 33 ft bls.

FIGURE 11.—NEAR HERE.

Table 10. *Summary of heat-pulse-flowmeter measurements for borehole MG-1593 (03-MW-04S) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
36	0.43	Down
50	.12	Up
64	No flow	

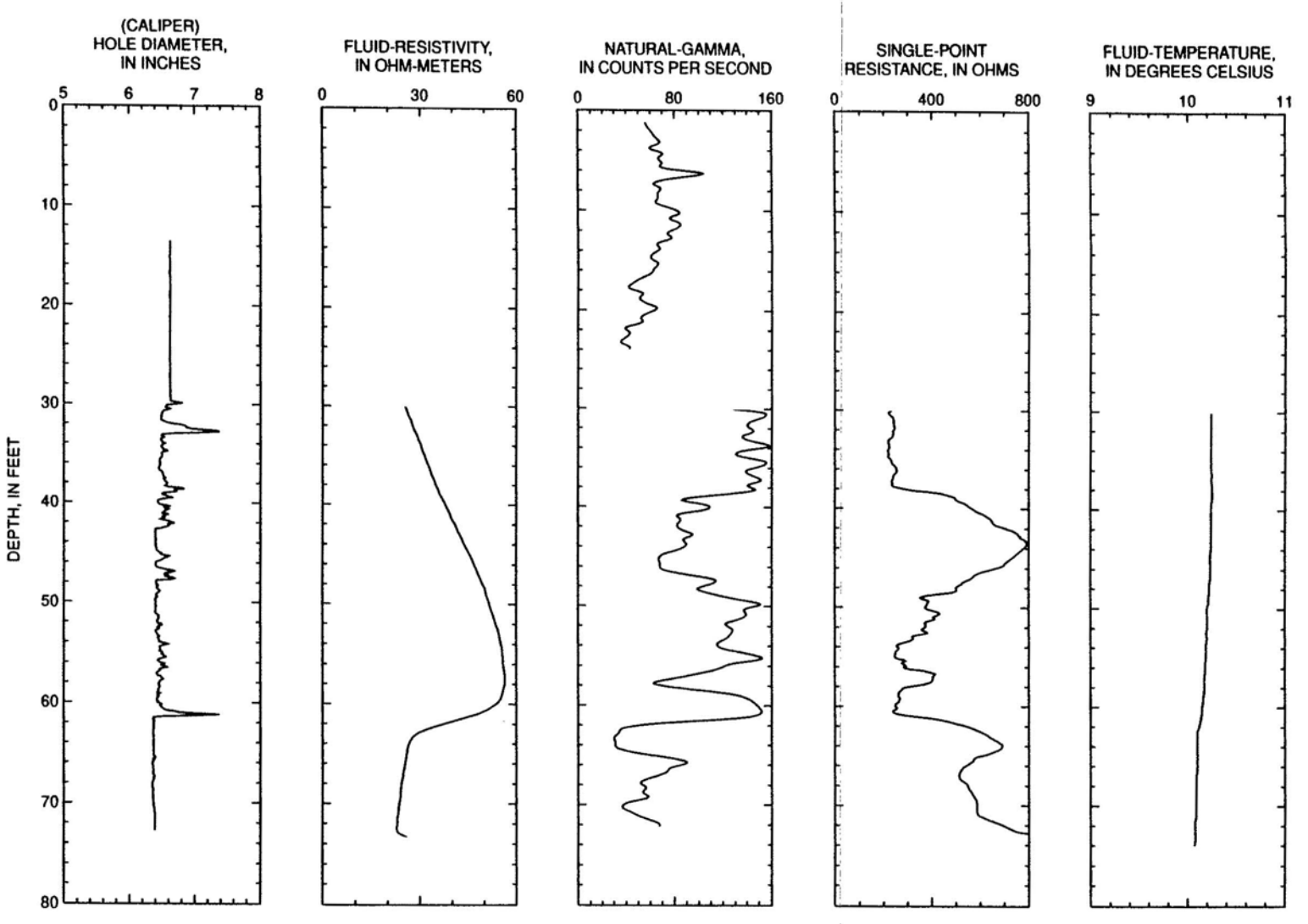

Figure 11. Borehole-geophysical logs for borehole MG-1593 (02-MW-04S), Willow Grove Naval Air Station.

MG-1594 (02-MW-04I)

The caliper log shows that the total depth of the borehole is 148 ft and that it is cased with 6-in.-diameter casing to 24 ft bls. The caliper log shows major fractures at 25 and 31 ft bls plus numerous minor fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 52 and 60 ft bls which may indicate water-producing fractures. The fluid-resistivity and fluid-temperature logs show a change in slope at 131 ft bls that correlates to a fracture shown on the caliper log. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 39, 51, 72, 95, 104, 114, and 122 ft bls (table 11). The borehole-video log shows that the borehole water becomes cloudy at 136 ft bls indicating no borehole flow exists below that depth. The geophysical logs, video log, and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 27 ft bls, moves downward, and exits the borehole through fractures at 110 and 130 ft bls. A screen was placed at 105-115 ft bls to include the water-receiving fractures at 110 ft bls.

FIGURE 12.—NEAR HERE.

Table 11. *Summary of heat-pulse-flowmeter measurements for borehole MG-1594 (03-MW-04I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
39	1.5	Down
51	1.5	Down
72	1.4	Down
95	1.5	Down
104	1.5	Down
114	.90	Down
122	.93	Down

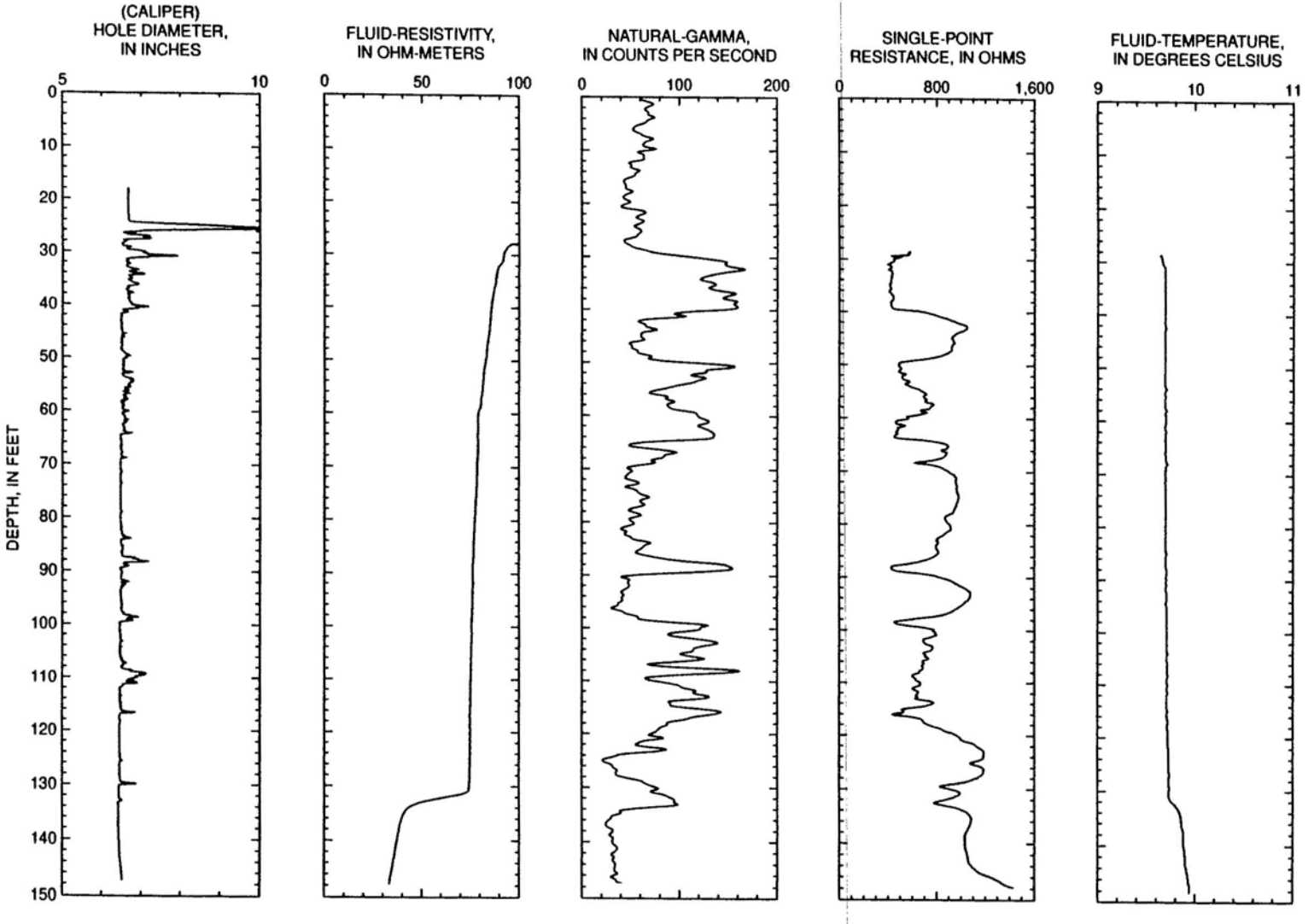

Figure 12. Borehole-geophysical logs for borehole MG-1594 (02-MW-04I), Willow Grove Naval Air Station.

MG-1595 (03-MW-05I)

The caliper log shows that the total depth of the borehole is 149 ft and that it is cased with 6-in.-diameter casing to 27 ft bls. The caliper log shows major fractures at 58-61, 65-66, 67-69, 74, 78 and 86 ft bls plus numerous minor fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 60, 94, 112, 135, and 145 ft bls that correlate to fractures shown on the caliper log which may indicate water-producing zones. Under ambient conditions, the heat-pulse flowmeter measured upward borehole flow at 46, 63, 83, 100, 124, and 140 ft bls (table 12). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 145, 110-116, 94, and 60 ft bls, moves upward, and exits the borehole through fractures at approximately 30 ft bls. The drilling log reports 2 gal/min of water production at about 90 ft bls and 4 gal/min at 135-145 ft bls. Screens placed at 80-95 and 130-145 ft bls would include the water-producing fractures at 90 and 135-145 ft bls. A screen was placed at 82-92 to include the water-producing fractures at 90 ft bls.

FIGURE 13.—NEAR HERE.

Table 12. *Summary of heat-pulse-flowmeter measurements for borehole MG-1595 (03-MW-05I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
46	0.18	Up
63	.17	Up
83	.17	Up
100	.15	Up
124	.11	Up
140	.13	Up

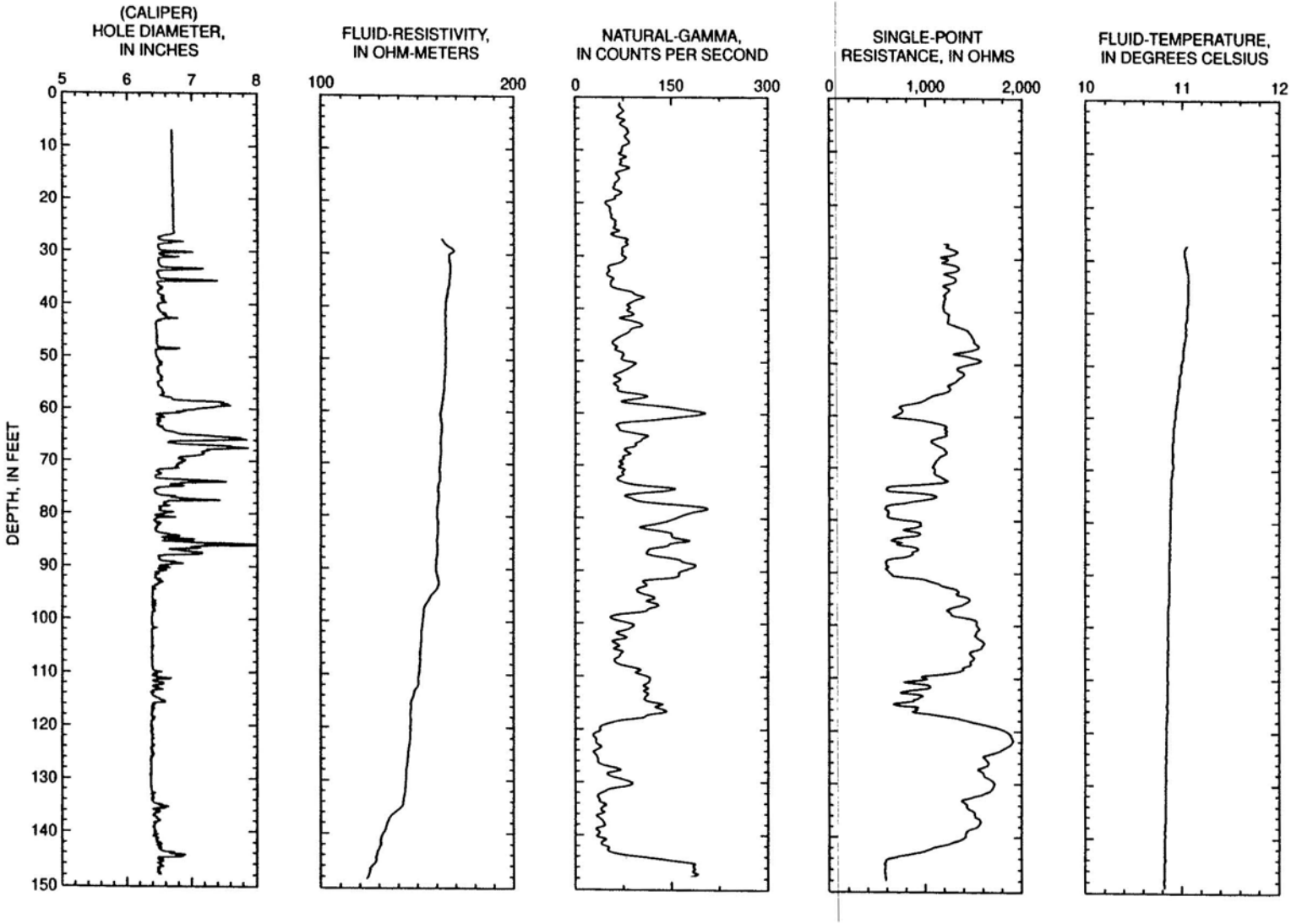

Figure 13. Borehole-geophysical logs for borehole MG-1595 (03-MW-05I), Willow Grove Naval Air Station.

MG-1596 (03-MW-06S)

The caliper log shows that the total depth of the borehole is 84 ft and that it is cased with 6-in.-diameter casing to 25 ft bls. The caliper log shows major fractures at 39-44 and 80-83 ft bls plus numerous minor fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 39 and 80 ft bls that correlate to fractures shown on the caliper log. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 35, 52, 68, and 75 ft bls (table 13). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 31, 39-44, and 55-65 ft bls, moves downward, and exits the borehole through fractures at 80-83 ft bls. Screens were placed at 26-36 and 75-85 ft bls to include the water-producing fracture at 31 ft bls and water-receiving fractures at 80-83 ft bls.

FIGURE 14.—NEAR HERE.

Table 13. *Summary of heat-pulse-flowmeter measurements for borehole MG-1596 (03-MW-06S) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
35	0.19	Down
52	.15	Down
68	.30	Down
75	.33	Down

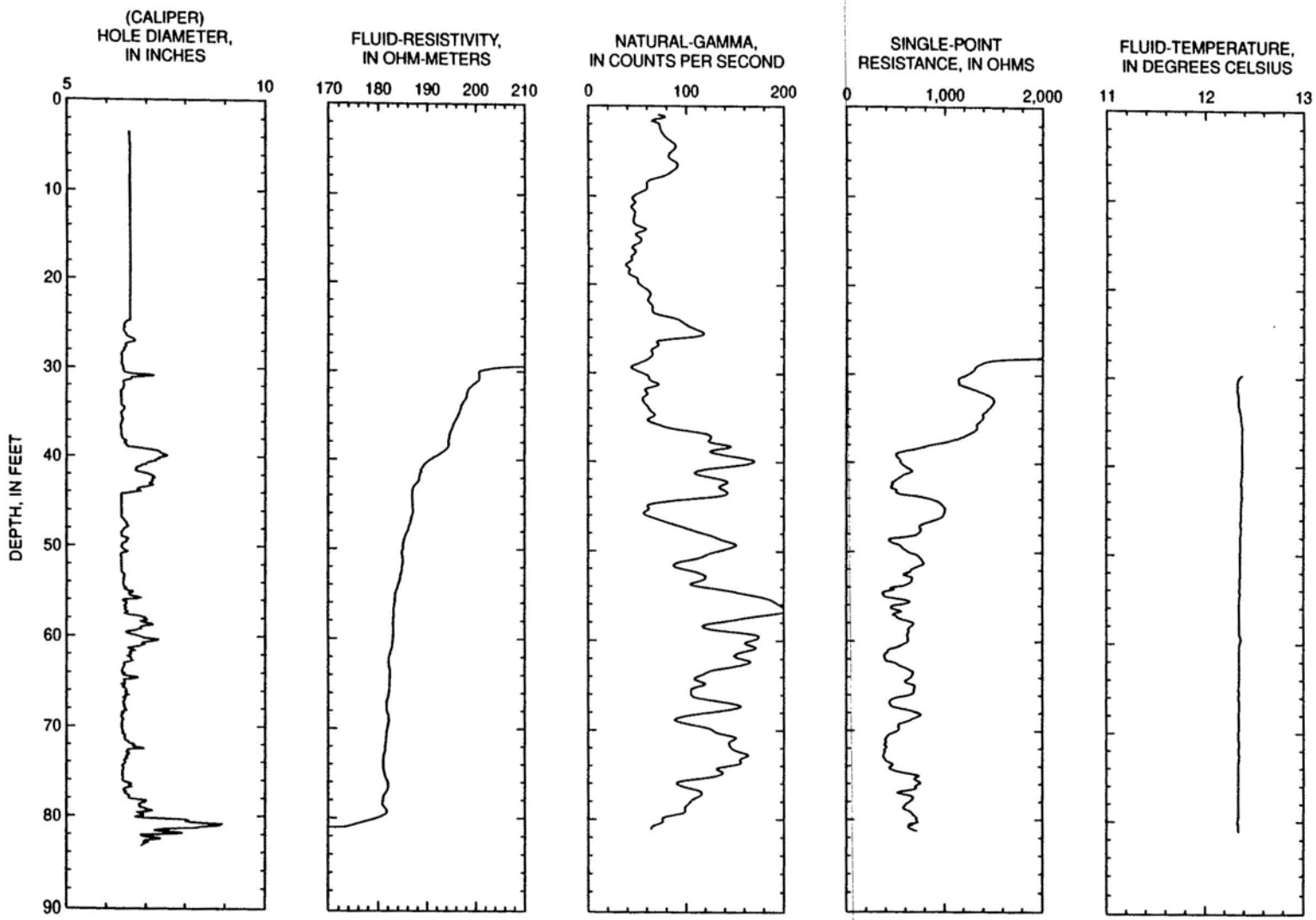

Figure 14. Borehole-geophysical logs for borehole MG-1596 (03-MW-06S), Willow Grove Naval Air Station.

MG-1597 (03-MW-06I)

The caliper log shows that the total depth of the borehole is 148 ft and that it is cased with 6-in.-diameter casing to 20 ft bls. The caliper log shows major fractures at 35-37, 103-106, and 118 ft bls plus other minor fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 60, 92, 106, 112, 118, 122, and 144 ft bls that correlate to fractures shown on the caliper log and may indicate water-producing zones. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 47, 63, 82, 94, 128, and 140 ft bls (table 14). The borehole-video log shows that the borehole water becomes very cloudy at 124 ft bls. The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 35-37 ft bls, moves downward, and exits the borehole through the fracture at 143 ft bls. The drilling log reports the greatest quantity of water is produced at about 103-106 ft bls. A screen placed at 100-115 ft bls would include the water-producing fractures at 103-106 ft bls. A screen was placed at 140-150 ft bls.

FIGURE 15.—NEAR HERE.

Table 14. *Summary of heat-pulse-flowmeter measurements for borehole MG-1597 (03-MW-06I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
47	0.24	Down
63	.19	Down
82	.19	Down
94	.19	Down
128	.23	Down
140	.25	Down

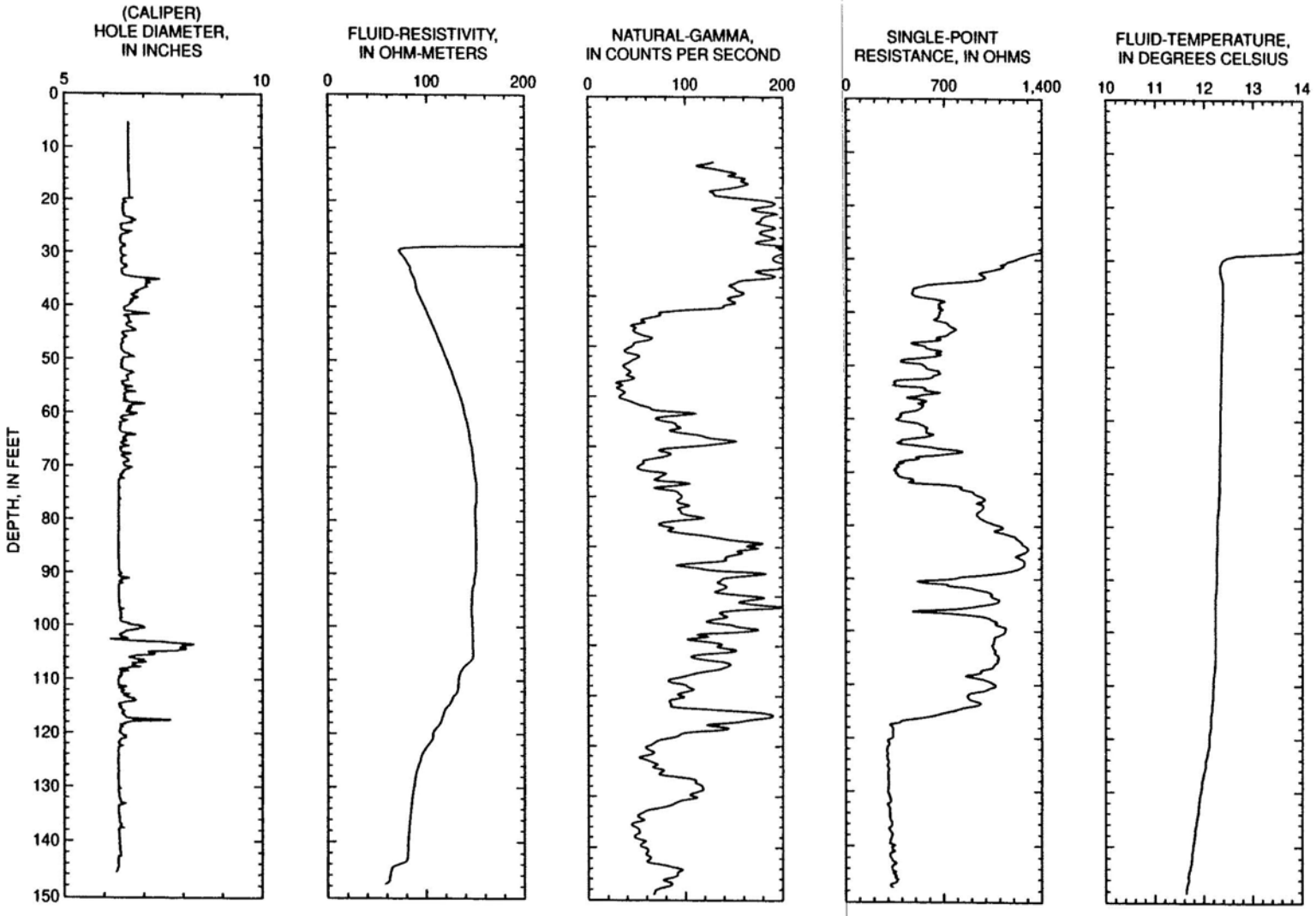

Figure 15. Borehole-geophysical logs for borehole MG-1597 (03-MW-06I), Willow Grove Naval Air Station.

MG-1598 (02-MW-01I)

The caliper log shows that the total depth of the borehole is 104 ft and that it is cased with 6-in.-diameter casing to 13 ft bls. The caliper log shows major fractures at 14, 15, and 74-78 ft bls plus numerous minor fractures throughout the open-hole interval. The fluid-temperature log shows a sharp change in slope at 98 ft bls that correlates to a fracture shown on the caliper log which indicates a water-producing zone. Under ambient conditions, the heat-pulse flowmeter measured upward borehole flow at 43, 68, 81, and 93 ft bls (table 15). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 97 and 74-78 ft bls, moves upward, and probably exits the borehole through the fracture at 46 ft bls. A screen was placed at 70-80 ft bls to include the water-producing fracture at 74-78 ft bls.

FIGURE 16.—NEAR HERE.

Table 15. *Summary of heat-pulse-flowmeter measurements for borehole MG-1598 (02-MW-01I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
43	0.77	Up
68	.89	Up
81	.76	Up
93	.73	Up

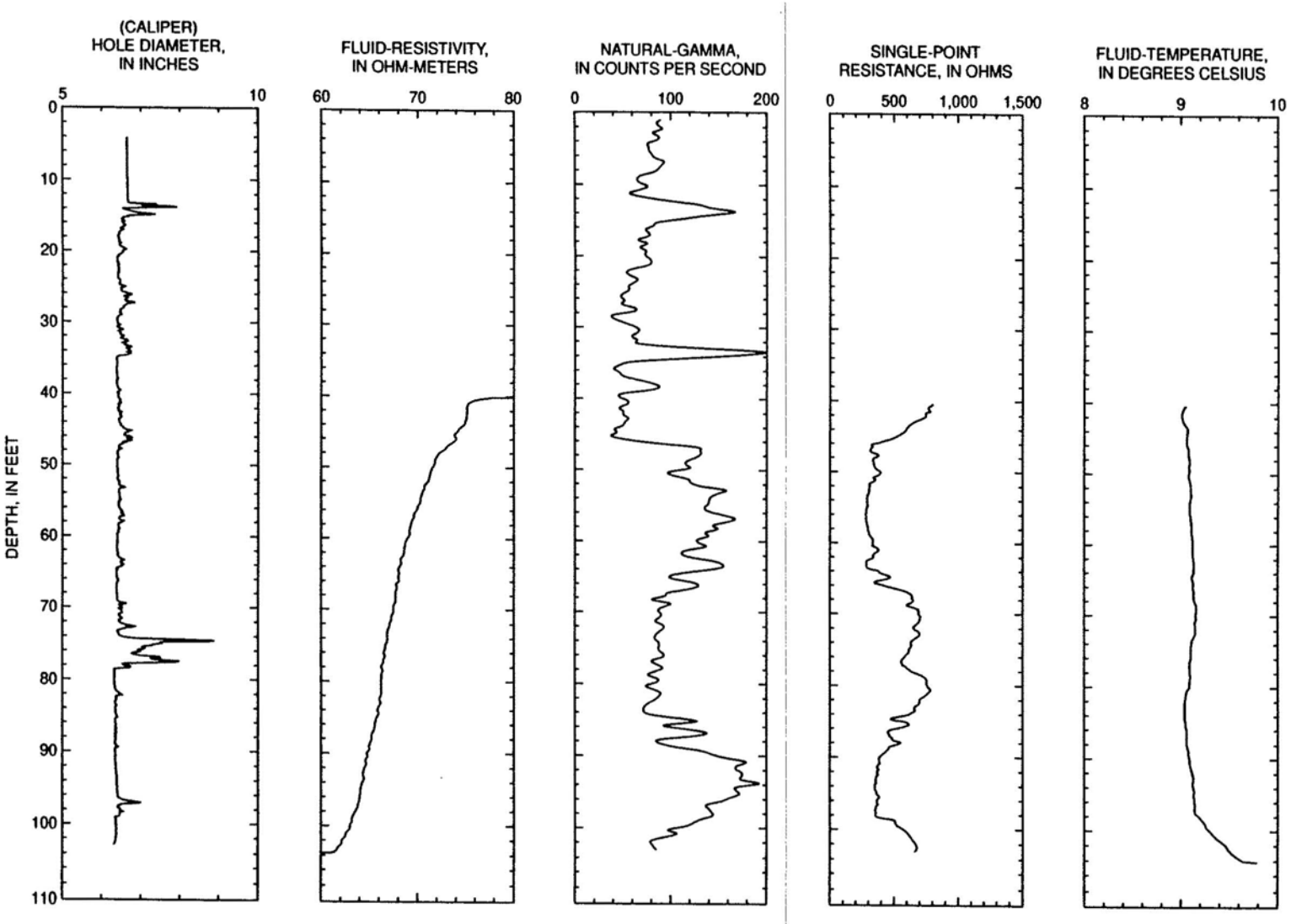

Figure 16. Borehole-geophysical logs for borehole MG-1598 (02-MW-01I), Willow Grove Naval Air Station.

MG-1599 (05-MW-01I)

The caliper log shows that the total depth of the borehole is 148 ft and that it is cased with 6-in.-diameter casing to 24 ft bls. The caliper log shows major fractures at 27, 72, and 76-92 ft bls plus other minor fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 38, 102, 108, 112, 120, and 130 ft bls that approximately correlate to fractures shown on the caliper log which may indicate water-producing zones. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 42 and 66 ft bls and no flow at 95 and 118 ft bls (table 16). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures between 30-62 ft bls, moves downward, and exits the borehole through the fractures at 76-92 ft bls. The drilling log reports 3 gal/min is produced at 126-130 ft bls. A screen was placed at 125-135 ft bls to include the water-producing fracture at 126-130 ft bls.

FIGURE 17.—NEAR HERE.

Table 16. *Summary of heat-pulse-flowmeter measurements for borehole MG-1599 (01-MW-01D) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
42	0.37	Down
66	.69	Down
95	No flow	
118	No flow	

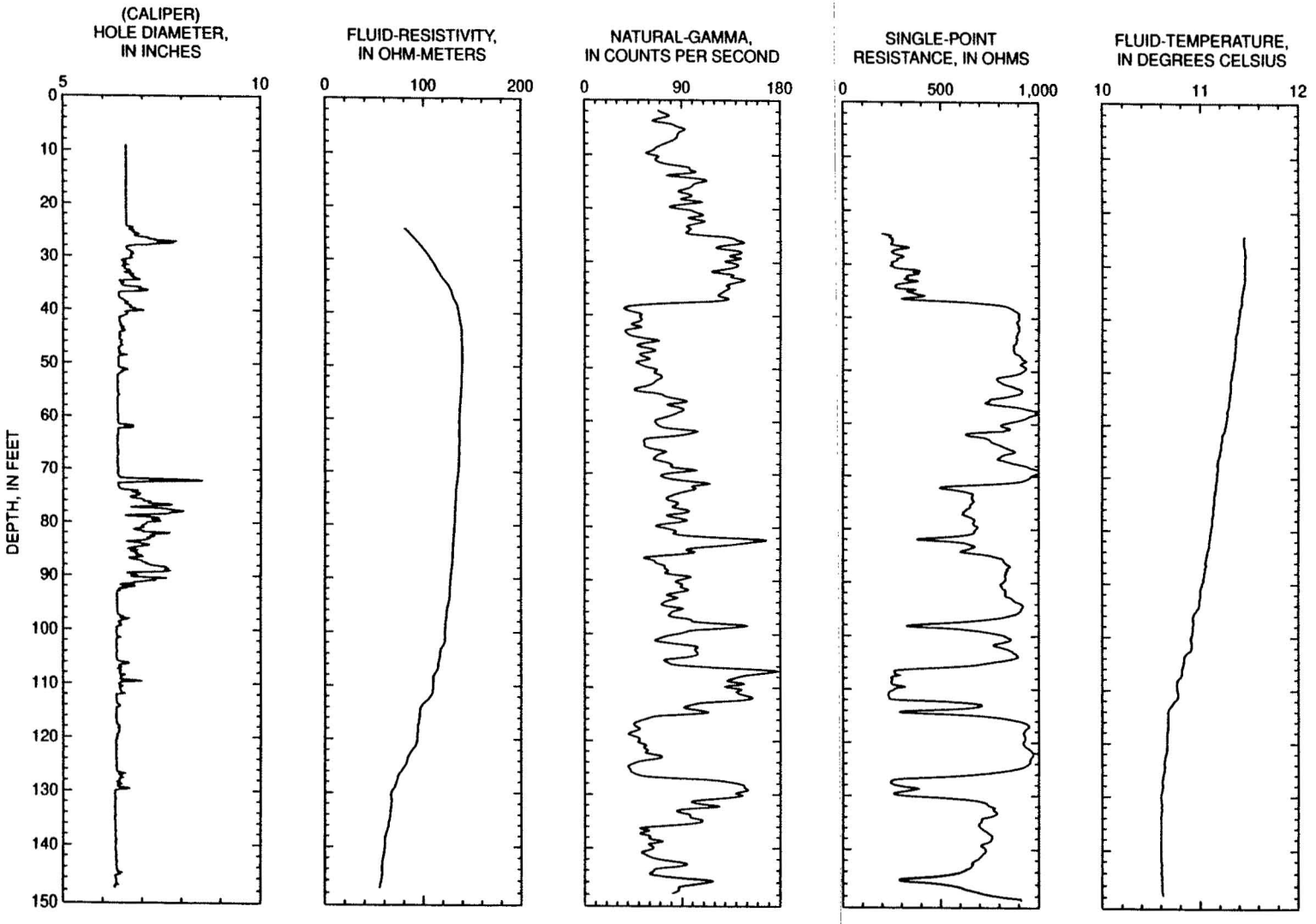

Figure 17. Borehole-geophysical logs for borehole MG-1599 (05-MW-011), Willow Grove Naval Air Station.

MG-1628 (02-MW-03I)

The caliper log shows that the total depth of the borehole is 148 ft and that it is cased with 6-in.-diameter casing to 13 ft bls. The caliper log shows major fractures at 13-16, 24-27, 64-70, and 144-146 ft bls plus other minor fractures throughout the open-hole interval. The fluid-temperature and fluid-resistivity logs show changes in slope at 44 and 51 ft bls that correlate to fractures shown on the caliper log, indicating a water-producing zone. Under ambient conditions, the heat-pulse flowmeter measured upward borehole flow at 35 ft bls and downward flow at 61, 98 and 130 ft bls (table 17). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures between 42-54 ft bls, moves upward and downward, and exits the borehole through the fractures at 14-32 and 144-146 ft bls. Screens placed at 40-55 and 140-150 ft bls would include the water-producing fractures at 42-54 ft bls and the water-receiving fracture at 144-146 ft bls.

FIGURE 18.—NEAR HERE.

Table 17. *Summary of heat-pulse-flowmeter measurements for borehole MG-1628 (02-MW-03I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
35	0.16	Up
61	1.4	Down
98	1.3	Down
130	1.4	Down

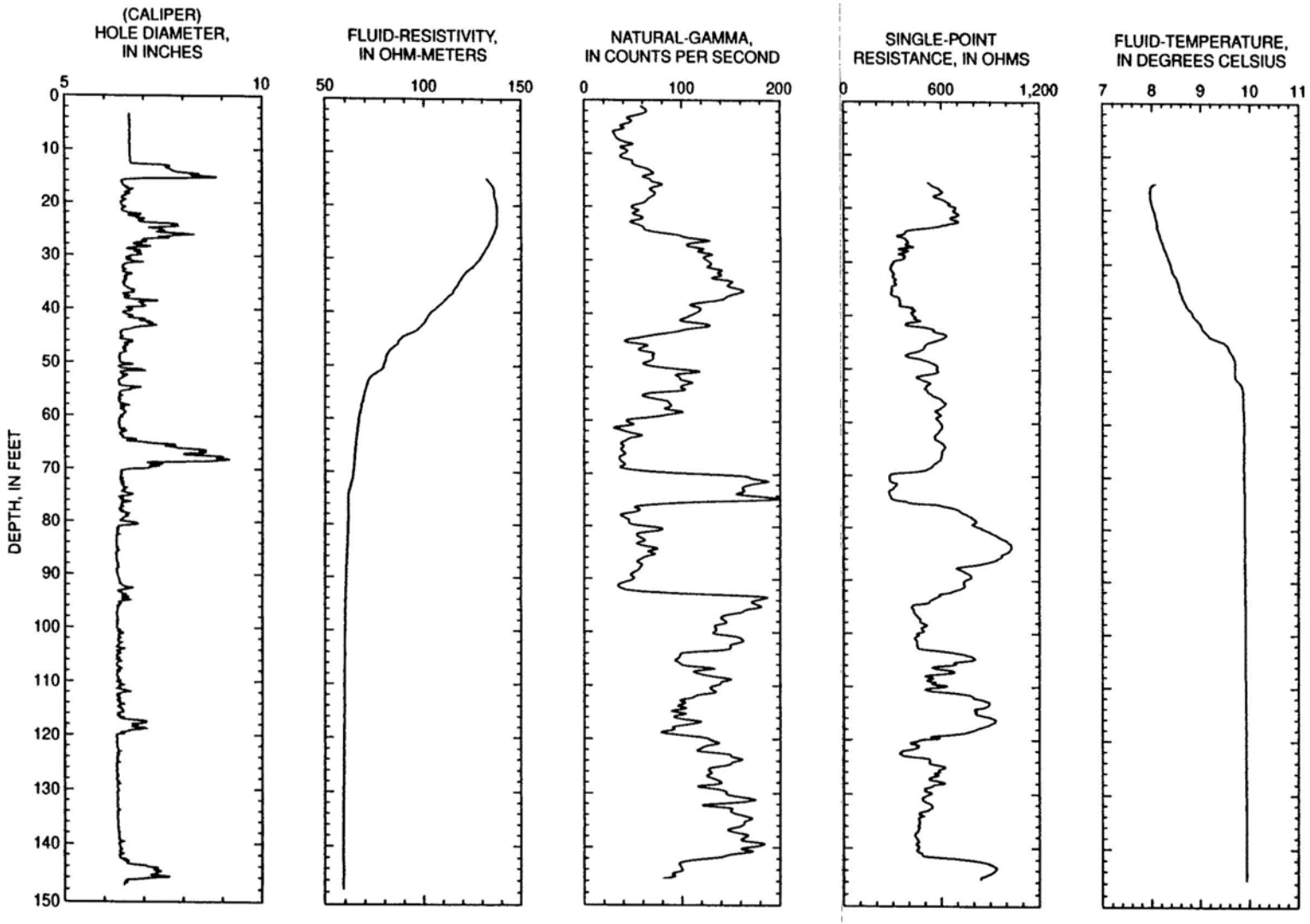

Figure 18. Borehole-geophysical logs for borehole MG-1628 (02-MW-03I), Willow Grove Naval Air Station.

MG-1629 (03-MW-02I)

The caliper log shows that the total depth of the borehole is 143 ft and that it is cased with 6-in.-diameter casing to 13 ft bls. The caliper log shows major fractures at 13-21 and 22-24 ft bls plus other minor fractures throughout the open-hole interval. The fluid-resistivity log shows a change in slope at 25, 62, 82, and 92 ft bls that correlate to fractures shown on the caliper log which may indicate water-producing zones. Under ambient conditions, the heat-pulse flowmeter measured upward borehole flow at 28, 87, 106, and 130 ft bls (table 18). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures between 140-143 ft bls moves upward and exits the borehole through fractures at about 24 ft bls. The driller's log reports a 2 gal/min water-production zone at 60 ft bls. A screen and sand pack was placed at 55-65 and 134-144 ft bls to include the water-producing fractures at 60 and 140-143 ft bls.

FIGURE 19.—NEAR HERE.

Table 18. *Summary of heat-pulse-flowmeter measurements for borehole MG-1629 (03-MW-02I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
28	1.2	Up
87	1.2	Up
106	1.1	Up
130	1.0	Up

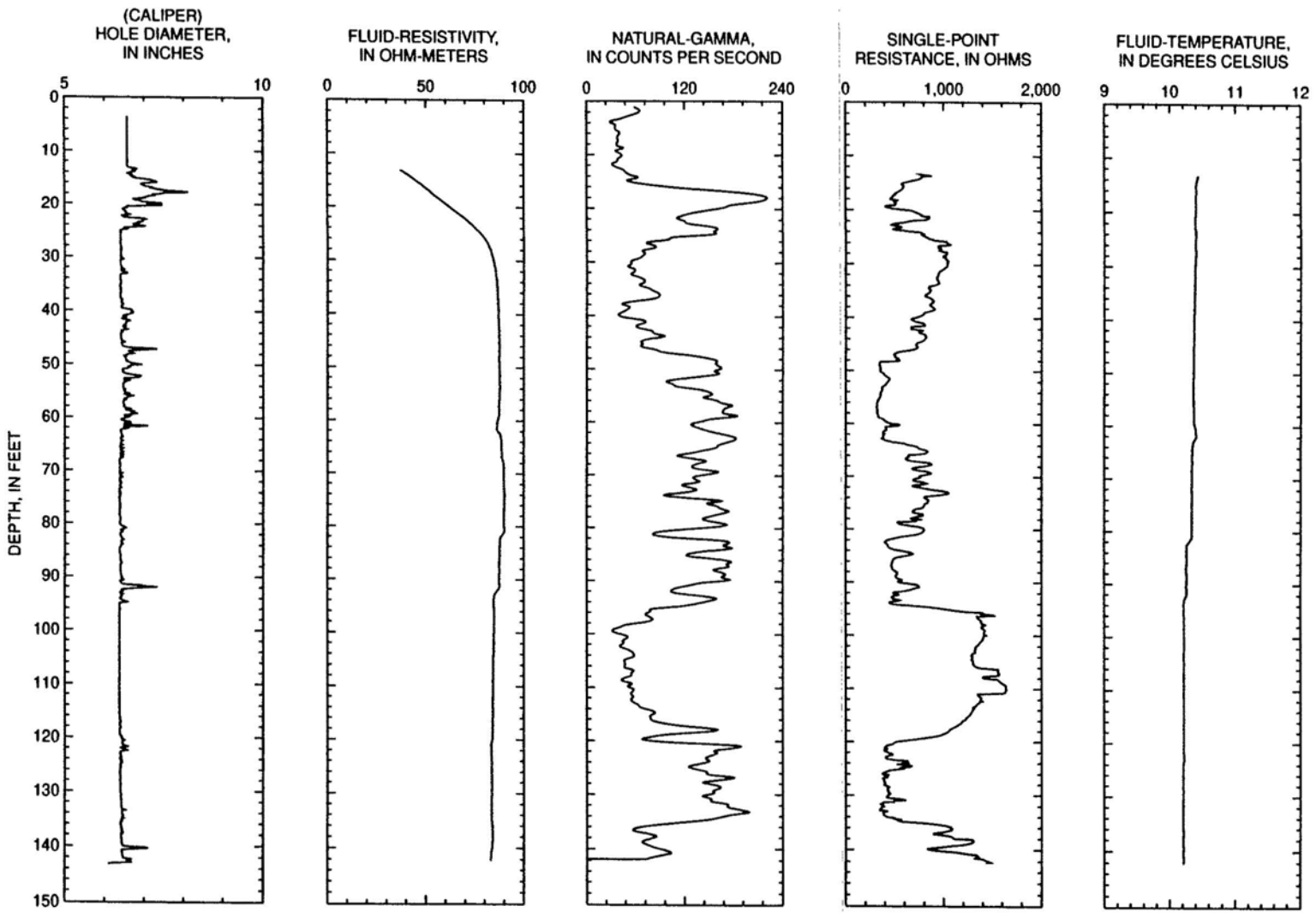

Figure 19. Borehole-geophysical logs for borehole MG-1629 (03-MW-02I), Willow Grove Naval Air Station.

MG-1630 (03-MW-07S)

The caliper log shows that the total depth of the borehole is 73 ft and that it is cased with 6-in.-diameter casing to 14 ft bls. The caliper log shows a major fracture at 40-41 ft bls plus minor fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 20, 42, 58, and 64 ft bls that correlate to fractures shown on the caliper log and indicates water-producing zones. Under ambient conditions, the heat-pulse flowmeter measured upward borehole flow at 31, 45, and 56 ft bls and no flow at 62 and 68 ft bls (table 19). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 58 and 52 ft bls, moves upward, and exits the borehole through fractures at 40-41 and 14-30 ft bls. The drillers log indicates 5-7 gal/min of water production at about 44 ft bls that probably is derived from the fracture at 40-41 ft bls. A screen was placed at 34-44 ft bls to include the water-producing fracture at 40-41 ft bls.

FIGURE 20.—NEAR HERE.

Table 19. *Summary of heat-pulse-flowmeter measurements for borehole MG-1630 (03-MW-07S) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
31	0.19	Up
45	.33	Up
56	.13	Up
62	No flow	
68	No flow	

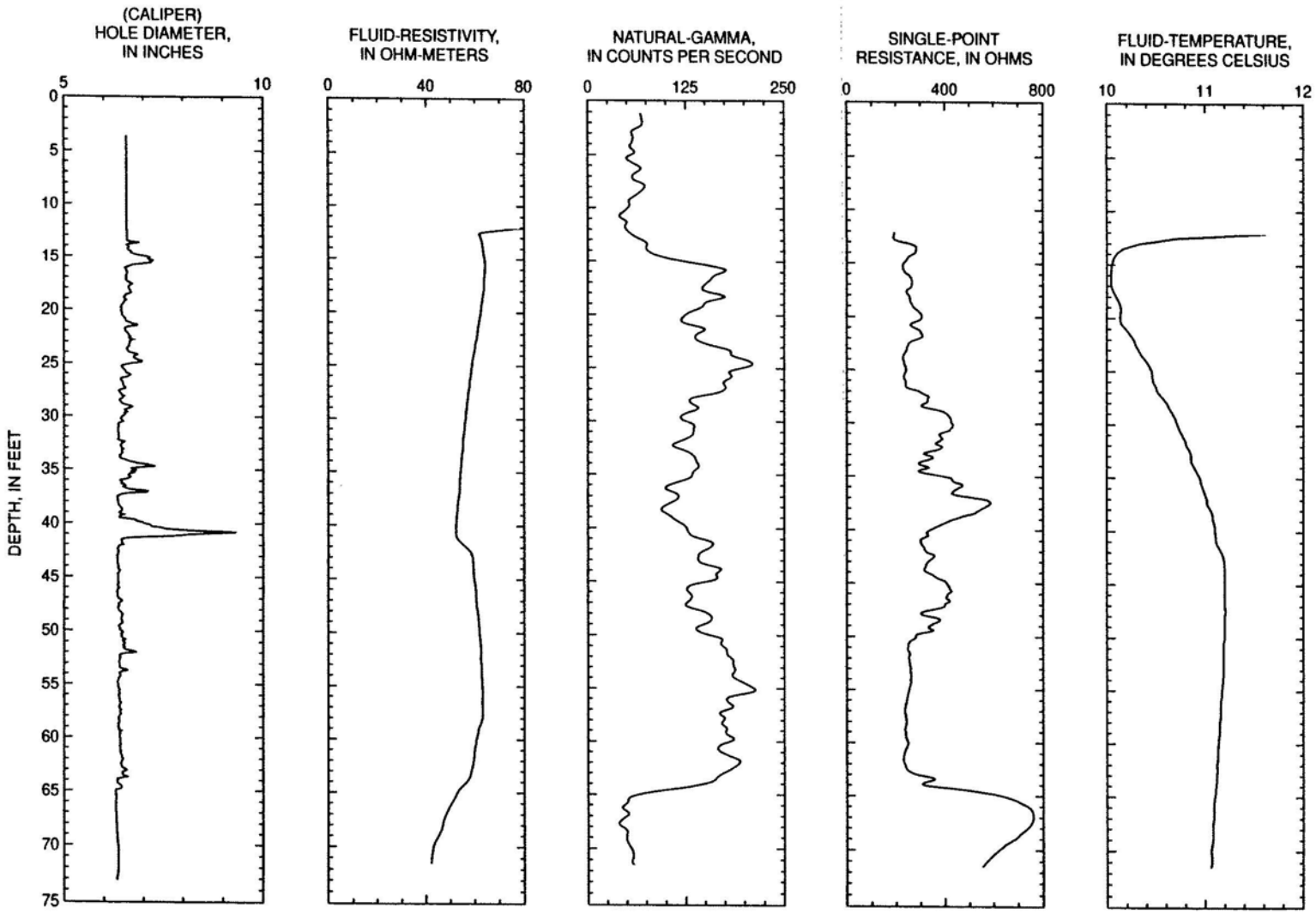

Figure 20. Borehole-geophysical logs for borehole MG-1630 (03-MW-07S), Willow Grove Naval Air Station.

MG-1631 (01-MW-03I)

The caliper log shows that the total depth of the borehole is 98 ft and that it is cased with 6-in.-diameter casing to 19 ft bls. The caliper log shows major fractures at 19-20, 70-72, and 84-86 ft bls plus other minor fractures throughout the open-hole interval. The fluid-resistivity log shows changes in slope at 24 and 93 ft bls that correlate to fractures shown on the caliper log and indicate water-producing zones. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 30, 54, 68, and 80 ft bls (table 20). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 19-28 ft bls, moves downward, and exits the borehole through fractures at 40-50, 70-78, and 94 ft bls. The drillers log indicates 20-25 gal/min of water is produced from 50-98 ft bls that probably is derived from fractures at 70-94 ft bls. A screen placed at 69-79 ft bls would include the water-receiving fractures at 70-78 ft bls.

FIGURE 21.—NEAR HERE.

Table 20. *Summary of heat-pulse-flowmeter measurements for borehole MG-1631 (01-MW-03I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
30	0.32	Down
54	1.0	Down
68	1.1	Down
80	.51	Down

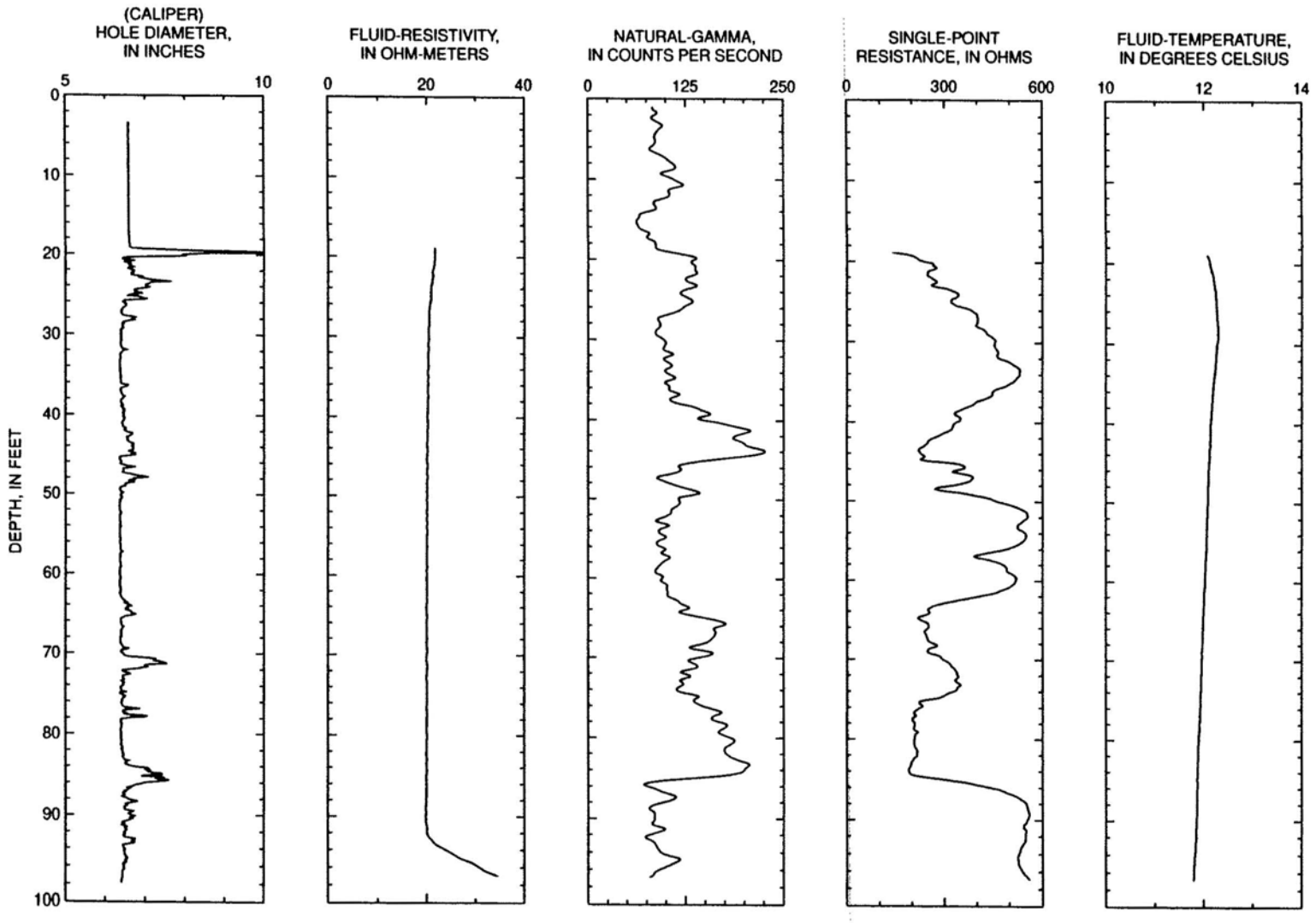

Figure 21. Borehole-geophysical logs for borehole MG-1631 (01-MW-03I), Willow Grove Naval Air Station.

MG-1632 (01-MW-01I)

The caliper log shows that the total depth of the borehole is 98 ft and that it is cased with 6-in.-diameter casing to 25 ft bls. The caliper log shows a major fracture at 38-40 ft bls plus numerous minor fractures throughout the open-hole interval. The fluid-resistivity log shows a change in slope at 93 ft bls that correlates to fractures shown on the caliper log and indicates a water-receiving zone. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 31, 43, 56, 70, and 88 ft bls (table 21). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures at 27-30 ft bls, moves downward, and exits the borehole through fractures at 33-40, 60-66, 80-83, and 94 ft bls. The driller's log indicates about 4 gal/min of water is produced from 82 ft bls. A screen was placed at 75-85 ft bls to include the water-producing fracture at 82 ft bls.

FIGURE 22.—NEAR HERE.

Table 21. *Summary of heat-pulse-flowmeter measurements for borehole MG-1632 (01-MW-01I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
31	1.4	Down
43	.68	Down
56	.63	Down
70	.37	Down
88	.24	Down

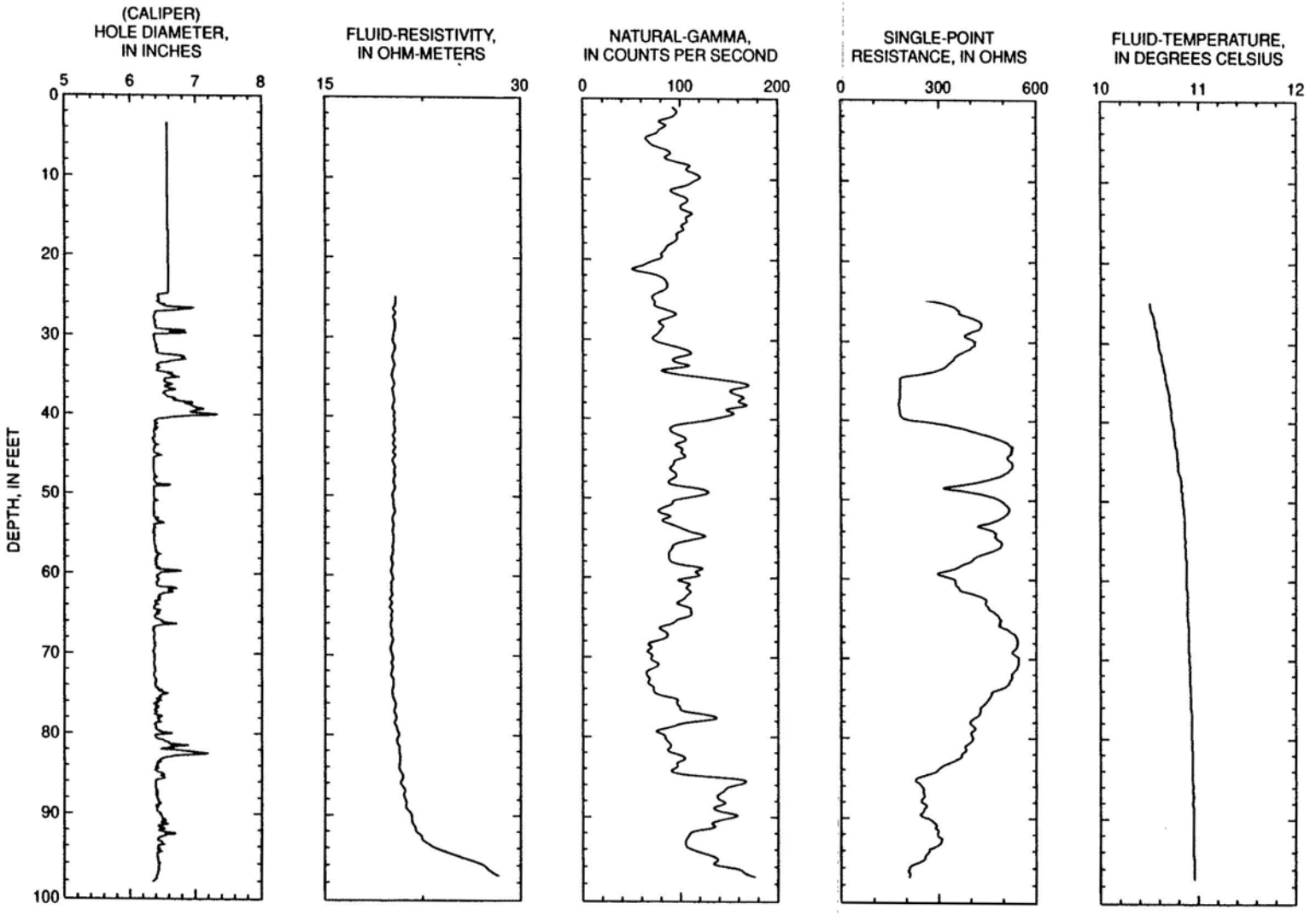

Figure 22. Borehole-geophysical logs for borehole MG-1632 (01-MW-01I), Willow Grove Naval Air Station.

MG-1633 (01-MW-08I)

The caliper log shows that the total depth of the borehole is 98 ft and that it is cased with 6-in.-diameter casing to 25 ft bls. The caliper log shows numerous minor fractures throughout the open-hole interval. The fluid-temperature and fluid-resistivity logs shows changes in slope at 26 and 80 ft bls that correlate to fractures shown on the caliper log and indicate a water-producing and a water-receiving zone, respectively. Under ambient conditions, the heat-pulse flowmeter measured downward borehole flow at 30, 44, 58, and 76 ft bls and no flow at 86 ft bls (table 22). The geophysical logs and the heat-pulse-flowmeter data indicate that water enters the borehole through fractures just below casing at 25 ft bls, moves downward, and exits the borehole through fractures at 64-73 and 80 ft bls. The drillers log indicates about 5 gal/min of water is produced at 80 ft bls. A screen was placed at 76-86 ft bls to include the water-producing fracture at 80 ft bls.

FIGURE 23.—NEAR HERE.

Table 22. *Summary of heat-pulse-flowmeter measurements for borehole MG-1633 (01-MW-08I) at Willow Grove Naval Air Station, Montgomery County, Pennsylvania*

[ft bls, feet below land surface; gal/min, gallon per minute]

Depth (ft bls)	Flow rate under ambient conditions (gal/min)	Flow direction under ambient conditions
30	1.2	Down
44	1.2	Down
58	1.1	Down
76	.50	Down
86	No flow	

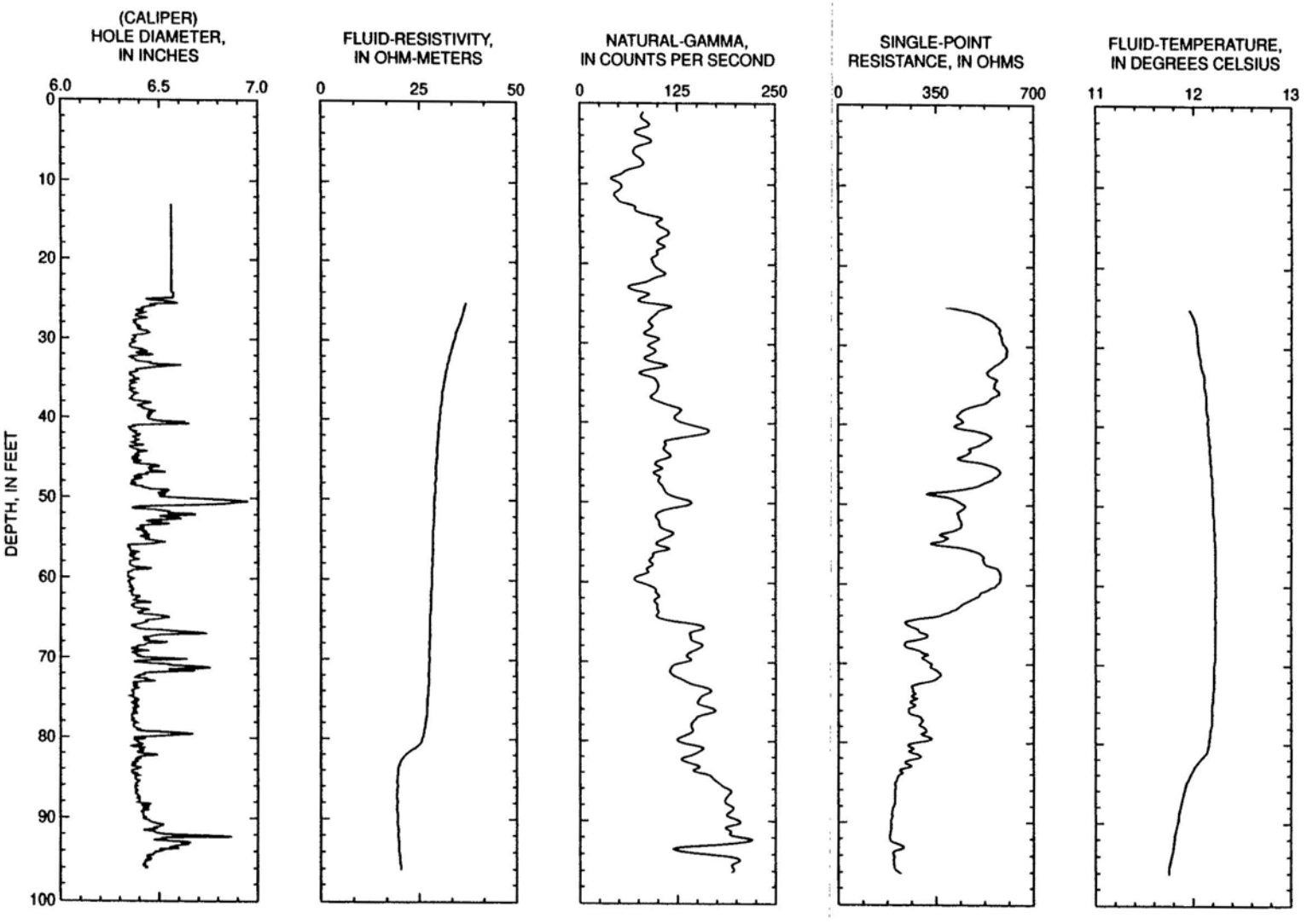

Figure 23. Borehole-geophysical logs for borehole MG-1633 (01-MW-08I), Willow Grove Naval Air Station.

CONCLUSIONS

Water-producing zones, water-receiving zones, and intervals of vertical borehole flow were identified by the use of geophysical logs, heat-pulse-flowmeter data, video logs, and drilling notes. This enabled Brown and Root to place screens at selected water-producing intervals so that these intervals could be sampled.

All boreholes flowmetered near NAS Site 1, NAS site 5, and wells MG-1596 and MG-1597 at NAS Site 3 showed downward ambient flow. In these boreholes, water is generally produced through fractures between 18-49 ft bls, moves downward, and exits the borehole through fractures between 53-128 ft bls. The deepest borehole [MG-1589 (05-MW-3I), located at NAS Site 5], showed downward flow from the top and upward flow near the bottom.

Boreholes MG-1595, MG-1629, and MG-1630 in NAS Site 3 and borehole MG-1598 in NAS Site 2 showed consistent upward borehole flow. These wells are located topographically lower than wells at NAS Sites 1, 2 and 5 and are in areas of ground-water discharge.

Not all water-producing zones in the wells at NAS are under different head pressure. For example, during drilling of MG-1599, well yield increased about 8 gal/min from depths of 88 to 129 ft bls. No flow was detected between the water-producing zones at 95 or 118 ft bls with the heat-pulse flowmeter. This indicates that the water-producing zones reported on the drillers log at 90, 100, 112, and 127-129 ft bls are essentially under the same head. Identification of zones such as these are correlated between the geophysical logs and the driller's notes.

The video logs show that most wells become distinctly cloudy immediately below the last water-receiving or water-producing zone. Heat-pulse flowmeter data indicate all boreholes penetrate 2-3 water-bearing zones depending on well depth: a shallow, unconfined zone and two semi-confined or confined zones. The shallow boreholes near NAS Site 5 are reported to produce 3-20 gal/min, and the intermediate boreholes produce from 25 to 70 gal/min. Generally, water yield increases with depth to about 150 ft bls. The vertical direction of ambient borehole flow in an open borehole is dependant upon depth and elevation of the water-producing intervals.

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OFF-BASE WELLS

PROPOSED OFF-STATION HYDROGEOLOGICAL INVESTIGATION
PHASE II REMEDIAL INVESTIGATION
NASJRB WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA

The Navy is performing hydrogeological investigations under access agreements between the Navy and the respective owner listed by borehole below. This document proposes action at two boreholes where geophysics has been performed.

Borehole No. 1 - 73 foot irrigation well located on Lot 1 (owner - Advanta Service Corporation)

Geophysical investigations were performed on Thursday, March 5, 1998. This work was performed by a United States Geological Service (USGS).

The results of geophysical studies indicate that the borehole has a total depth of 73 feet, not the 450 feet previously reported by ERM. Based on the geophysical log data, there is only one significant water producing zone.

Based on the hydogeologists recommendations, the Navy will obtain one sample for VOC analysis from the flowing borehole to verify previous sampling results and to determine if there is a trend in the concentration over time.

Borehole No. 2 - 150 foot test borehole located on Lot 8 (owner - Comrock Associates, L.P.) (MW-2)

Geophysics and borehole video logs were collected on Wednesday, March 11, 1998.

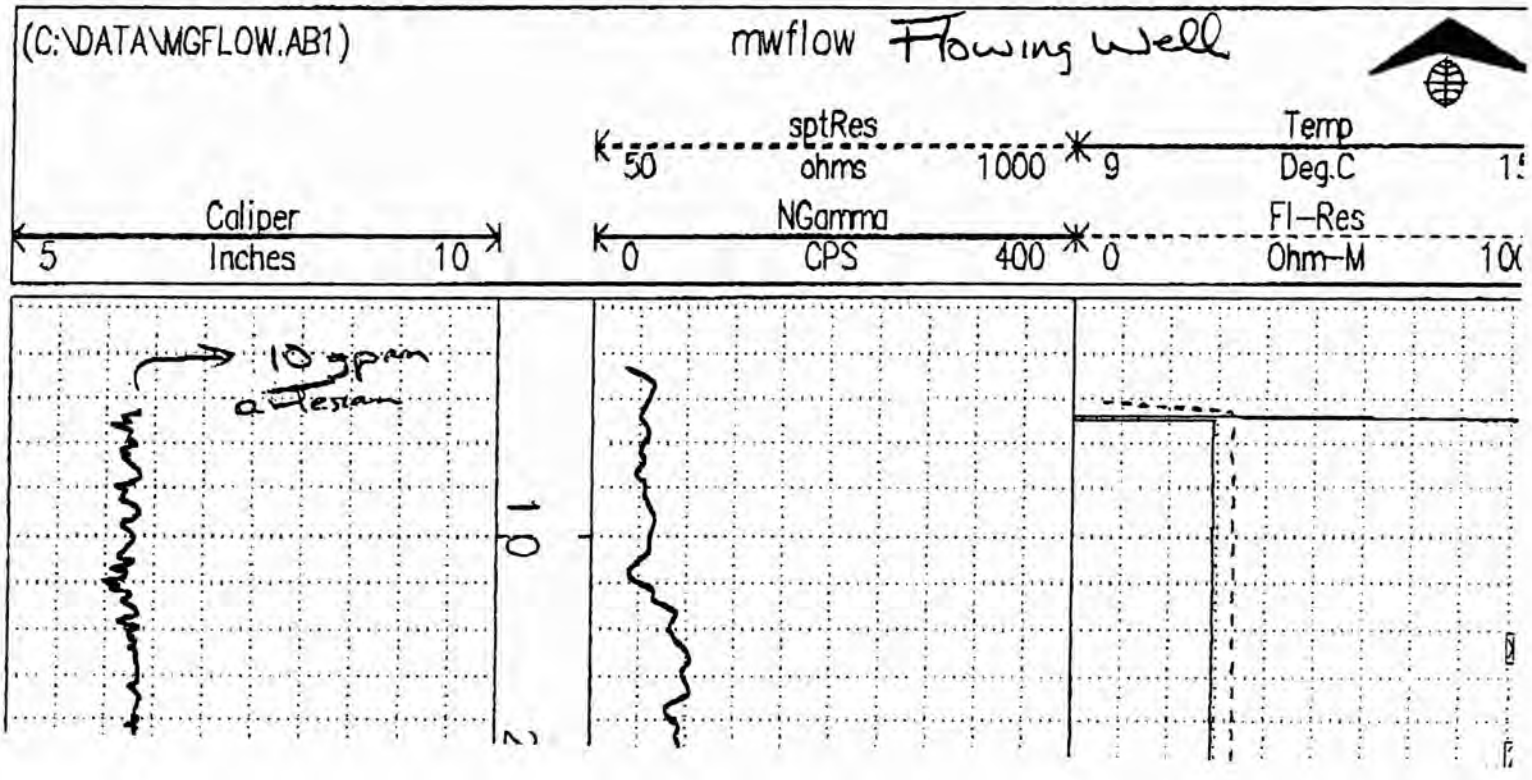
The results of geophysical studies indicate that the borehole has a total depth of approximately 150 feet, in agreement with the depth previously reported by ERM. Based on the geophysical log data, there are three significant water producing zones. There is not sufficient space in the borehole to install a separate monitoring well to monitor each of the three water producing zones.

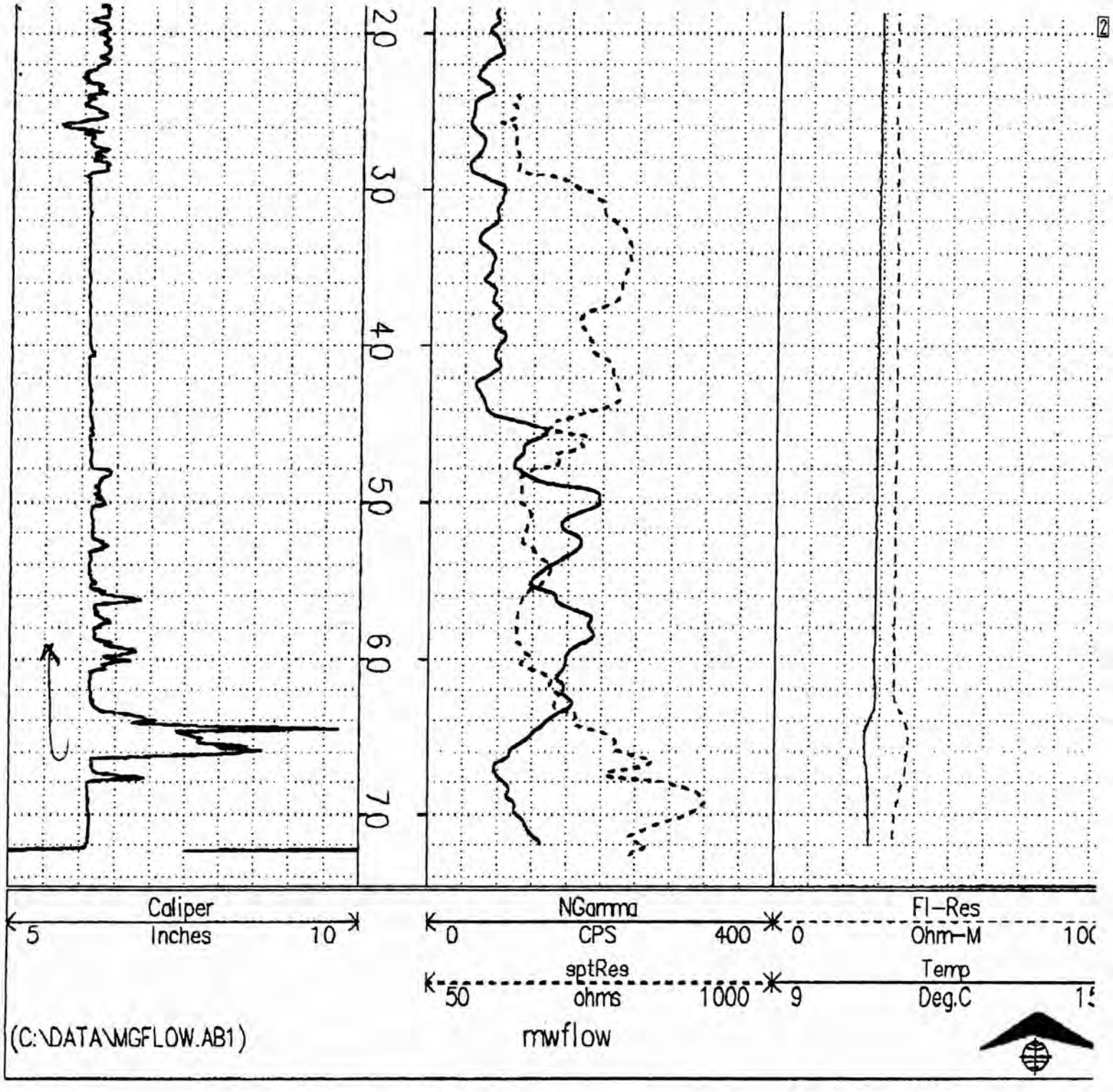
Previous borehole sampling results (ERM 1996) did not find VOCs in the groundwater obtained from the 120 to 150 foot interval using packer technology.

Based on the hydogeologists recommendations, the Navy will obtain one groundwater sample for VOC analysis from each of the three significant water producing zones in the open borehole. The modified EPA low flow purge and sample technique used in the Phase II RI will be used to obtain samples. Results will be used to verify previous sampling results.

By not installing monitoring wells at up to two of the water producing zones (thereby losing access to the third), the Navy will retain greater options for future utility of this borehole.

Willow Grove

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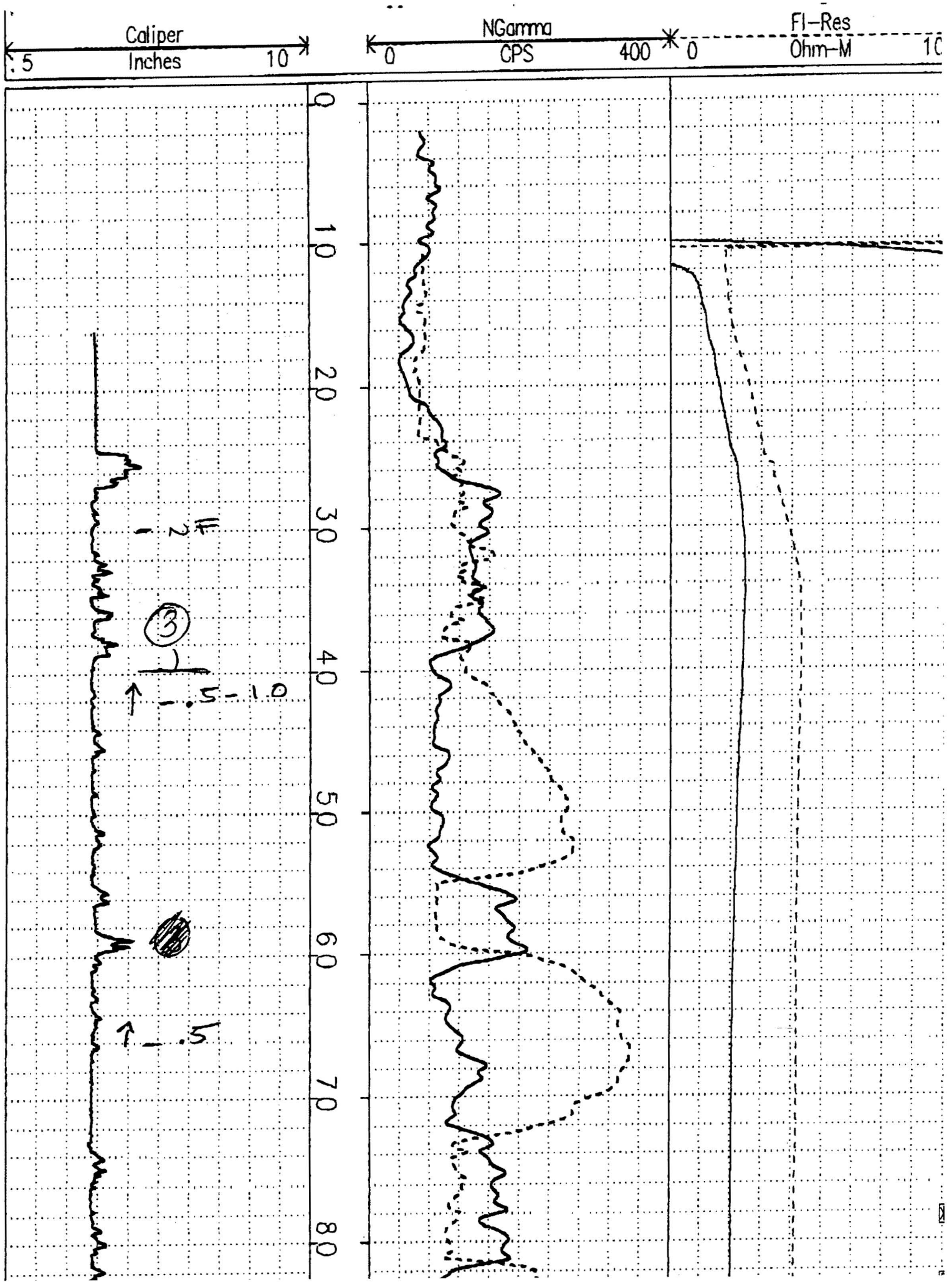
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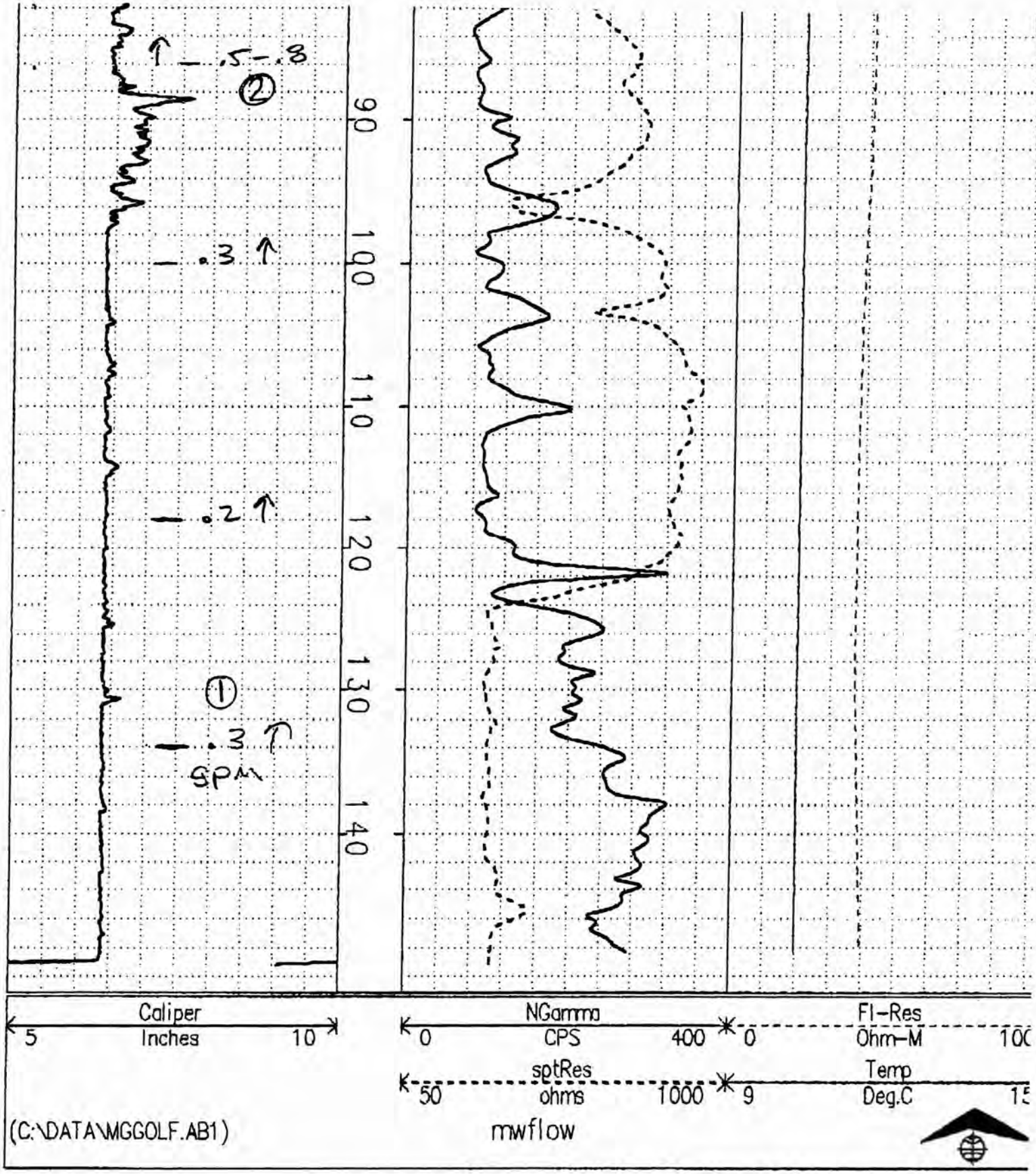
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APPENDIX H

CHAIN-OF-CUSTODY FORMS

(1 of 2)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466-0105	NASJRB Willow Grove
SAMPLERS (SIGNATURE):	

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	2 ounce Jar VOA	4 ounce Jar SVOC	4 ounce Jar Pest/PCB	4 ounce Jar Metals	4 ounce Jar PCB only		REMARKS
1	5/27/97	1125		✓	055531	1					1		
2	5/27/97	1328	✓		125B02-0002	4	1	1	1	1			
3	5/27/97	1334	✓		125B02-0204	4	1	1	1	1			
4	5/27/97	1338	✓		125B02-0406	4	1	1	1	1			
5	5/27/97	1342	✓		125B02-0608	4	1	1	1	1			
6	5/27/97	1420		✓	125502	4	1	1	1	1			
7	5/27/97	1520	✓		035B01-0204	1	1						
8	5/27/97	1530	✓		035B01-0608	1	1						
9	5/27/97	1558	✓		035B01-1416	1	1						

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
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Order No. 70440 (0693)

2 of 2

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466 - 0105	MASTRB Willow Grove

SAMPLERS (SIGNATURE): WHSe

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40 ML VOA	1 Liter Amber SVOC	1 Liter Amber Pest/PCB	1 Liter Clear CN	1 Liter poly Metals		REMARKS
1	5/27/97	0800		✓	Trip Blank	2	2						
2	5/27/97	1600		✓	WGRB0527	6	2	1	1	1	1		Hold - Do not Analyze

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
WHSe	5-27 97 1700				
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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	Fed Ex Airbill # 299 2720522

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466	Willow Grove

SAMPLERS (SIGNATURE): [signature] [signature]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	624/40 ML V.A.I.S TCL - VOC						REMARKS
	6/27/97	830		✓	Trip Blank	2	✓						Trip Blank
	6/27/97	940		✓	01 MW01 S	2	✓						groundwater
	6/27/97	1025		✓	01 MW01 SO	2	✓						time 1025 groundwater
	6/27/97	1123		✓	01 MW 03 S	2	✓						groundwater
	6/27/97	1215		✓	01 MW ~~03~~ 04Z 04 S	2	✓						01 MW 04S groundwater
	6/27/97	1255		✓	01 MW 04 I	2	✓						
	6/27/97	1315		✓	WGRB62797	2	✓						Rinsate Blank
	6/27/97	1420		✓	01 MW06 S	2	✓						
	6/27/97	1510		✓	01 MW06I	2	✓						
	6/27/97	1016		✓	01 MW02 I	2	2						
	6/27/97	1118		✓	01 MW02 S	2	2						
	6/27/97	1234		✓	01 MW05 I	2	2						
	6/27/97	1320		✓	01 MW05 S	2	2						
	6/27/97	1040		✓	01 MW10 I	2	2						

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[signature] [signature]	6/27/97 1645				
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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Shipped via Federal Express Airbill No 508140022 5	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466	Willow Grove

SAMPLERS (SIGNATURE): John Lounsbury

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	2) 40 ML VIAL TCL - VOC	1) 1000 ML AMBER GL SVOC TCL	1) 1000 AMBER GL TCL - Pesticide/PCB	1) 1000 PLASTIC TAL - METALS	1) 1000 PLASTIC TCL - CYANIDE	REMARKS
	6/26/97	900		✓	trip BLANK	2	✓					trip Blank
		1200		✓	02 MW04 I	6	✓	✓	✓	✓	✓	groundwater
		1249		✓	02 MW04 S	6	✓	✓	✓	✓	✓	"
		1442		✓	03 MW02 S	6	✓	✓	✓	✓	✓	"
		1510			WGRB626 97	6	✓	✓	✓	✓	✓	Rinse Blank
		1609		✓	02 MW01 S	6	✓	✓	✓	✓	✓	groundwater

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
John Lounsbury	6/26/97 1830				
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				FedEx Airbill - 508140021 4	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 277 5466 0111	SITE NAME: Willow Grove NAS
SAMPLERS (SIGNATURE):	

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40ml glass vial HCl	TCL Volatiles 2 liter amber glass	TCL SVOC 1 liter amber glass	TCL Pest/PCB 1 liter amber glass	TAL Metals 1 liter poly HNO3	Cyanide 1 liter poly NaOH	40z wide mouth glass PLM Analysis Only	REMARKS
Site 03	6/25/97	1630		✓	03MW110S	6	2	1	1	1	1			groundwater
Rinsate Blank	6/25/97	1645		✓	WGRB062501	6	2	1	1	1	1			Rinsate Blank
	6/25/97	1340		✓	015839-0002	1						1		soil sample
Rinsate Blank	6/25/97	1505		✓	WGRB0625	1			1					Rinsate Blank

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	6/25/97 1840				
RELINQUISHED BY (SIGNATURE):	**DATE / TIME:**	**RECEIVED BY (SIGNATURE):**	**RELINQUISHED BY (SIGNATURE):**	**DATE / TIME:**	**RECEIVED BY(SIGNATURE):**
RELINQUISHED BY (SIGNATURE):	**DATE / TIME:**	**RECEIVED FOR LABORATORY BY (SIGNATURE):**	**DATE / TIME:**	**REMARKS:** Shipped via Federal Express A.B.11 No 508140020 3	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466	Willow Grove NAS

SAMPLERS (SIGNATURE):

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	2) 40 ML VIAL TCL VOC	1) 500 ML AMBER TCL SVOC	1) 1000 ML AMBER TCL PESTICIDE/PCB	1) 500 ML PLASTIC TAL INORGANIC	1) 125 ML PLASTIC CYANIDE		REMARKS
	9/25/97	0751		✓	05 MW04 S	6	✓	✓	✓	✓	✓		groundwater
	9/25/97	0800		✓	Trip BLANK-01	2	✓						Lab trip
	9/25/97	1111		✓	05 MW08 S	6	✓	✓	✓	✓	✓		groundwater
	9/25/97	1145		✓	WGRB62597	6	✓	✓	✓	✓	✓		Rinse BLANK
	9/25/97	1155		✓	WGFB62597	6	✓	✓	✓	✓	✓		Field BLANK
	9/26/97	1257		✓	03 MW06 I	6	✓	✓	✓	✓	✓		groundwater
	9/26/97	1505		✓	03 MW03 S	6	✓	✓	✓	✓	✓		"
	9/26/97	1557		✓	03 MW03 SI	6	✓	✓	✓	✓	✓		"
	9/29/97	0950		✓	05 MW06 S	6	2	1	1	1	1		groundwater
	9/29/97	1056		✓	05 MW06 I	6	2	1	1	1	1		groundwater
	9/29/97	1240		✓	03 MW01 I	6	2	1	1	1	1		groundwater
	9/29/97	1353		✓	03 MW01 S	6	2	1	1	1	1		groundwater
	9/29/97	1512		✓	03 MW04 S	6	2	1	1	1	1		groundwater
	9/29/97	1612		✓	03 MW04 SI	6	2	1	1	1	1		groundwater

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	9/29/97 1846				
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Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
CTO 277	NAS JRB Willow Grove

SAMPLERS (SIGNATURE): [signature]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40 CFR 136 Table II TCL Volatiles	TCL Base/Neutrals	TCL Pesticides	TAL Metals	Cyanide	REMARKS
	6/18/97	0800		✓	Trip Blank	2						Trip Blank
	6/18/97	1338		✓	03-MW-05I	2	1	1	1	1		time 13:38
	6/18/97	1240		✓	03-MW-06SI	2	1	1	1	1		
	6/18/97	1442		✓	03-MW-05S	2	1	1	1	1		
	6/18/97	1615		✓	~~03~~ FB-001897	2	1	1	1	1		Field Blank
	6/18/97	1615		✓	WG-RB-001897	2	1	1	1	1		Rinsate Blank

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[signature]	6-18-97 1330				
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Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466 / CTO-277	NASJRB Willow Grove
SAMPLERS (SIGNATURE):	

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40 ML VOA	1 liter Amber SVOC	1 liter Amber Pest/PCB	1 liter poly metals	1 liter poly CN		REMARKS
1	07/06/97	0800		✓	Trip Blank	2	2						Trip Blank
2	07/06/97	0940		✓	03MW02SI	6	2	1	1	1	1		
3	07/06/97	1025		✓	03MW02I	6	2	1	1	1	1		
4	07/06/97	1135		✓	05MW01D	6	2	1	1	1	1		
5	07/06/97	1200		✓	01MW23I	2	2						
6	07/06/97	1258		✓	01MW03I	6	6						Do MS/MSD
7	07/06/97	1400		✓	01MW01I	2	2						
8	07/06/97	1420		✓	WGRB0707	6	2	1	1	1	1		
9	07/06/97	1015		✓	02MW03I	18	6	3	3	3	3		Do MS/MSD
10	07/06/97	1040		✓	02MW13	6	2	1	1	1	1		
11	07/06/97	1145		✓	02MW03SI	6	2	1	1	1	1		
12	07/06/97	1242		✓	03MW07S	6	2	1	1	1	1		
13	07/06/97	1405		✓	01MW08I	2	2						
14	07/06/97	1455		✓	WGRB070797	6	2	1	1	1	1		

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	07-07-97 1700				
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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	FedEx Airbill # 508140 0240

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
54166	Willow Grove

SAMPLERS (SIGNATURE):

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	1) 40 ML VIAL TCL-VOC	2) 40 ML VIAL TCL-VOC + MTBE	3) 40 ML VIAL TPH - GRO	1) 1000 ML AMBER GL TPH - DRO	1) 1000 ML AMBER GL SVOC - TCL	1) 1000 ML AMBER GL PESTICIDE / PCB	1) 1000 ML PLASTIC TAL METALS	1) 1000 ML PLASTIC CYANIDE	REMARKS
	6/30/97	0900		✓	Trip Blank			✓							
	6/30/97	1035		✓	12 MW02			✓	✓	✓	✓	✓	✓	✓	✓
	6/30/97	1147		✓	12 MW01			✓	✓	✓	✓	✓	✓	✓	✓
	6/30/97	1270		✓	WGFB063097			✓	✓	✓	✓	✓	✓	✓	✓
	6/30/97	1240		✓	WGRB063097			✓	✓	✓	✓	✓	✓	✓	✓
	7/1/97	1439		✓	03 MW06 S		✓				✓	✓	✓	✓	✓
	7/1/97	1550		✓	01 MW08 S		✓				~~✓~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~ 07.7/17/97
	7/2/97	1038		✓	12 MW04	27		6	6	3	3	3	3	3	DO MS/MSD
	7/2/97	1110		✓	12 MW05	9		2	2	1	1	1	1	1	
	7/2/97	1210		✓	12 MW03	9		2	2	1	1	1	1	1	
	7/2/97	1505		✓	03 MW03I	18	6				3	3	3	3	DO MS/MSD
	7/2/97	1545		✓	03 MW17I	6	2				1	1	1	1	
	7/2/97	1615		✓	03 MW04I	6	2				1	1	1	1	
	7/2/97	1715		✓	WG-12B063001	9		2	2	1	1	1	1	1	

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	6/30/97 1830				
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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Shipped Via Federal Express Airbill No 508140023 6	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 277 5466 0111	SITE NAME: Willow Grove NAS	NO. OF CONTAINERS	40 ml Glass Vials HCl TCL VOCs + 1,4-D						REMARKS
SAMPLERS (SIGNATURE):									
STATION NO. / DATE / TIME / COMP / GRAB / STATION LOCATION									
	6/27/97 1425	✓	01MW07I	2	2				
	6/27/97 1506	✓	01MW07S	2	2				
	6/27/97 1525	✓	WG-RB062701	2	2				Rinsate Blank

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	6/27/97 1645				
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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Shipped Via Federal Express Airbill No 508140225	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466 / CTO-277	NASTRB Willow Grove
SAMPLERS (SIGNATURE):	

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	4 ounce Jar SVOC/Pest/PCB	4 ounce Jar Cyanide/Metal	1 liter Amber SVOC	1 liter Amber Pest/PCB	1 liter clear Cn	1 liter Poly Hill metals	REMARKS
1	4/8/97	1035		✓	035501	2	1	1					
2	4/8/97	1057		✓	035502	2	1	1					
3	4/8/97	1119		✓	035503	2	1	1					
4	4/8/97	1141		✓	035504	2	1	1					
5	4/8/97	1204		✓	035505	2	1	1					
6	4/8/97	1225		✓	035506	2	1	1					
7	4/8/97	1248		✓	035507	2	1	1					
8	4/8/97	1307		✓	035508	2	1	1					
9	4/8/97	1325		✓	035509	2	1	1					
10	4/8/97	1400		✓	035510	2	1	1					
11	4/8/97	1420		✓	035511	2	1	1					
12	4/8/97	1445		✓	035512	2	1	1					
13	4/8/97	1455		✓	035513	2	1	1					
14	4/8/97	1525		✓	WGRB0408	4			1	1	1	1	

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	4-8-97 1700				
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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	Fed Ex Airbill # 799272004 3

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466 / CTO-277	NASJRB Willow Grove

SAMPLERS (SIGNATURE): [signature]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	4 ounce Jar Diexia	1 Liter Amber Diexia					REMARKS
1	4/3/97	1141		✓	035504	1	1						
2	4/3/97	1307		✓	035508	1	1						
3	4/3/97	1525		✓	WGRB0408	1		1					Hold - Do not analyze

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[signature]	4-5 97 1700				
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Order No. 70440 (0693)

(1 of 1)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466 / CTO 277	NHSJRB Willow Grove

SAMPLERS (SIGNATURE):

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	4 ounce Jar SVOC/Pest/PCB	4 ounce Jar TAL Metals/CN	1 Liter Amber SVOC	1 Liter Amber PCB/Pest	1 Liter Clear CN	1 Liter Amber TAL Metals	REMARKS
1	4/7/97	0955		✓	BGSS01	6	3	3					Do MS/MSD
2	4/9/97	1018		✓	BGSS02	2	1	1					
3	4/9/97	1040		✓	BGSS09	2	1	1					
4	4/9/97	1105		✓	BGSS07	2	1	1					
5	4/7/97	1135		✓	BGSS04	2	1	1					
6	4/9/97	1240		✓	BGSS10	2	1	1					
7	4/7/97	1250		✓	BGSS08	2	1	1					
8	4/9/97	1302		✓	BGSS03	2	1	1					
9	4/7/97	1315		✓	BGSS12	2	1	1					
10	4/9/97	1355		✓	BGSS05	2	1	1					
11	4/7/97	1420		✓	BGSS06	2	1	1					
12	4/7/97	1435		✓	BGSS11	2	1	1					
13	4/9/97	1445		✓	BGSS13	2	1	1					
14	4/9/97	1500		✓	WGRB0407	4			1	1	1	1	Hold - Do not analyze

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	1700 4-7-97				
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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Fed Ex air bill # 799272011 3	

Order No. 70440 (0693)

1 of 2

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466 CTO-277	NAS JRB Willow Grove
SAMPLERS (SIGNATURE):	

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40ML VOC	1 Liter Amber SVOC	1 Liter Amber PCB/Pest	1 Liter clear CN	1 Liter Amber THL Metals		REMARKS
1	3/20/97	1155		✓	035W09	6	2	1	1	1	1		
2	3/20/97	1215		✓	035W11	6	2	1	1	1	1		
3	3/20/97	1245		✓	035W08	6	2	1	1	1	1		
4	3/20/97	1305		✓	025P01L	6	2	1	1	1	1		
5	3/20/97	1530		✓	WGRB0320	6	2	1	1	1	1		Hold - Do not analyze
6	3/20/97	0800		✓	Trip Blank	2	2						

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
	3-20-97 1700				
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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Fed Ex Airbill # 299271693	

Order No. 70440 (0693)

2 of 2

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466 CTO-277	NASTRB Willow Grove
SAMPLERS (SIGNATURE):	

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	2 ounce for VOC	4 ounce for SVOC/Pest/PCB	4 ounce for CN/TAL Metals	8 ounce for TOC/Grain Size			REMARKS
1	3/20/97	1205		✓	035D09	4	1	1	1	1			
2	3/20/97	1250		✓	035D08	4	1	1	1	1			
3	3/20/97	1315		✓	025P01S	4	1	1	1	1			

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
	3-20-97 1700				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Fed Ex Airbill # 299271969 3	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
5466 / CTO-277	NAS JRB Willow Grove

SAMPLERS (SIGNATURE): Wilse

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	2oz [illegible] Jar VOC	16oz [illegible] Jar SVOC Pest PCB	1 lit Metals Cyanide [illegible]	40ml VOC	1 Liter Amber SVOC	1 Liter Amber Pest/PCB	1 Liter Amber [illegible]	1 L Metals / 1 Liter Cyanide	REMARKS
1	3/13/97	0925		✓	BGSW07	6				2	1	1	1	1	
2	3/13/97	0930		✓	BGSS07	2	1	1							
3	3/13/97	0950		✓	BGSW05	6				2	1	1	1	1	
[illegible]	3/13/97	0955		✓	BGSS05	2	1	1							
5	3/13/97	1010		✓	BGSW08	6				2	1	1	1	1	
6	3/13/97	1015		✓	BGSS08	2	1	1							
7	3/13/97	1030		✓	BGSW06	6				2	1	1	1	1	
8	3/13/97	1035		✓	BGSS06	2	1	1							
9	3/13/97	1100		✓	BGSW03	18				6	3	3	3	3	Do MS/MSD
10	3/13/97	1110		✓	BGSS03	6	3	3							Do MS/MSD
11	3/13/97	1200		✓	BGSW09	6				2	1	1	1	1	
12	3/13/97	1210		✓	BGSS09	2	1	1							
13	3/13/97	1130		✓	BGSW04	6				2	1	1	1	1	
14	3/13/97	1135		✓	BGSS04	2	1	1							

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
Wilse	1930 3-13-97				
RELINQUISHED BY (SIGNATURE):	**DATE / TIME:**	**RECEIVED BY (SIGNATURE):**	**RELINQUISHED BY (SIGNATURE):**	**DATE / TIME:**	**RECEIVED BY (SIGNATURE):**
RELINQUISHED BY (SIGNATURE):	**DATE / TIME:**	**RECEIVED FOR LABORATORY BY (SIGNATURE):**	**DATE / TIME:**	**REMARKS:** Fed Ex Airbill # 250513328 2	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

(2 of 2)

PROJECT NO.:	SITE NAME:
54166 / CTO-277	MSTRS Willow Grove
SAMPLERS (SIGNATURE):	

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	1 Liter Amber Unpres. VOC	1 Liter Amber Unpres. SVOC	1 Liter Amber Unpres. TAL Metals	1 Liter Amber Unpres. Cyanide	1 Liter Amber H2SO4 VOC	1 Liter Amber HNO3 TAL Metals	1 Liter Amber HNO3 Hg	1 Liter Amber NaOH Cyanide	REMARKS
15	3/13/17	1355		✓	BGSW01	6				2	1	1	1	1	
16	3/13/17	1400		✓	BGSS01	2	1	1							
17	3/13/17	1420		✓	DESW02	6				2	1	1	1	1	
18	3/13/17	1425		✓	DGSS02	2	1	1							
19	3/13/17	1515		✓	WGFB0313	6				2	1	1	1	1	
20	3/13/17	1530		✓	WGRB0313	6				2	1	1	1	1	
21	3/13/17	am		✓	Trip Blank	2				2					

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
	3/13/17 1730				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	
					Fed Ex #8250513329 2

Order No. 70440 (0693)

Chain of Custody Record

STL-4124 (0901)

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

Client: Tetra Tech NUS	Project Manager: Russell Turner	Date: 4/30/07	Chain of Custody Number: 312314
Address: 610 Clark Ave	Telephone Number (Area Code)/Fax Number: 610-491-9658	Lab Number	Page 1 of 1
City: King of Prussia / State: PA / Zip Code: 19406	Site Contact / Lab Contact		
Project Name and Location (State): NAS JRB Willow Grove, PA	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		Analysis (Attach list if more space is needed): VOC 5035 Encore	SVOC, PCB/Pest/Herb	TAL Metals/CN	Dioxin [illegible]	VOC [illegible]								Special Instructions/ Conditions of Receipt
03TP05-0506-01	4/30/07	1215				✓		✓							3	1	1	1									
03TP05-0910-02	4/30/07	1515				✓		✓							3	1	1										
03TP05-0102-03	4/30/07	1530				✓		✓							3	1	1										DUP 03TP05-0910-02
03 TB-01	4/30/07	1730		✓							✓								[illegible]								Trip Blank

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other______

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: David Whalen	4/30/07	1730	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT STL
Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
Tetra Tech NUS	Russell Turner	5/1/07	312315
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	
600 Clark Ave.	610-491-9688		Page 1 of 1

City	State	Zip Code	Site Contact	Lab Contact
King of Prussia	PA	19406		

Project Name and Location (State)	Carrier/Waybill Number
NAS JRB Willow Grove, PA	FedEx 7545 6865 7320

Contract/Purchase Order/Quote No.

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		Analysis: VOC 5g Encore	TCL SVOC/Pest/PCB	TAL metals/CN	Dioxin	VOC 40ml								Special Instructions/ Conditions of Receipt
03TP06-0304-01	5/1/07	0925				✓		✓							6	2	2										Do MS/MSD
03TP06-0708-02	5/1/07	1045				✓		✓							3	1	1										
03TP06-0809-03	5/1/07	1110				✓		✓							3	1	1	2*									* Do MS/MSD Dioxin only
03TP06-0607-04	5/1/07	1330				✓		✓							3	1	1										
03TP06-0102-05	5/1/07	1400				✓		✓										1									DUP 03TP06-0809-03
03TB-02	5/1/07	0740		✓							✓								2								trip Blank

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other______

QC Requirements (Specify)

Relinquished By	Date	Time	Received By	Date	Time
1. Relinquished By: Donald White	5/1/07	1900	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
Tetra Tech NUS	Russell Turner	5/2/07	312316
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
661 Clark Ave.	610-491-9188		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
King of Prussia / PA / 19406			
Project Name and Location (State)	**Carrier/Waybill Number**		
NAS JRB Willow Grove	Fed Ex 8545 6845 7530		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/NaOH	Analysis: VOC 5 g Encore	SVOC, Pest/PCB 4oz	Amenable CN 4oz	VOC 40ml vial	Special Instructions/ Conditions of Receipt
03TP07-0304-01	5/2/07	0905				✓	✓						2	1	1		
03TP07-0203-02	5/2/07	0935				✓	✓						3	1	1		
03TP08-0405-01	5/2/07	1115				✓	✓						3	1	1		
03TP08-0304-02	5/2/07	1350				✓	✓						3	1	1		
03TP08-0203-03	5/2/07	1350				✓	✓						3	1	1		
03TB-03	5/2/07	1340		✓						✓						2	trip blank

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other_____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: [signature]	5/2/07	1330	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT **STL**
Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
Tetra Tech NUS	Russell Turner	5/3/07	312317
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	
600 Clark Ave	610 491 9688		Page 1 of 1

City	State	Zip Code	Site Contact	Lab Contact
King of Prussia	PA	19406		

Project Name and Location (State)	Carrier/Waybill Number
NAS JRB Willow Grove, PA	Fed Ex 8545 6945 7541

Contract/Purchase Order/Quote No.

Matrix: Air, Aqueous, Sed., Soil
Containers & Preservatives: Unpres., H2SO4, HNO3, HCl, NaOH, ZnAc/NaOH
Analysis (Attach list if more space is needed)

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil		Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		VOC 5g Encore	SVOC, Pest/PCB 4 oz	Metals/CN 4 oz	VOC 4 vial	SVOC (...)	Pest/PCB (...)	Metals (...)	Special Instructions/ Conditions of Receipt
03TP09-0506-01	5/3/07	0820				✓		✓							3	1	1					
03TP09-0506-02	5/3/07	0850				✓		✓							3	1	1					
03TP10-0405-01	5/3/07	1405				✓		✓							3	1	1					
03TP10-0304-02	5/3/07	1430				✓		✓							3	1	1					
03TB-04	5/3/07	0740		✓							✓							2				Trip Blank
03-FB-050307	5/3/07	1530		✓				✓		✓	✓							3	2	2	1	Field Blank

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other______

QC Requirements (Specify)

Relinquished By	Date	Time	Received By	Date	Time
1. Relinquished By: Donald Whalen	5/3/07	1830	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
Tetra Tech NUS	Russ Turner	5/4/07	312320
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page** 1 **of**
600 Clark Avenue Suite 3	610 491 9655 610 491 9645		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
King of Prussia / PA / 19406	Chuck Meyer	Veronica Foltz	
Project Name and Location (State)	**Carrier/Waybill Number**		
NAS JRB Willow Grove PA	854568659611 FedEx Express		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: 40 ml VOA Vial TCL VOC	5 gram Encore TCL VOC	4oz clear glass SVOC PCB/Pest	4oz clear glass Metals only
TB-050407	5/4/07	0730		X						X			2			
03TP12-0405-01	5/4/07	0825				X	X							3	1	1
03TP12-0304-02	5/4/07	0855				X	X							3	1	1
03TP12-0102-03	5/4/07	0955				X	X							3	1	1
03TP11-0304-01	5/4/07	1155				X	X							3	1	1
03TP11-0405-02	5/4/07	1235				X	X							9	3	3
03TP13-0203-01	5/4/07	1520				X	X							3	1	1
03TP14-0203-01	5/4/07	1610				X	X							2	1	1

Special Instructions/ Conditions of Receipt

DO MS/MSD

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

1. Relinquished By	Date	Time	1. Received By	Date	Time
Chuck W Meyer	5/4/07	1930			
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
Tetra Tech NUS	Russ Turner	5/7/07	311308
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
600 Clark Avenue Suite 3	610 491 9688 610 491 9645		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
King of Prussia / PA / 19406	Chuck Meyer	Veronica Bortot	
Project Name and Location (State)	**Carrier/Waybill Number**		
NASJRB Willow Grove PA	8545 6865 8644		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Analysis: 40 ml VOA Vial VOC	5 gram Encore VOC	8oz Clear Glass SVOC, Pest/PCB	8oz Clear Glass Metals/Cyanide	Special Instructions/ Conditions of Receipt
TB-050707	5/7/07	0730		X						X			2				
03TP15-0405-01	5/7/07	0950				X	X							3	1	1	
03TP16-0102-01	5/7/07	1250				X	X							3	1	1	03-Dup-02
03TP17-0304-01	5/7/07	1510				X	X							3	1	1	
03-Dup-02	5/7/07	1650				X	X							3	1	1	

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Relinquished By	Date	Time	Received By	Date	Time
1.	[signature]	5/7/07	1830			
2.						
3.						

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
Tetra Tech NUS	Russ Turner	5/8/07	311306
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
600 Clark Avenue Suite 3	610 491 9658 610 491 9645		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
King of Prussia / PA / 19406	Chuck Meyer	Veronica Bortot	
Project Name and Location (State)	**Carrier/Waybill Number**		
NAS JRB Willow Grove PA	8554 6865 5622		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Analysis: 40 ml VOA Vial VOC	8 oz Clear Glass SVOC	8 oz Clear Glass Pest/PCB	8 oz Clear Glass Pest/PCB	1 Liter Amber Glass	1 Liter Poly NaOH	Special Instructions/ Conditions of Receipt
TB-050807		0735		X						X			2						
03TP18-0203-01		1025				X	X							3	1	1			Dup TP18-0203-04
03TP18-0203-04		1045				X	X							3	1	1			Dup TP18-0203-01
FB-050807		1435		X							X						2	1	

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	5/8/07	1945	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Page ____ of ____

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name	Project Name
Address	Sampling Location
City State Zip	Turnaround time
Project Contact	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #	Are aqueous samples field filtered for metals? Y or N
Sampler's Name	Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	Number of Preserved Bottles: HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOC	SVOC	Methane/Ethane	pH / Sample Info (Lab Use)
	03-55-17		1120	SO	5							3	1	1	
	03-55-18		1145	SO	5							3	1	1	
	03-55-19		1210	SO	5							3	1	1	
	03-55-20		1215	SO	5							3	1	1	
	03-55-21		1220	SO	5							3	1	1	
	03-55-22		1230	SO	15							9	3	3	
	03-55-23		1320	SO	5							3	1	1	
	03-55-24		1335	SO	5							3	1	1	
	03-55-25		1410	SO	5							3	1	1	
	03-55-26	↓	1420	SO	5							3	1	1	

Lab Use Only

Sample Unpacked By:
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? | Custody Seal(s) intact? Y or N | On Ice? Y or N | Cooler Temp: °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

CHAIN OF CUSTODY

CompuChem
a division of Liberty Analytical Corp.

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier	Fed Ex
Airbill No.	[illegible]
Sampling Complete? Y or N	

Client/Reporting Information

Company Name	TetraTech NUS
Address	234 Mall Blvd
City / State / Zip	King of Prussia PA 19406
Project Contact	Rose Turner
Phone #	610-491-9688
Sampler's Name	[illegible] Whalen

Project Information

Project Name	Site 3 Landfill
Sampling Location	
Turnaround time	
Batch QC or Project Specific? If Specific, which Sample ID?	
Are aqueous samples field filtered for metals? Y or N	
Are high concentrations expected? Y or N? If yes, which ID(s)?	

Matrices

GW - Ground water
WW - Waste water
SW - Surface water
SO - Soil/Sediment
TB - Trip Blank
RI - Rinsate
WP - Wipe
O - Other

Requested Analysis (include method and bottle type)

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOC [illegible] Encore	SVOC/[illegible]/PCB	Metals/Hg/CN	VOC	pH / Sample Info (Lab Use)
	03-55-27	12/[illegible]	1435	SO	5							3	1	1		
	03-55-28	↓	1450	SO	5							3	1	1		
	03-55-29	↓	[illegible]	SO	5							3	1	1		
	03-55-30	↓	1535	SO	5							3	1	1		
	TB-[illegible]	[illegible]	[illegible]	TB	3	3									3	

Lab Use Only

Sample Unpacked By:	Cyanide samples checked for sulfide & chlorine? Y or NA
Sample Order Entry By:	625 & Phenol samples checked for chlorine? Y or NA
Samples Received in Good Condition? Y or N	608 samples checked for pH between 5.0-9.0? Y or NA
If no, explain:	

Comments

Sample Custody

Relinquished by: [illegible]	Date/Time: [illegible]	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Page 1 of 1

Courier FedEx
Airbill No. 2511 [illegible] 3407
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: Tetra Tech NUS	Project Name: [illegible] Landfill
Address: 234 Mall Blvd. Suite 210	Sampling Location:
City: [illegible] State: PA Zip: 19406	Turnaround time:
Project Contact: Kris Turner	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 610-491-9108	Are aqueous samples field filtered for metals? Y or N.
Sampler's Name: David Whalen	Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type): VOC 8260, SVOC 8270, Explosives 8330, TAL metals, Cyanide, VOC 8260, [illegible]

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection: Date	Collection: Time	Matrix	# of bottles	Number of Preserved Bottles: HCl	NaOH	HNO3	H2SO4	MEOH	Other	pH / Sample Info (Lab Use)
	03-SW-12	[illegible]	1215	SW	27	9	3	3				
	03-SD-12	↓	1215	SO	15							
	TB-121503			TB	3	3						

Lab Use Only

Sample Unpacked By:
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

03-SW-12 [illegible]
03-SD-12 [illegible]

Sample Custody

Relinquished by: [illegible]	Date/Time: [illegible] 1230	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? | Custody Seal(s) intact? Y or N | On Ice? Y or N | Cooler Temp: °C

Samples stored 60 days after date report mailed at no extra charge.

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Courier	Fed Ex
Airbill No.	[illegible]
Sampling Complete? Y or N	N

Client/Reporting Information	Project Information
Company Name: TetraTech NUS	Project Name: Site 3 Landfill
Address: 234 Mall Blvd Ste. 260	Sampling Location:
City: King of Prussia State: PA Zip: 19406	Turnaround time:
Project Contact: Russ Turner	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 610-491-9688	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: Donald Whalen	Are high concentrations expected? Y or N? If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

Requested Analysis (include method and bottle type)

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOC 40ml/HCl	SVOC 1L amber	Pest/PCB 1L amber	TAL metals 500ml poly/HNO3	Cyanide 250ml poly/NaOH	VOC 5g Encore	SVOC/Pest/PCB 8oz jar	metals/Hg/CN 2oz jar			pH / Sample Info (Lab Use)
	03-SW-13	12/16/05	0930	SW	9	3	1	1				3	2	2	1	1						
	03-SW-14	↓	1035	SW	9	3	1	1				3	2	2	1	1						
	03-SW-15	↓	1115	SW	9	[illegible]	1	1				3	2	2	1	1						
	03-SW-16	↓	1315	SW	9	[illegible]	1	1				3	2	2	1	1						
	03-SW-17	↓	1415	SW	9	[illegible]	1	1				3	2	2	1	1						
	03-SW-18	↓	[illegible]00	SW	9	3	1	1				3	2	2	1	1						
	03-SD-13	↓	0935	SO	5												3	1	1			
	03-SD-14	↓	1045	SO	5												3	1	1			
	03-SD-15	↓	1200	SO	5												3	1	1			
	03-SD-16	↓	1315	SO	5												3	1	1			

Lab Use Only		Comments
Sample Unpacked By:	Cyanide samples checked for sulfide & chlorine? Y or NA	
Sample Order Entry By:	625 & Phenol samples checked for chlorine? Y or NA	
Samples Received in Good Condition? Y or N	608 samples checked for pH between 5.0-9.0? Y or NA	
If no, explain:		

Sample Custody

Relinquished by: [illegible signature]	Date/Time: 12/16/05 1730	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: °C

Samples stored 60 days after date report mailed at no extra charge.

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Page ___ of ___

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: TetraTech NUS	Project Name: SVE System Landfill
Address: 331 Mall Blvd. ste. 260	Sampling Location
City: King of Prussia State: PA Zip: 19406	Turnaround time
Project Contact: Russ Turner	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 610 491-9658	Are aqueous samples field filtered for metals? Y or (N)
Sampler's Name: Donald Whalen	Are high concentrations expected? Y or (N)? If yes, which ID(s)?

CompuChem No (Lab Use)	Field ID	Collection: Date	Collection: Time	Matrix	# of bottles	Number of Preserved Bottles: HCl	NaOH	HNO3	H2SO4	MEOH	Other	Requested Analysis: VOC	SVOC	Pest/PCB	*All metals except Hg	Cyanide	VOC - 8260	SVOC/Pest/PCB 8270/8081/8082	Hg 7470/7471	pH / Sample Info (Lab Use)
	03-SD-17	8/10/07	1420	SO	5												3	1	1	
	03-SD-18	"	0000	SO	5												3	1	1	
	TB-121607	↓	0700	TB	3	3						3								

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

Lab Use Only

Sample Unpacked By:
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by: Donald Whalen	Date/Time: 8/10/07 1730	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: °C

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Page ____ of ____

Courier	[illegible]
Airbill No.	[illegible]
Sampling Complete? Y or N	

Client/Reporting Information	Project Information
Company Name: [illegible]	Project Name: [illegible]
Address: [illegible] Mall Blvd [illegible]	Sampling Location:
City: [illegible] State: IA Zip: [illegible]	Turnaround time:
Project Contact: [illegible]	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: [illegible]	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: [illegible]	Are high concentrations expected? Y or N? If yes, which ID(s)?

Matrices
GW - Ground water
WW - Waste water
SW - Surface water
SO - Soil/Sediment
TB - Trip Blank
RI - Rinsate
WP - Wipe
O - Other

Requested Analysis (include method and bottle type)

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOC [illegible]	SVOC/Pest/PCB [illegible]	Metals/Hg/CN [illegible]	[illegible]							pH / Sample Info (Lab Use)
	C3TP20 07-9-01	[illegible]	[illegible]	SO	5							3	1	1								
	C3TP19-0607-01		1105	SO	[illegible]							[illegible]	1	1								
	C3TP17-[illegible]		1440	SO	5							3	1	1								
	TB-11209	↓	[illegible]	TB	3	[illegible]																

Lab Use Only		Comments
Sample Unpacked By:	Cyanide samples checked for sulfide & chlorine? Y or NA	
Sample Order Entry By:	625 & Phenol samples checked for chlorine? Y or NA	
Samples Received in Good Condition? Y or N	608 samples checked for pH between 5.0-9.0? Y or NA	
If no, explain:		

Sample Custody

Relinquished by: [illegible]	Date/Time: [illegible]	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: °C

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Page ___ of ___

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information	Requested Analysis (include method and bottle type)	Matrices
Company Name	Project Name		GW - Ground water
Address	Sampling Location		WW - Waste water
City State Zip	Turnaround time		SW - Surface water
Project Contact	Batch QC or Project Specific? If Specific, which Sample ID?		SO - Soil/Sediment
Phone #	Are aqueous samples field filtered for metals? Y or N		TB - Trip Blank
Sampler's Name	Are high concentrations expected? Y or N? If yes, which ID(s)?		RI - Rinsate
			WP - Wipe
			O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	Number of Preserved Bottles: HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOC										pH / Sample Info (Lab Use)

Lab Use Only

Sample Unpacked By:
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? | Custody Seal(s) intact? Y or N | On Ice? Y or N | Cooler Temp: °C

Samples stored 60 days after date report mailed at no extra charge.

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CHAIN OF CUSTODY

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Page 1 of 1

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Airbill No. [illegible]
Sampling Complete? Y or N

Client/Reporting Information	Project Information	Requested Analysis (include method and bottle type)	Matrices
Company Name: Tetra Tech NUS	Project Name: Site 3 Land fill		GW - Ground water WW - Waste water SW - Surface water SO - Soil/Sediment TB - Trip Blank RI - Rinsate WP - Wipe O - Other
Address: 234 Mall Blvd Ste. 260	Sampling Location		
City: King of Prussia State: PA Zip: 19406	Turnaround time		
Project Contact: Russ Turner	Batch QC or Project Specific? If Specific, which Sample ID?		
Phone #: 610-491-9488	Are aqueous samples field filtered for metals? Y or N		
Sampler's Name: Donald Whalen	Are high concentrations expected? Y or N? If yes, which ID(s)?		pH / Sample Info (Lab Use)

CompuChem No (Lab Use)	Field ID	Collection: Date	Collection: Time	Matrix	# of bottles	Number of Preserved Bottles: HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOC Eg Excel	SVOC/TPH/PCB 8oz Jar	Metals/Hg/CN 2oz Jar	VOC 40ml HCl								
	03TP26-0506-01	11/16/07	1045	SO	5							3	1	1									
	03TP29-0504-01	"	1320	SO	5							3	1	1									
	03TP30-0506-01	"	1415	SO	5							3	1	1									
	TB-111407	"	[illegible]	TB	3	3									3								

Lab Use Only

Sample Unpacked By:
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 11/16/07 [illegible]	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: °C

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CHAIN OF CUSTODY

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Courier [illegible]
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: TetraTech NUS	Project Name: Site 5 Landfill
Address: 234 Mill Blvd Suite	Sampling Location:
City: Kennett Square State: PA Zip: 19348	Turnaround time:
Project Contact: Russ Turner	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 610-444-9455	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: Donald Whalen	Are high concentrations expected? Y or N? If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection: Date	Collection: Time	Matrix	# of bottles	Number of Preserved Bottles: HCl	NaOH	HNO3	H2SO4	MEOH	Other	Requested Analysis: VOC 524.2 Extract	Svoc/pest/PCB	Metals/Hg/CN	VOC [illegible]	pH / Sample Info (Lab Use)
	037F27-0504-01	11/5/09	[illegible]	SO	5							2	1	1		
	037F27-0309-02	"	0930	SO	5							3	1	1		
	037F28-0205-01	"	1115	SO	15							9	3	3		
	037F-DUP-02	"	[illegible]	SO	5							3	1	1		
	TB-110509	↓		TT	3	3									3	

Lab Use Only

Sample Unpacked By:
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

[illegible]

Sample Custody

Relinquished by: [illegible]	Date/Time: 11/5/09 [illegible]	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: °C

Samples stored 60 days after date report mailed at no extra charge.

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TETRA TECH NUS, INC. **CHAIN OF CUSTODY** | NUMBER 2630 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
[illegible]45	[illegible]	[illegible]	[illegible]	[illegible]
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
[illegible]		[illegible]	[illegible]	[illegible] Ave
		CARRIER/WAYBILL NUMBER		CITY, STATE
		[illegible]		Cary, NC [illegible]

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G)

PRESERVATIVE USED

TYPE OF ANALYSIS

DATE YEAR [illegible]	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	[illegible]								COMMENTS
[illegible]	[illegible]	C3TP20-1506-02	[illegible]	5	6		[illegible]	1	✓								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	2-19-09	[illegible]	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | **CHAIN OF CUSTODY** | **NUMBER** 0781 | **PAGE** ___ **OF** ___

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
SAMPLERS (SIGNATURE)		**FIELD OPERATIONS LEADER**	**PHONE NUMBER**	**ADDRESS**
		CARRIER/WAYBILL NUMBER		**CITY, STATE**

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE / YEAR	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS								COMMENTS

1. RELINQUISHED BY		DATE	TIME	1. RECEIVED BY	DATE / TIME
2. RELINQUISHED BY		DATE	TIME	2. RECEIVED BY	DATE / TIME
3. RELINQUISHED BY		DATE	TIME	3. RECEIVED BY	DATE / TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

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Environmental • Industrial Hygiene • Field Services

34 Dogwood Lane • Middletown, PA 17057 • 717.944.5541 • Fax: 717.944.1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page 1 of 1

Courier:

Tracking #:

Co. Name: Tetra Tech NUS

Contact (Report to): Russ Turner **Phone:** 610 491 9068

Address: 234 Mall Boulevard
Suite 260
King of Prussia, PA 19406

Bill to (if different than Report to): **PO#:**

Project Name/#: **ALSI Quote #:**

TAT: [X] Normal-Standard TAT is 10-12 business days. **Date Required:**
[ ] Rush-Subject to ALSI approval and surcharges. **Approved By:**

Email? [ ] -Y
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	TCL VOC 8260 B	1,4-Dioxane 8270C	Total TAL Metals	Dissolved TAL Metals	Hexavalent Chromium
						VG	AG	Poly	Poly	Poly			
						40ml	1Liter	500ml	500ml	1Liter			
						HCl	4°C	HNO3	NaOH	4°C			
1 TB-20080314		3/14/08	0850	G	GW	2							
2 03MW06I-20080314		3/14/08	0915	G	GW	2	2	1	1	1			
3 03MW04I-20080314		3/14/08	1215	G	GW	2	2	1	1				
4 03MW04SR-20080314		3/14/08	1403	G	GW	2	2	1	1				
5													
6													
7													
8													

Enter Number of Containers Per Analysis

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	Container in good condition?	COC/Labels complete/accurate?	Received on ice?	(if present) Seals intact?	Custody seals Present?
N	Y	N	N	N	Y
N	Y	N	N	N	Y
N	Y	N	N	N	Y
N	Y	N	N	N	Y

Correct containers? Correct sample volume? Correct preservation? Headspace/Volatiles?

SAMPLED BY (Please Print): Charles Meyer

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Megan Pitcher	3/14/08	1603	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] (other)

EDDs Required? [ ] If yes, format type:

SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ]

State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ]

Other

DOD Criteria Required?

ALSI FIELD SERVICES

[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite

**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

Rev 6/07

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Environmental • Industrial Hygiene • Field Services

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___

Courier: Federal Express

Tracking #: 2646 0702 2016

Co. Name: Tetra Tech NUS

Contact (Report to): Russ Turner **Phone:** 610 491 9685

Address: 234 Mall Boulevard
Suite 260
King of Prussia, PA 19406

Bill to (if different than Report to): Tetra Tech NUS **PO#:**
7 Foster Plaza
661 Anderson Drive
Pittsburgh PA 15220

Project Name/#: **ALSI Quote #:**

TAT: [X] Normal-Standard TAT is 10-12 business days. **Date Required:**
[ ] Rush-Subject to ALSI approval and surcharges. **Approved By:**

Email? [ ] -Y

Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	TCL VOC 8260B	1,4-Dioxane 8270C	Total TAL metals	Dissolved Metals	Hexavalent Chromium						
		***Container Type				CG	AG	Poly	Poly	Poly						
		***Container Size				40ml	1 Liter	500ml	500ml	1 Liter						
		*** Preservative				HCl	4°C	NONE	HNO_3	4°C						
		ANALYSES/METHOD REQUESTED														
		Enter Number of Containers Per Analysis														
1 TR-20080313		3/13/08	0810	G	GW	2										
2 03MW06SI-20080313		3/13/08	1440	G	GW	2	2	1	1	1						
3 03MW06S-20080313		3/13/08	1714	G	GW	2	2	1	1	1						
4																
5																
6																
7																
8																

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

	Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?	Circle appropriate Y or N.
N	N	N	N	N	
Y	Y	Y	Y	Y	

	Custody seals Present?	(if present) Seals intact?	Received on ice?	COC/Labels complete/accurate?	Container in good condition?
N	N	N	N	N	N
Y	Y	Y	Y	Y	Y

SAMPLED BY (Please Print): Cherise Meyer

LOGGED BY(signature): DATE: TIME:

REVIEWED BY(signature): DATE: TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Cherise Meyer TtNUS	3/13/08	1900	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] Other

EDDs Required? [ ] If yes, format type:

SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ]

State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ] Other

DOD Criteria Required?

ALSI FIELD SERVICES

[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite

**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___

Courier:

Tracking #:

Co. Name: Tetra Tech NUS

Contact (Report to): Russ Turney **Phone:** 610 491 9688

Address: 234 Mall Boulevard Suite 260 King of Prussia PA 19406

Bill to (if different than Report to): **PO#:**

Project Name/#: **ALSI Quote #:**

TAT: [X] Normal-Standard TAT is 10-12 business days. **Date Required:**

[ ] Rush-Subject to ALSI approval and surcharges. **Approved By:**

Email? [ ] -Y

Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	TCL VOC 8260B	Total TAL Metals	Dissolved Metals	1,4-Dioxane 8270C	Hexavalent Chromium
									ANALYSES/METHOD REQUESTED				
									Enter Number of Containers Per Analysis				
1 TB-20080312		3/14/08	0700	G	AQ	2							
2 03MW05S-20080312		3/14/08	1046	G	GW	2	1	1	2	1			
3 03MW05S-20080312		3/14/08	1454	G	GW	2	1	1	2				
4 03MW08D-20080312		3/14/08	1700	G	GW	2	1	1	2				
5													
6													
7													
8													

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	Container in good condition?	COC/Labels complete/accurate?	Received on ice?	(If present) Seals intact?	Custody seals Present?	Correct preservation?	Correct sample volume?	Correct containers?
	N	N	N	N	N	N	N	N
	Y	Y	Y	Y	Y	Y	Y	Y

SAMPLED BY (Please Print): Charles Meyer

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Charles Meyer TtNUS	3/14/08	1900	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ]

EDDs Required? [ ] If yes, format type:

SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ]

State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ] Other

DOD Criteria Required?

ALSI FIELD SERVICES

[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite

**Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; Ol=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

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Page ___ of ___

Courier: Federal Express

Tracking #: 8646 0967 [illegible]

Co. Name: Tetra Tech NUS

Contact (Report to): Dan Whalen **Phone:** 610 491 9688

Address: 234 Mall Boulevard, Suite 260, King of Prussia PA 19406

Bill to (if different than Report to): Tetra Tech NUS, Foster Plaza 7, 661 Andersen Drive, Pittsburgh PA 15120 **PO#:**

Project Name/#: **ALSI Quote #:**

TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALSI approval and surcharges. Date Required: Approved By:

Email? [ ] -Y ____ Fax? [ ] -Y No.

	Analysis 1	Analysis 2	Analysis 3	Analysis 4	Analysis 5
***Container Type	Glass	Glass	Poly	Poly	Poly
***Container Size	40ml	Liter	500ml	500ml	Liter
***Preservative	HCl	4°C	HNO3	HNO3	4°C
ANALYSES/METHOD REQUESTED	8260B - TCL Compounds	8270C 1,4 Dioxane	Total Metals	Dissolved Metals	Hexavalent Chromium

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	8260B - TCL Compounds	8270C 1,4 Dioxane	Total Metals	Dissolved Metals	Hexavalent Chromium
1 TB-20080311		3/11/08	0700	G	GW	2				
2 03MW01I-20080311		3/11/08	0923	G	GW	6	6	3	3	3
3 03MW01S-20080311		3/11/08	1245	G	GW	2	2	1	1	1
4 03MW05I-20080311		3/11/08	1558	G	GW	2	2	1	1	1
5 DUP-01		3/11/08	1745	G	GW	2	2	1	1	1
6										
7										
8										

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Correct containers? Y N; Correct sample volume? Y N; Correct preservation? Y N; Headspace/Volatiles? Y N; Circle appropriate Y or N.

Custody seals Present? Y N; (if present) Seals intact? Y N; Received on ice? Y N; COC/Labels complete/accurate? Y N; Container in good condition? Y N

SAMPLED BY (Please Print): Charles Meyer

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 [signature] TtNUS	3/11/08	1830	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other

SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ]

State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ]

EDDs Required? [ ] If yes, format type: Other

DOD Criteria Required?

ALSI FIELD SERVICES

[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite **Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY ***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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[illegible] MS/MSD on 03MW01S-20080311

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Page 1 of 1

Courier: Federal Express

Tracking #: 9641 0967 0345

Co. Name: Tetra Tech NUS

Contact (Report to): Russ Turner **Phone:** 610 491 9658

Address: 234 Mall Boulevard
Suite 260
King of Prussia PA 19406

Bill to (if different than Report to): Tetra Tech NUS **PO#:**
1 Foster Plaza 7
662 Anderson Drive
Pittsburgh, PA

Project Name/#: **ALSI Quote #:**

TAT: [X] Normal-Standard TAT is 10-12 business days. **Date Required:**
[ ] Rush-Subject to ALSI approval and surcharges. **Approved By:**

Email? [ ] -Y
Fax? [ ] -Y No.:

	***Container Type	***Container Size	*** Preservative	G or C	**Matrix	TCL VOCs 8260B	1,4-Dioxane 8270C	Total TAL Metals	Dissolved TAL Metals	Hexavalent Chromium
				ANALYSES/METHOD REQUESTED						
1	CG	40 ml	HCl	G	AQ	2				
2	AG	1 Liter	4°C	G	AQ	2	2	1	1	1
3	Poly	500 ml	HNO3	G	GW	2	2	1	1	
4	Poly	500 ml	HNO3							
5	Poly	1 Liter	4°C							
6										
7										
8										

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time
1 TB-20080320		3/20/08	0925
2 FB-20080320		3/20/08	1123
3 03MW015T-20080320		3/20/08	1125
4			
5			
6			
7			
8			

Enter Number of Containers Per Analysis

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	
Correct containers?	N / Y
Correct sample volume?	N / Y
Correct preservation?	N / Y
Headspace/Volatiles?	N / Y
Custody seals Present?	N / Y
(if present) Seals intact?	N / Y
Received on ice?	N / Y
COC/Labels complete/accurate?	N / Y
Container in good condition?	N / Y

SAMPLED BY (Please Print): Charles Meyer

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 [illegible] TtNUS	3/20/08	1700	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ]

EDDs Required? [ ] If yes, format type:

SDWA Forms? yes [ ]

State Samples Collected in? MD [ ] NJ [ ] NY [ ] PA [ ]

Other

DOD Criteria Required?

ALSI FIELD SERVICES

[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite

**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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Courier: Federal Ex
Tracking #: 8646 0967 0127

Co. Name: Tetra Tech NUS
Contact (Report to): Russ Turner **Phone:** 610 491 9688
Address: 234 Mall Boulevard
Suite 260
King of Prussia, PA 19406

Bill to (if different than Report to): Tetra Tech NUS **PO#:**
7 Foster Plaza
661 Andersen Drive
Project Name/#: Pittsburgh PA **ALSI Quote #:**

TAT: [X] Normal-Standard TAT is 10-12 business days. **Date Required:**
[ ] Rush-Subject to ALSI approval and surcharges. **Approved By:**

Email? [ ] -Y
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	TCL VOC 8260B	1,4-Dioxane 8270C	TOTAL TAL METALS	DISSOLVED TAL METALS							Enter Number of Containers Per Analysis
						CG	AG	Poly	Poly										
						40ml	1Lit	500 ml	500 ml										
						HCl	unp	HNO3	HNO3										
1 TB-20080318		3/18/08	1200	G	WQ	2													
2 03MW02C-20080317		3/17/08	1346	G	GW	2	2	1	1										
3 03MW02S-20080317		3/17/08	1546	G	GW	2	2	1	1										
4 03MW02S-20080318		3/18/08	1716	G	GW	2	2	1	1										
5 03IW01-20080314		3/14/08	0923	G	GW	2	2	1	1										
6 03SW11-20080319		3/19/08	0944	G	GW	2	2	1											
7 05SW10-20080319		3/19/08	1013	G	GW	2	2	1											
8 03MW07S-20080319		3/19/08	1323	G	GW	2	2	1	1										

SAMPLED BY (Please Print): Charles Meyer

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Charles Meyer TtNUS	3/19/08	1900	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other
EDDs Required? [ ] If yes, format type:
SDWA Forms?→ yes [ ] yes [ ] yes [ ] yes [ ]
State Samples Collected in? MD [ ] NJ [ ] NY [ ] PA [ ] Other
DOD Criteria Required?

Receipt Information (completed by Sample Receiving)
Performed by: INITIAL HERE
Cooler Temp:
Therm. ID:
No. of Coolers:
Notes:

Circle appropriate Y or N.	
Container in good condition?	Y
COC/Labels complete/accurate?	Y
Received on Ice?	Y
Correct preservation?	Y
Headspace/Volatiles?	N
Custody seals Present?	Y
(if present) Seals intact?	Y
Correct sample volume?	Y
Correct containers?	Y

ALSI FIELD SERVICES
[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite
**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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Page 2 of 2

Courier: Federal Express

Tracking #: 8145 0067 0650

Co. Name: Tetra Tech NUS

Contact (Report to): Russ Turner **Phone:** 610 941 4688

Address: 234 Mall Boulevard
Suite 260
King of Prussia, PA 19406

Bill to (if different than Report to): Tetra Tech NUS **PO#:**
Foster Plaza
661 Andersen Drive

Project Name/#: Pittsburgh, PA 15 **ALSI Quote #:**

TAT: [X] Normal-Standard TAT is 10-12 business days. **Date Required:**
[ ] Rush-Subject to ALSI approval and surcharges. **Approved By:**

Email? [ ] -Y

Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	TCL VOC 8260B	1,4-Dioxane 8260B	Total TAL Metals	Dissolved TAL Metals	Hexavalent Chromium 7196A
									ANALYSES/METHOD REQUESTED				
									Enter Number of Containers Per Analysis				
1 RB-20080318		3/18/08	1453	G	AQ	CG	40ml	HCl	2	2	1	1	1
2 DUP-03		3/18/08	1523	G	GW	CG	40ml	HCl	2	2	1	1	
3													
4													
5													
6													
7													
8													

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	
Correct containers?	N / Y
Correct sample volume?	N / Y
Correct preservation?	N / Y
Headspace/Volatiles?	N / Y
Container in good condition?	N / Y
COC/Labels complete/accurate?	N / Y
Received on ice?	N / Y
(if present) Seals intact?	N / Y
Custody seals Present?	N / Y

SAMPLED BY (Please Print):

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Tetra Tech NUS	3/19/08	1900	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ]

EDDs Required? [ ] If yes, format type:

SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ]

State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ] Other

DOD Criteria Required?

ALSI FIELD SERVICES

[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite

**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

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Page 1 of 1

Courier: [illegible]

Tracking #:

Co. Name: Tetra Tech NUS

Contact (Report to): Russ Turner **Phone:** 610 491 9586

Address: 234 Mall Boulevard
Suite 260
King of Prussia PA 19406

Bill to (if different than Report to): Tetra Tech NUS **PO#:**
Foster Plaza 7
661 Andersen Drive
Pittsburgh, PA 15220

Project Name/#: **ALSI Quote #:**

TAT: [X] Normal-Standard TAT is 10-12 business days. **Date Required:**
[ ] Rush-Subject to ALSI approval and surcharges. **Approved By:**

Email? [ ] -Y

Fax? [ ] -Y No:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	TCL VOC 82608	1,4 Dioxane 8270C	Total TAL Metals	Dissolved Metals	Hex. Chromium						
						CG	Combo 4-Bottle	Poly	Poly	Poly									
						40ml	1L+500	500ml	500ml	1L									
						HCl	4°C	HNO3	HNO3	4°C									
						ANALYSES/METHOD REQUESTED													
						Enter Number of Containers Per Analysis													
1	TB-20080314		9/14/08	1630	G	Aq	2												
2	03MW045-20080314		3/14/08	1735	G	GW	2	2	1	1									
3	03MW035I-20080317		3/17/08	1010	G	GW	2	2	1	1									
4	DUP-02		3/17/08	0000	G	GW	2	2	1	1									
5	03MW035-20080317		3/17/08	1027	G	GW	2	2	1	1									
6	03MW03I-20080317		3/17/08	1637	G	GW	2	2	1	1	1								
7																			
8																			

Receipt Information (completed by Sample Receipt)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	Container in good condition?	COC/Labels complete/accurate?	Received on ice?	Correct preservation?	(if present) Seals intact?	Correct sample volume?	Custody seals Present?	Correct containers?	Headspace/Volatiles?
	N	N	N	N	N	N	N	N	N
	Y	Y	Y	Y	Y	Y	Y	Y	Y

SAMPLED BY (Please Print): Donald Whalen

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Donald Whalen	3/17/08	1920	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other

EDDs Required? [ ] If yes, format type:

DOD Criteria Required?

SDWA Forms?-> yes [ ] yes [ ] yes [ ] yes [ ]

State Samples Collected in? MD [ ] NJ [ ] NY [ ] PA [ ]

Other

ALSI FIELD SERVICES

[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite

**Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; Ol=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___

Courier:

Tracking #:

Co. Name: Tetra Tech NUS

Contact (Report to): Russell Turner Phone: 610-382-1534

Address: 234 Mall Blvd. Suite 260 King of Prussia PA 19406

Bill to (if different than Report to): PO#:

Project Name/#: Willow Grove Site 3 ALSI Quote #:

TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALSI approval and surcharges. Date Required: Approved By:

Email? [ ] -Y

Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	ANALYSES/METHOD REQUESTED: TCL-VOC	Enter Number of Containers Per Analysis
1 TB-101308		10/13/08	0730	G	OL	CG	40ml	HCl	2	
2 03IW01-20081013			1015	G	GW				2	
3 035W10-20081013			1055	G	SW				2	
4 035W11-20081013			1040	G	SW				2	
5 DUP-03		↓	0000	G	GW	↓	↓	↓	2	
6										
7										
8										

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	Container in good condition?	COC/Labels complete/accurate?	Received on ice?	(if present) Seals intact?	Custody seals Present?
Correct containers?	N / Y	N / Y	N / Y	N / Y	N / Y
Correct sample volume?	N / Y	N / Y	N / Y	N / Y	N / Y
Correct preservation?	N / Y	N / Y	N / Y	N / Y	N / Y
Headspace/Volatiles?	N / Y	N / Y	N / Y	N / Y	N / Y

SAMPLED BY (Please Print): Donald Whalen

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Donald Whalen / Tetra Tech	10/13/08	1630	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] EDDs Required? [ ] If yes, format type:

SDWA Forms?-S: yes [ ] yes [ ] yes [ ] yes [ ]

Drinking Samples Collected In?: MD [ ] NJ [ ] NY [ ] PA [X] Other

→ Enter PWSID No.

DOD Criteria Required?

ALSI FIELD SERVICES

[ ] Pickup

[ ] Labor

[ ] Composite Sampling

[ ] Rental Equipment

[ ] Other:

* G=Grab; C=Composite

**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page 1 of 2

Courier: Fed Ex

Tracking #: 8646 0967 0363

Co. Name: Tetra Tech NUS 610

Contact (Report to): Russ Turner Phone: 491 9688

Address: 234 Mall Boulevard Suite 260
King of Prussia, PA 19406

Bill to (if different than Report to): PO#:

Project Name/#: NAS JRB Willow Grove Site 3 ALSI Quote #:

TAT: ☐ Normal-Standard TAT is 10-12 business days. ☐ Rush-Subject to ALSI approval and surcharges. Date Required: Approved By:

Email? ☐ Y

Fax? ☐ Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	40ml VOA Vial HCl VOCs								
						CG	40ml	HCl	Enter Number of Containers Per Analysis								
1 TB101408		10/14/08	0730	G	OL				2								
2 03MW04I-20081014		10/14/08	1410	G	GW				2								
3 03MW04SI-20081014		10/14/08	1515	G	GW				2								
4 03MW04SIL-20081014		10/14/08	1715	G	GW				2								
5 03MW08D-20081015		10/15/08	1235	G	GW				2								
6 03MW08S-20081015		10/15/08	1030	G	GW				2								
7 03MW06I-20081015		10/15/08	1705	G	GW				2								
8 03MW06IL-20081015		10/15/08	1450	G	GW				2								

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	Container in good condition?	COC/Labels complete/accurate?	Received on ice?	(if present) Seals intact?	Custody seals Present?
	Y	Y	Y	Y	Y
	N	N	N	N	N
	Y	Y	Y	Y	Y
	N	N	N	N	N

Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?
Y	Y	Y	Y
N	N	N	N

SAMPLED BY (Please Print): Donald Whalen

LOGGED BY (signature): DATE: TIME:

REVIEWED BY (signature): DATE: TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Donald Whalen	10/15/08	1900	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: ☐ Standard ☐ CLP-like ☐ NJ-Reduced ☐ NJ-Full ☐ other

EDDs Required: ☐ If yes, format type:

SDWA Forms?: yes ☐ yes ☐ yes ☐ yes ☐

State Samples Collected in?: MD ☐ NJ ☐ NY ☐ PA ☒

Other

Enter Permit No.

DOD Criteria Required?

ALSI FIELD SERVICES

☐ Pickup
☐ Labor
☐ Composite Sampling
☐ Rental Equipment
☐ Other:

* G=Grab; C=Composite

**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page 2 of 2

Courier:

Tracking #:

Co. Name: Tetra Tech NUS

Contact (Report to): Russ Turner **Phone:** 610-491-9888

Address: 234 Mall Blvd. Suite 260 King of Prussia, PA 19406

Bill to (if different than Report to): **PO#:**

Project Name/#: Naval Air Willow Grove Site 3 **ALSI Quote #:**

TAT: ☐ Normal-Standard TAT is 10-12 business days. ☐ Rush-Subject to ALSI approval and surcharges. **Date Required:** **Approved By:**

Email? ☐ -Y

Fax? ☐ -Y **No.:**

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	ANALYSES/METHOD REQUESTED												Enter Number of Containers Per Analysis
						CG	4oz	HCl	VOC												
1 03MW06SI-20081015		10/15/08	1535	G	GW				2												
2 03MW06S-20081015		10/15/08	1725	G	GW				2												
3																					
4																					
5																					
6																					
7																					
8																					

Receipt Information (completed by Sample Receiving)

Performed by: (INITIAL & DATE)

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	Container in good condition?	COC/Labels complete/accurate?	Received on ice?	(if present) Seals intact?	Custody seals Present?	Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?
N	N	N	N	N	N	N	N	N	N
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

SAMPLED BY (Please Print): Donald Whalen

LOGGED BY(signature): DATE: TIME:

REVIEWED BY(signature): DATE: TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Donald Whalen	10/15/08	1900	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: ☐ Standard ☐ CLP-like ☐ NJ-Reduced ☐ NJ-Full ☐ other

EDDs Required? ☐ If yes, format type:

SDWA Forms? yes ☐ yes ☐ yes ☐ yes ☐

State Samples Collected In? MD ☐ NJ ☐ NY ☐ PA ☒ Other

DOD Criteria Required?

ALSI FIELD SERVICES

☐ Pickup
☐ Labor
☐ Composite Sampling
☐ Rental Equipment
☐ Other:

* G=Grab; C=Composite

**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

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Page 1 of 2

Courier: Fed Ex

Tracking #: [illegible]

Co. Name: Tetra Tech NUS

Contact (Report to): **Phone:** 610-491-9658

Address: 234 Mall Blvd. Suite 260 King of Prussia, PA 19406

Bill to (if different than Report to): **PO#:**

Project Name/#: NAS JRB Willow Grove Site 3 **ALSI Quote #:**

TAT: ☐ Normal-Standard TAT is 10-12 business days. ☐ Rush-Subject to ALSI approval and surcharges. **Date Required:** **Approved By:**

Email? ☐ -Y

Fax? ☐ -Y No.:

	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	Enter Number of Containers Per Analysis									
***Container Type							CG									
***Container Size							40ml									
*** Preservative							HCl									
ANALYSES/METHOD REQUESTED							VOCs									
1	TB-101608		10/16/08	0700	G	OL	2									
2	RB-101608			1640	G	OL	2									
3	03MW05S-20081016			1015	G	GW	2									
4	03MW05I-20081016			1050	G	GW	2									
5	03MW01S-20081016			1405	G	GW	2									
6	03MW04S-20081016			1455	G	GW	2									
7	03MW02S-20081016		↓	1625	G	GW	2									
8	03MW01SIL-20081017		10/17/08	1145	G	GW	2									

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

	Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?	Circle appropriate Y or N.
N	N	N	N	N	
Y	Y	Y	Y	Y	
Custody seals Present?	(if present) Seals intact?	Received on ice?	COC/Labels complete/accurate?	Container in good condition?	
N	N	N	N	N	
Y	Y	Y	Y	Y	

SAMPLED BY (Please Print): Donald Wheeler

LOGGED BY(signature): DATE: TIME:

REVIEWED BY(signature): DATE: TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Donald Wheeler	10/17/08	1830	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: ☐ Standard ☐ CLP-like ☐ NJ-Reduced ☐ NJ-Full ☐ other

EDDs Required? ☐ If yes, format type:

DOD Criteria Required?

SDWA Forms?→ yes ☐ yes ☐ yes ☐ yes ☐

State Samples Collected in? MD ☐ NJ ☐ NY ☐ PA ☒ Other

ALSI FIELD SERVICES

☐ Pickup
☐ Labor
☐ Composite Sampling
☐ Rental Equipment
☐ Other:

* G=Grab; C=Composite

**Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; Oil=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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Page ___ of ___

Courier:

Tracking #:

Co. Name: Tetra Tech NUS

Contact (Report to): Russ Turner **Phone:** 610-491-9688

Address: 234 Mall Blvd. Suite 360 King of Prussia, PA 19406

Bill to (if different than Report to): **PO#:**

Project Name/#: NAS JRB Willow Grove Site 3 **ALSI Quote #:**

TAT: ☐ Normal-Standard TAT is 10-12 business days. ☐ Rush-Subject to ALSI approval and surcharges. **Date Required:** **Approved By:**

Email? ☐ -Y

Fax? ☐ -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	Enter Number of Containers Per Analysis
1 DUP-04		10/17/08	0000	G	GW	2
2 03MW01SI-20081017			1410	G	GW	2
3 03MW02SI-20081017			1555	G	GW	6
4 03MW01I-20081017		↓	1625	G	GW	2
5						
6						
7						
8						

***Container Type: CG

***Container Size: 40ml

*** Preservative: HCl

ANALYSES/METHOD REQUESTED: VOC

Receipt Information (completed by Sample Receipt rep.)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	Container in good condition?	COC/Labels complete/accurate?	Received on ice?	(If present) Seals intact?	Custody seals Present?
Correct containers?	N / Y				
Correct sample volume?	N / Y				
Correct preservation?	N / Y				
Headspace/Volatiles?	N / Y				
Circle appropriate Y or N.	N	N	N	N	N
	Y	Y	Y	Y	Y

SAMPLED BY (Please Print): Donald Whalen

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Donald Whalen / Tetra Tech NUS	10/17/08	1830	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: ☐ Standard ☐ CLP-like ☐ NJ-Reduced ☐ NJ-Full ☐ (other)

EDDs Required? ☐ If yes, format type:

SDWA Forms? yes ☐ yes ☐ yes ☐ yes ☐

State Samples Collected In? MD ☐ NJ ☐ NY ☐ PA ☒

Other

DOD Criteria Required?

ALSI FIELD SERVICES

☐ Pickup
☐ Labor
☐ Composite Sampling
☐ Rental Equipment
☐ Other:

* G=Grab; C=Composite

**Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; Oi=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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*DUP MADE ON 03MW01SI-20081017

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page 1 of 2
Courier: Fed Ex
Tracking #: [illegible]

Co. Name: TetraTech NUS
Contact (Report to): Russ Turner
Phone: 610-491-9688
Address: 234 Mall Blvd, Suite 260, King of Prussia, PA 19406
Bill to (if different than Report to):
PO#:
Project Name/#: NAS JRB Willow Grove Site 3
ALSI Quote #:
TAT: Normal-Standard TAT is 10-12 business days. / Rush-Subject to ALSI approval and surcharges.
Date Required:
Approved By:
Email? -Y
Fax? -Y No.:

***Container Type: CG
***Container Size: 40ml
***Preservative: HCl

ANALYSES/METHOD REQUESTED: VOC

Enter Number of Containers Per Analysis

	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	VOC
1	03MW02IL-20081020		10/20/08	1105	G	GW	2
2	03MW02I-20081020		↓	1225	G	GW	2
3	DUP-05			0000	G	GW	2
4	03MW03SL-20081020			1500	G	GW	6
5	03MW03S-20081020			1600	G	GW	2
6	TB-102008		↓	0900	G	OL	2
7	03MW03FI-20081021		10/21/08	1010	G	GW	2
8	03MW03I-20081021		↓	1205	G	GW	2

Receipt Information (completed by Sample Receiving)
Performed by: INITIAL HERE
Cooler Temp:
Therm. ID:
No. of Coolers:
Notes:

Circle appropriate Y or N: Correct containers? Y N; Correct sample volume? Y N; Correct preservation? Y N; Headspace/Volatiles? Y N
Custody seals Present? Y N; (If present) Seals intact? Y N; Received on ice? Y N; COC/Labels complete/accurate? Y N; Container in good condition? Y N

SAMPLED BY (Please Print): Donald Whalen
LOGGED BY(signature): DATE TIME
REVIEWED BY(signature): DATE TIME

	Relinquished By / Company Name	Date	Time		Received By / Company Name	Date	Time
1	Donald Whalen	10/21/08	1630	2			
3				4			
5				6			
7				8			
9				10			

Data Deliverables: Standard; CLP-like; NJ-Reduced; NJ-Full; (other)
SDWA Forms? yes
State Samples Collected In? MD; NJ; NY; PA [X]; Other
EDDs Required? If yes, format type:
DOD Criteria Required?

ALSI FIELD SERVICES: Pickup; Labor; Composite Sampling; Rental Equipment; Other:

* G=Grab; C=Composite **Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; Ol=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY ***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc. Rev 6/07

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___
Courier:
Tracking #:

Co. Name: Tetra Tech NUS
Contact (Report to): Russ Turner **Phone:** 610-491-9688
Address: 234 Mall Blvd. Suite 260 King of Prussia, PA 19406

Bill to (if different than Report to): **PO#:**

Project Name/#: NASJRB Willow Grove Site 3 **ALSI Quote #:**

TAT: ☐ Normal-Standard TAT is 10-12 business days. ☐ Rush-Subject to ALSI approval and surcharges. **Date Required:** **Approved By:**

Email? -Y **Fax?** -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	ANALYSES/METHOD REQUESTED										Enter Number of Containers Per Analysis
						CG	40ml	HCl	VOC										
1 FB-102108		10/21/08	1400	G	OL														2
2 03MW07S-20081021		↓	1430	G	GW														2
3 RB-102108		↓	1455	G	OL														2
4																			
5																			
6																			
7																			
8																			

Receipt Information (completed by Sample Receiving)
Performed by: INITIAL HERE
Cooler Temp:
Therm. ID:
No. of Coolers:
Notes:

Circle appropriate Y or N.	
Correct containers?	N / Y
Correct sample volume?	N / Y
Correct preservation?	N / Y
Headspace/Volatiles?	N / Y
Custody seals Present?	N / Y
(If present) Seals intact?	N / Y
Received on ice?	N / Y
COC/Labels complete/accurate?	N / Y
Container in good condition?	N / Y

SAMPLED BY (Please Print): Donald Whalen
LOGGED BY(signature): DATE TIME
REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Donald Whalen / TtNUS	10/21/08	1630	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: ☐ Standard ☐ CLP-like ☐ NJ-Reduced ☐ NJ-Full ☐ ____
EDDs Required? ☐ If yes, format type:
SDWA Forms? yes ☐ yes ☐ yes ☐ yes ☐
State Samples Collected In? MD ☐ NJ ☐ NY ☐ PA ☒ Other
DOD Criteria Required?

ALSI FIELD SERVICES
☐ Pickup
☐ Labor
☐ Composite Sampling
☐ Rental Equipment
☐ Other:

* G=Grab; C=Composite
**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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CHAIN OF CUSTODY

CompuChem
a division of Liberty Analytical Corp.
501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: TETRA TECH NUS, INC.	Project Name: NAS JRB Willow Grove
Address: 2301 MAIN BLVD	Sampling Location: SITE 3
City / State / Zip: KING of PRUSSIA, PA 19406	Turnaround time: ONE WEEK
Project Contact: KISS TURNER	Batch QC or Project Specific? If Specific, which Sample ID? CHEM QC
Phone #: 610-491-7648	Are aqueous samples field filtered for metals? Y or (N)
Sampler's Name: JOE TOMMARAGE	Are high concentrations expected? Y or (N)? If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	Number of Preserved Bottles: HCl	NaOH	HNO3	H2SO4	MEOH	Other	Requested Analysis: TCL VOC	pH / Sample Info (Lab Use)
	03MW09S QST	2/11/10	1435	GW	9	✓						✓	
	RINSATE		1452		3	✓						✓	
	TRIP		1521		3	✓						✓	
	03MW09D QST		1540		3	✓						✓	
	DUP		1545		3	✓						✓	

Lab Use Only

Sample Unpacked By:
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

RUN MS/MSD ON 03MW09

Sample Custody

Relinquished by: J. Tommarage	Date/Time: 2/11/10 12:00	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page 1 of 1

Courier:

Tracking #:

COC#

Co. Name: Tetra Tech NUS

Contact (Report to): Russ Turner Phone: 610 382 1574

Address: 234 Mall Boulevard Suite 260
King of Prussia, PA 19406

Bill to (if different than Report to): Tetra Tech NUS PO#:
661 Anderson Drive Foster Plaza 7
Pittsburgh, PA 15220

Project Name/#: NAS5128 Willow Grove Site 3 ALSI Quote #:

TAT: [✓] Normal-Standard TAT is 10-12 business days. Data Required:
[ ] Rush-Subject to ALSI approval and surcharges. Approved By:

Email? [ ] -Y

Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	***Container Size	*** Preservative	ANALYSES/METHOD REQUESTED: 40ml VOA Vial HCl VOC	Enter Number of Containers Per Analysis
1 TB-20090401		4/1/09	0700	G	QA	CG	40ml	HCl		2
2 03IW01 20090401		4/1/09	1025	G	GW					2
3 03SW11 20090401		4/1/09	1055	G	SW					2
4 03SW10 20090401		4/1/09	1040	G	SW					2
5 03MW03S 20090401		4/1/09	1235	G	GW					2
6 03MW03SI 20090401		4/1/09	1338	G	GW					2
7 03MW03I 20090401		4/1/09	1355	G	GW					2
8 03DUP01 20090401		4/1/09	0000	G	QA					2

Receipt Information (completed by Sample Receiving)

Performed by: INITIAL HERE

Cooler Temp:

Therm. ID:

No. of Coolers:

Notes:

Circle appropriate Y or N.	Container in good condition?	COC/Labels complete/accurate?	Received on ice?	(if present) Seals intact?	Custody seals Present?
	N	N	N	N	N
	Y	Y	Y	Y	Y
Correct containers?					
Correct sample volume?					
Correct preservation?					
Headspace/Volatiles?					

SAMPLED BY (Please Print):

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 [signature]	4/1/09	1532	2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other

EDDs Required? [ ] If yes, format type:

DOD Criteria Required?

SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ]

States Samples Collected in? MD [ ] NJ [ ] NY [ ] PA [ ]

Other

⇨ Enter PWSID No.

ALSI FIELD SERVICES

[X] Pickup

[ ] Labor

[ ] Composite Sampling

[ ] Rental Equipment

[ ] Other:

* G=Grab; C=Composite

**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Courier:
Tracking #:

COC#

Co. Name: Tetra Tech NUS
Contact (Report to): Russ Turner **Phone:** 610 592 1534
Address: 234 Mall Boulevard Suite 260
King of Prussia PA 19406

Bill to (if different than Report to): Tetra Tech NUS **PO#:**
661 Andersen Drive Foster Plaza 7
Pittsburgh, PA 15220

Project Name/#: NAS JRB Willow Grove Site 3 **ALSI Quote #:**

TAT: [✓] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALSI approval and surcharges.
Date Required:
Approved By:

Email? [ ] -Y
Fax? [ ] -Y No.:

***Container Type	CG
***Container Size	40ml
***Preservative	HCl

ANALYSES/METHOD REQUESTED: 40ml VOA Vials HCl VOC

Enter Number of Containers Per Analysis

	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	40ml VOA Vials HCl VOC
1	03Dup02 20090401		4/1/09	0000	G	GA	2
2	03MW04S 20090402		4/2/09	0955	G	GW	2
3	03MW04SI 20090402		4/2/09	1045	G	GW	2
4	03MW04I 20090402		4/2/09	1130	G	GW	2
5	03MW07S 20090402		4/2/09	1210	G	GW	6
6							
7							
8							

Receipt Information (completed by Sample Receiver)
Performed by: INITIAL HERE
Cooler Temp:
Therm. ID:
No. of Coolers:
Notes:

Correct containers? Y N
Correct sample volume? Y N
Correct preservation? Y N
Headspace/Volatiles? Y N
Circle appropriate Y or N.
Custody seals Present? Y N
(If present) Seals intact? Y N
Received on ice? Y N
COC/Labels complete/accurate? Y N
Container in good condition? Y N

SAMPLED BY (Please Print):
LOGGED BY (signature): DATE TIME
REVIEWED BY (signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 [signature]	4/2/09	1532	2 [signature]	[illegible]	[illegible]
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ]
SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ]
State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ]
EDDs Required? [ ] If yes, format type: Other
⇒ Enter PWSID No.
DOD Criteria Required?

ALSI FIELD SERVICES
[✓] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite **Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY ***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Rev 6/07

[illegible]

APPENDIX I

ECOLOGICAL RISK ASSESSMENT DOCUMENTATION

APPENDIX I

ECOLOGICAL RISK ASSESSMENT SUPPORTING DOCUMENTATION

Table I-1	**Sources and Endpoints for Toxicity Reference Values**
Tables I-2 through I-15	**Food Chain Hazard Quotients: Calculation Worksheets**
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TABLE I-1
SOURCES AND ENDPOINTS FOR TOXICITY REFERENCE VALUES
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Concentration (mg/kg-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Semivolatiles Organics							
1,2,4-Trichlorobenzene	14.8	LOAEL	reproduction & growth	subchronic	rat	IT Corporation, 1997	LANL, 2004
1,4-Dichlorobenzene[1]	300	LOAEL	mortality	chronic	rat	NTP, 1985a	ATSDR, 1998
7,12-dimethylbenz(a)anthracene[2]	2	NOAEL	systemic	chronic	European starling	Trust et al (1994)	Trust et al (1994)
7,12-dimethylbenz(a)anthracene[2]	20	LOAEL	systemic	chronic	European starling	Trust et al (1994)	Trust et al (1994)
Low Molecular Weight PAHs	65.6	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Low Molecular Weight PAHs	356	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
High Molecular Weight PAHs	0.615	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
High Molecular Weight PAHs	38.4	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Pesticides							
4,4'-DDT[3]	0.147	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
4,4'-DDT[3]	5.56	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
4,4'-DDT[3]	0.227	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
4,4'-DDT[3]	2.7	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Aldrin	0.2	NOAEL	reproductive	chronic	rat	Treon and Cleveland, 1955	Sample et.al., 1996
Aldrin	1	LOAEL	reproductive	chronic	rat	Treon and Cleveland, 1955	Sample et.al., 1996
Aroclor-1254[4]	1.8	LOAEL	reproductive	chronic	pheasant	Dahlgren et al., 1972	Sample et.al., 1996
Aroclor-1254[4]	0.68	LOAEL	reproductive	chronic	mouse	McCoy et al., 1995	Sample et.al., 1996
beta-BHC	4	NOAEL	systemic	subchronic	rat	Van Velsen et al., 1986	Sample et.al., 1996
beta-BHC	20	LOAEL	systemic	subchronic	rat	Van Velsen et al., 1986	Sample et.al., 1996
BHC (mixed isomers)[6]	0.137	LOAEL	reproductive	chronic	mink	Bleavins et al., 1984	Sample et.al., 1996
BHC (mixed isomers)[6]	0.563	NOAEL	reproductive	chronic	Japanese quail	Vos et al., 1971	Sample et.al., 1996
BHC (mixed isomers)[6]	2.25	LOAEL	reproductive	chronic	Japanese quail	Vos et al., 1971	Sample et.al., 1996
Chlordane	2.14	NOAEL	mortality	chronic	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane	10.7	LOAEL	mortality	chronic	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane	4.58	NOAEL	reproduction	chronic	mouse	WHO, 1984	Sample et.al., 1996
Chlordane	9.16	LOAEL	reproduction	chronic	mouse	WHO, 1984	Sample et.al., 1996
Dieldrin	0.0709	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Dieldrin	0.8	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Dieldrin	0.015	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Dieldrin	1.27	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Endosulfan	1.5	NOAEL	reproduction	subchronic	rat	Dikshith et al., 1984	ATSDR, 1993
Endosulfan	10	NOAEL	reproduction	chronic	gray partridge	Abiola, 1992	Sample et.al., 1996
Endrin Aldehyde	0.92	LOAEL	reproduction	chronic	mouse	Good and Ware, 1969	Sample et.al., 1996
Endrin Aldehyde	0.1035	LOAEL	reproduction	chronic	screech owl	Fleming et al., 1982	Sample et.al., 1996
Endrin Ketone	0.92	LOAEL	reproduction	chronic	mouse	Good and Ware, 1969	Sample et.al., 1996
Endrin Ketone	0.1035	LOAEL	reproduction	chronic	screech owl	Fleming et al., 1982	Sample et.al., 1996
gamma-BHC (lindane)	8	NOAEL	reproductive	chronic	rat	Palmer et al., 1978	Sample et.al., 1996
gamma-BHC (lindane)	20	LOAEL	reproductive	chronic	mallard duck	Chakravarty and Lahiri, 1986	Sample et.al., 1996
Heptachlor	1	LOAEL	reproduction	chronic	mink	Crum et al., 1993	Sample et.al., 1996
Heptachlor Epoxide	1	LOAEL	reproduction	chronic	mink	Crum et al., 1994	Sample et.al., 1996
Methoxychlor	4	NOAEL	reproduction	chronic	rat	Gray et al., 1988	Sample et.al., 1996
Methoxychlor	8	LOAEL	reproduction	chronic	rat	Gray et al., 1989	Sample et.al., 1996
Inorganics							
Antimony	0.059	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Antimony	2.76	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Arsenic	2.24	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Arsenic	4.51	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Arsenic	1.04	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	

TABLE I-1
SOURCES AND ENDPOINTS FOR TOXICITY REFERENCE VALUES
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Concentration (mg/kg-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Arsenic	4.55	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Cadmium	1.47	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Cadmium	6.35	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Cadmium	0.77	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Cadmium	6.9	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Chromium(III)	2.66	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Chromium(III)	15.63	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Chromium(III)	2.4	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Chromium(III)	58.17	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Copper	4.05	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Copper	34.76	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Copper	5.6	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Copper	82.7	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Cyanide	68.7	NOAEL	reproductive	chronic	rat	Tewe and Maner, 1981	
Lead	1.63	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Lead	44.6	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Lead	4.7	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Lead	186.4	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Mercury	0.064	LOAEL	reproductive	chronic	mallard duck	Heinz, 1979	Sample et.al., 1996
Mercury	0.032	NOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996
Mercury	0.16	LOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996
Nickel	6.71	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Nickel	18.57	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Nickel	1.7	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Nickel	14.77	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Selenium	0.29	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Selenium	0.819	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Selenium	0.143	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Selenium	0.661	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Silver	6.02	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Silver	118.62	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Silver	2.02	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Silver	60.47	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	
Thallium	0.74	LOAEL	reproductive	subchronic	rat	Formigli et al., 1986	Sample et.al., 1996
Vanadium	4.16	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Vanadium	9.436	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents[5]	
Vanadium	0.344	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents[5]	

TABLE I-1
SOURCES AND ENDPOINTS FOR TOXICITY REFERENCE VALUES
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Concentration (mg/kg-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Vanadium	1.686	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents(5)	
Zinc	75.4	NOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents(5)	
Zinc	297.58	LOAEL	reproduction & growth	chronic	mammals	USEPA Eco-SSL documents(5)	
Zinc	66.1	NOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents(5)	
Zinc	171.44	LOAEL	reproduction & growth	chronic	birds	USEPA Eco-SSL documents(5)	
Dioxins/Furans							
2,3,7,8-TCDD (TEQ)	0.000001	NOAEL	reproduction	chronic	rat	Murray et al., 1979	Sample et.al., 1996
2,3,7,8-TCDD (TEQ)	0.00001	LOAEL	reproduction	chronic	rat	Murray et al., 1979	Sample et.al., 1996
2,3,7,8-TCDD (TEQ)	0.000014	NOAEL	reproduction	chronic	pheasant	Nosek et al., 1992	Sample et.al., 1996
2,3,7,8-TCDD (TEQ)	0.00014	LOAEL	reproduction	chronic	pheasant	Nosek et al., 1992	Sample et.al., 1996

Notes:

(1) Used as a surrogate for 1,2-diclorobenzene.

(2) 7,12-dimethylbenz(a)anthracene was used as a surrogate for avain NOAELs and LOAELs for PAHs.

(3) Used as a surrogate for 4,4'-DDE, 4,4'-DDD, and total DDT.

(4) Used as a surrogate for Aroclor-1260.

(5) NOAELs taken from Eco-SSL documents; LOAELs calculated as the geometric mean of growth and reproduction data from the Eco-SSL documents.

(6) Used as a surrogate for alpha-BHC and delta-BHC.

TABLE I-2

MEADOW VOLE - CONSERVATIVE SCENARIO
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Chemical	Max Soil Conc. (mg/kg)	Max SW Conc. (mg/L)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Surface Water	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Semivolatile Organics											
1,2,4-Trichlorobenzene	1.50E-01	0.00E+00	2.70E-02	1.06E-03	0.00E+00	5.97E-03	7.03E-03	1.48E+00	1.48E+01	4.75E-03	4.75E-04
1,2-Dichlorobenzene	3.30E-01	0.00E+00	1.34E-01	2.33E-03	0.00E+00	2.95E-02	3.19E-02	3.00E+01	3.00E+02	1.06E-03	1.06E-04
1,4-Dichlorobenzene	1.60E-01	0.00E+00	6.48E-02	1.13E-03	0.00E+00	1.43E-02	1.54E-02	3.00E+01	3.00E+02	5.15E-04	5.15E-05
Acenaphthene	3.30E+01	0.00E+00	1.93E-04	2.33E-01	0.00E+00	4.26E-05	2.33E-01	6.56E+01	3.56E+02	3.56E-03	6.56E-04
Acenaphthylene	1.60E-01	1.60E-05	7.48E-02	1.13E-03	7.07E-06	1.65E-02	1.77E-02	6.56E+01	3.56E+02	2.69E-04	4.96E-05
Anthracene	6.60E+01	0.00E+00	9.70E+00	4.67E-01	0.00E+00	2.14E+00	2.61E+00	6.56E+01	3.56E+02	3.98E-02	7.33E-03
Benzo(a)anthracene	6.50E+01	2.70E-05	7.97E-01	4.60E-01	1.19E-05	1.76E-01	6.36E-01	6.15E-01	3.84E+01	1.03E+00	1.66E-02
Benzo(a)pyrene	4.80E+01	4.70E-05	5.55E+00	3.39E-01	2.08E-05	1.23E+00	1.56E+00	6.15E-01	3.84E+01	2.54E+00	4.07E-02
Benzo(b)fluoranthene	5.80E+01	9.70E-05	1.80E+01	4.10E-01	4.29E-05	3.97E+00	4.38E+00	6.15E-01	3.84E+01	7.13E+00	1.14E-01
Benzo(g,h,i)perylene	1.30E+01	3.60E-05	8.19E+00	9.19E-02	1.59E-05	1.81E+00	1.90E+00	6.15E-01	3.84E+01	3.09E+00	4.95E-02
Benzo(k)fluoranthene	3.10E+01	8.50E-05	2.21E+00	2.19E-01	3.76E-05	4.89E-01	7.08E-01	6.15E-01	3.84E+01	1.15E+00	1.84E-02
Butyl Benzyl Phthalate	3.30E-01	0.00E+00	1.82E-02	2.33E-03	0.00E+00	4.01E-03	6.34E-03	1.59E+01	4.70E+01	3.99E-04	1.35E-04
Chrysene	5.20E+01	5.30E-05	6.98E-01	3.68E-01	2.34E-05	1.54E-01	5.22E-01	6.15E-01	3.84E+01	8.49E-01	1.36E-02
Di-n-Butyl Phthalate	3.70E-01	0.00E+00	2.04E-02	2.62E-03	0.00E+00	4.50E-03	7.11E-03	5.50E+02	1.83E+03	1.29E-05	3.88E-06
Dibenzo(a,h)anthracene	4.80E+00	1.20E-05	6.24E-01	3.39E-02	5.30E-06	1.38E-01	1.72E-01	6.15E-01	3.84E+01	2.79E-01	4.47E-03
Fluoranthene	1.50E+02	1.20E-04	7.50E+01	1.06E+00	5.30E-05	1.66E+01	1.76E+01	6.56E+01	3.56E+02	2.69E-01	4.95E-02
Fluorene	4.10E+01	6.90E-04	4.28E-04	2.90E-01	3.05E-04	9.46E-05	2.90E-01	6.56E+01	3.56E+02	4.43E-03	8.15E-04
Indeno(1,2,3-cd)pyrene	1.90E+01	4.20E-05	2.09E+00	1.34E-01	1.86E-05	4.62E-01	5.96E-01	6.15E-01	3.84E+01	9.69E-01	1.55E-02
Phenanthrene	2.10E+02	9.60E-05	2.33E+01	1.48E+00	4.24E-05	5.16E+00	6.64E+00	6.56E+01	3.56E+02	1.01E-01	1.87E-02
Pyrene	1.40E+02	9.90E-05	1.01E+02	9.90E-01	4.38E-05	2.23E+01	2.33E+01	6.15E-01	3.84E+01	3.78E+01	6.06E-01
Pesticides/PCBs											
4,4'-DDD	4.50E-02	0.00E+00	NA	3.18E-04	0.00E+00	NA	3.18E-04	1.47E-01	5.56E+00	2.16E-03	5.72E-05
4,4'-DDE	2.10E-01	0.00E+00	NA	1.48E-03	0.00E+00	NA	1.48E-03	1.47E-01	5.56E+00	1.01E-02	2.67E-04
4,4'-DDT	4.50E-01	0.00E+00	NA	3.18E-03	0.00E+00	NA	3.18E-03	1.47E-01	5.56E+00	2.16E-02	5.72E-04
Total DDT	6.66E-01	0.00E+00	5.97E-02	4.71E-03	0.00E+00	1.32E-02	1.79E-02	1.47E-01	5.56E+00	1.22E-01	3.22E-03
Aldrin	1.60E-03	0.00E+00	1.11E-03	1.13E-05	0.00E+00	2.44E-04	2.56E-04	2.00E-01	1.00E+00	1.28E-03	2.56E-04
Alpha-BHC	5.60E-03	0.00E+00	1.18E-03	3.96E-05	0.00E+00	2.60E-04	2.99E-04	1.40E-02	1.40E-01	2.14E-02	2.14E-03
Beta-BHC	9.80E-04	0.00E+00	1.78E-04	6.93E-06	0.00E+00	3.94E-05	4.63E-05	4.00E-01	2.00E+00	1.16E-04	2.32E-05
Alpha-Chlordane	2.30E-02	0.00E+00	5.64E-04	1.63E-04	0.00E+00	1.25E-04	2.87E-04	4.58E+00	9.16E+00	6.27E-05	3.13E-05
Aroclor-1254	8.40E-02	0.00E+00	1.06E-03	5.94E-04	0.00E+00	2.34E-04	8.28E-04	6.80E-02	6.80E-01	1.22E-02	1.22E-03
Aroclor-1260	1.50E-01	0.00E+00	4.35E-04	1.06E-03	0.00E+00	9.61E-05	1.16E-03	6.80E-02	6.80E-01	1.70E-02	1.70E-03
Dieldrin	6.20E-01	1.10E-05	2.54E-01	4.38E-03	4.86E-06	5.62E-02	6.06E-02	1.50E-02	1.27E+00	4.04E+00	4.77E-02
Endosulfan I	3.00E-02	0.00E+00	9.96E-03	2.12E-04	0.00E+00	2.20E-03	2.41E-03	1.50E-01	1.50E+00	1.61E-02	1.61E-03
Endosulfan II	1.60E-02	0.00E+00	5.31E-03	1.13E-04	0.00E+00	1.17E-03	1.29E-03	1.50E-01	1.50E+00	8.58E-03	8.58E-04
Endosulfan Sulfate	3.20E-03	0.00E+00	1.06E-03	2.26E-05	0.00E+00	2.35E-04	2.57E-04	1.50E-01	1.50E+00	1.72E-03	1.72E-04
Endrin	1.60E-02	0.00E+00	1.31E-03	1.13E-04	0.00E+00	2.88E-04	4.02E-04	9.20E-02	9.20E-01	4.37E-03	4.37E-04
Endrin Aldehyde	8.00E-03	0.00E+00	6.53E-04	5.66E-05	0.00E+00	1.44E-04	2.01E-04	9.20E-02	9.20E-01	2.18E-03	2.18E-04
Endrin Ketone	9.60E-03	0.00E+00	7.83E-04	6.79E-05	0.00E+00	1.73E-04	2.41E-04	9.20E-02	9.20E-01	2.62E-03	2.62E-04
Gamma-BHC (Lindane)	1.10E-03	0.00E+00	2.99E-04	7.78E-06	0.00E+00	6.61E-05	7.39E-05	8.00E+00	8.00E+01	9.24E-06	9.24E-07
Gamma-Chlordane	3.30E-02	0.00E+00	8.09E-04	2.33E-04	0.00E+00	1.79E-04	4.12E-04	4.58E+00	9.16E+00	9.00E-05	4.50E-05
Heptachlor	3.90E-03	0.00E+00	4.76E-04	2.76E-05	0.00E+00	1.05E-04	1.33E-04	1.00E-01	1.00E+00	1.33E-03	1.33E-04
Heptachlor Epoxide	2.00E-02	0.00E+00	5.60E-04	1.41E-04	0.00E+00	1.24E-04	2.65E-04	1.00E-01	1.00E+00	2.65E-03	2.65E-04
Methoxychlor	5.00E-03	0.00E+00	5.35E-04	3.54E-05	0.00E+00	1.18E-04	1.54E-04	4.00E+00	8.00E+00	3.84E-05	1.92E-05
Inorganics											
Antimony	1.04E+01	0.00E+00	3.55E-01	7.35E-02	0.00E+00	7.84E-02	1.52E-01	5.90E-02	2.76E+00	2.57E+00	5.50E-02
Arsenic	1.30E+01	0.00E+00	4.88E-01	9.19E-02	0.00E+00	1.08E-01	2.00E-01	1.04E+00	4.55E+00	1.92E-01	4.39E-02
Cadmium	1.84E+01	0.00E+00	3.05E+00	1.30E-01	0.00E+00	6.74E-01	8.04E-01	7.70E-01	6.90E+00	1.04E+00	1.16E-01
Chromium	3.58E+01	1.30E-03	1.47E+00	2.53E-01	5.75E-04	3.24E-01	5.78E-01	2.40E+00	5.82E+01	2.41E-01	9.94E-03
Copper	1.82E+02	0.00E+00	1.52E+01	1.29E+00	0.00E+00	3.35E+00	4.64E+00	5.60E+00	8.27E+01	8.28E-01	5.61E-02
Cyanide	2.30E+00	0.00E+00	2.01E+01	1.63E-02	0.00E+00	4.45E+00	4.46E+00	6.87E+01	6.87E+02	6.50E-02	6.50E-03
Lead	3.79E+02	2.70E-03	7.41E+00	2.68E+00	1.19E-03	1.64E+00	4.32E+00	4.70E+00	1.86E+02	9.19E-01	2.32E-02
Mercury	7.70E-01	0.00E+00	3.85E+00	5.44E-03	0.00E+00	8.51E-01	8.56E-01	3.20E-02	1.60E-01	2.68E+01	5.35E+00
Nickel	3.90E+01	2.00E-03	1.68E+00	2.76E-01	8.84E-04	3.71E-01	6.47E-01	1.70E+00	1.48E+01	3.81E-01	4.38E-02
Selenium	3.60E-01	0.00E+00	1.64E-01	2.55E-03	0.00E+00	3.63E-02	3.89E-02	1.43E-01	6.60E-01	2.72E-01	5.89E-02
Silver	2.63E+01	0.00E+00	3.68E-01	1.86E-01	0.00E+00	8.14E-02	2.67E-01	6.02E+00	1.19E+02	4.44E-02	2.25E-03
Thallium	1.80E+00	0.00E+00	7.20E-03	1.27E-02	0.00E+00	1.59E-03	1.43E-02	7.40E-03	7.40E-02	1.93E+00	1.93E-01
Vanadium	4.57E+01	1.40E+00	2.22E-01	3.23E-01	6.19E-01	4.90E-02	9.91E-01	4.16E+00	9.44E+00	2.38E-01	1.05E-01
Zinc	4.66E+02	1.60E-02	1.45E+02	3.30E+00	7.07E-03	3.21E+01	3.54E+01	7.54E+01	2.98E+02	4.70E-01	1.19E-01
Dioxins/Furans											
TEQ	1.26E-05	0.00E+00	5.40E-08	8.87E-08	0.00E+00	1.19E-08	1.01E-07	1.00E-06	1.00E-05	1.01E-01	1.01E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	3.76E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Water Ingestion Rate = (Iw)	7.51E-03	L/day	Dose (water) = (Cw * Iw)(H)/BW
Soil Ingestion Rate = (Is)	1.20E-04	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
			H=HR/CA (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

NA - soil-to-plant BAF not available, total dose is from soil ingestion only.

TABLE I-3

MEADOW VOLE - AVERAGE SCENARIO
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	Avg Soil Conc.	Avg SW Conc.	Vegetation Conc.	Dose (mg/kg/d) from:			Total Dose	NOAEL	LOAEL	Hazard Quotients	
Chemical	(mg/kg)	(mg/L)	(mg/kg)	Soil	Surface Water	Veget.	(mg/kg/d)	(mg/kg/d)	(mg/kg/d)	NOAEL	LOAEL
Semivolatile Organics											
1,2,4-Trichlorobenzene	1.50E-01	0.00E+00	2.70E-02	1.75E-04	0.00E+00	2.63E-03	2.81E-03	1.48E+00	1.48E+01	1.9E-03	1.9E-04
1,2-Dichlorobenzene	3.30E-01	0.00E+00	1.34E-01	3.86E-04	0.00E+00	1.30E-02	1.34E-02	3.00E+01	3.00E+02	4.5E-04	4.5E-05
1,4-Dichlorobenzene	1.60E-01	0.00E+00	6.48E-02	1.87E-04	0.00E+00	6.31E-03	6.50E-03	3.00E+01	3.00E+02	2.2E-04	2.2E-05
Acenaphthene	6.46E-01	0.00E+00	5.58E-03	7.55E-04	0.00E+00	5.44E-04	1.30E-03	6.56E+01	3.56E+02	2.0E-05	3.6E-06
Acenaphthylene	1.60E-01	1.60E-05	7.48E-02	1.87E-04	2.80E-06	7.28E-03	7.47E-03	6.56E+01	3.56E+02	1.1E-04	2.1E-05
Anthracene	1.19E+00	0.00E+00	4.26E-01	1.39E-03	0.00E+00	4.15E-02	4.29E-02	6.56E+01	3.56E+02	6.5E-04	1.2E-04
Benzo(a)anthracene	1.25E+00	2.70E-05	7.61E-02	1.46E-03	4.72E-06	7.42E-03	8.88E-03	6.15E-01	3.84E+01	1.4E-02	2.3E-04
Benzo(a)pyrene	9.71E-01	4.70E-05	1.24E-01	1.14E-03	8.22E-06	1.20E-02	1.32E-02	6.15E-01	3.84E+01	2.1E-02	3.4E-04
Benzo(b)fluoranthene	1.04E+00	4.36E-05	3.22E-01	1.22E-03	7.62E-06	3.14E-02	3.26E-02	6.15E-01	3.84E+01	5.3E-02	8.5E-04
Benzo(g,h,i)perylene	4.64E-01	3.60E-05	2.59E+00	5.43E-04	6.30E-06	2.53E-01	2.53E-01	6.15E-01	3.84E+01	4.1E-01	6.6E-03
Benzo(k)fluoranthene	7.32E-01	5.43E-05	8.84E-02	8.56E-04	9.50E-06	8.61E-03	9.48E-03	6.15E-01	3.84E+01	1.5E-02	2.5E-04
Butyl Benzyl Phthalate	3.30E-01	0.00E+00	1.82E-02	3.86E-04	0.00E+00	1.77E-03	2.15E-03	1.59E+01	4.70E+01	1.4E-04	4.6E-05
Chrysene	1.07E+00	5.30E-05	6.94E-02	1.25E-03	9.27E-06	6.76E-03	8.02E-03	6.15E-01	3.84E+01	1.3E-02	2.1E-04
Di-n-Butyl Phthalate	3.70E-01	0.00E+00	2.04E-02	4.33E-04	0.00E+00	1.98E-03	2.42E-03	5.50E+02	1.83E+03	4.4E-06	1.3E-06
Dibenzo(a,h)anthracene	6.07E-01	1.20E-05	7.89E-02	7.10E-04	2.10E-06	7.69E-03	8.40E-03	6.15E-01	3.84E+01	1.4E-02	2.2E-04
Fluoranthene	2.71E+00	7.55E-05	1.36E+00	3.17E-03	1.32E-05	1.32E-01	1.35E-01	6.56E+01	3.56E+02	2.1E-03	3.8E-04
Fluorene	7.66E-01	6.43E-04	9.83E-04	8.96E-04	1.12E-04	9.57E-05	1.10E-03	6.56E+01	3.56E+02	1.7E-05	3.1E-06
Indeno(1,2,3-cd)pyrene	5.58E-01	1.70E-05	6.14E-02	6.52E-04	2.97E-06	5.98E-03	6.64E-03	6.15E-01	3.84E+01	1.1E-02	1.7E-04
Phenanthrene	3.47E+00	9.60E-05	1.83E+00	4.06E-03	1.68E-05	1.78E-01	1.83E-01	6.56E+01	3.56E+02	2.8E-03	5.1E-04
Pyrene	2.52E+00	2.93E-05	1.81E+00	2.95E-03	5.12E-06	1.77E-01	1.80E-01	6.15E-01	3.84E+01	2.9E-01	4.7E-03
Pesticides/PCBs											
4,4'-DDD	1.95E-02	0.00E+00	NV	2.28E-05	0.00E+00	NV	2.28E-05	1.47E-01	5.56E+00	1.6E-04	4.1E-06
4,4'-DDE	2.45E-02	0.00E+00	NV	2.86E-05	0.00E+00	NV	2.86E-05	1.47E-01	5.56E+00	1.9E-04	5.2E-06
4,4'-DDT	3.26E-02	0.00E+00	NV	3.81E-05	0.00E+00	NV	3.81E-05	1.47E-01	5.56E+00	2.6E-04	6.9E-06
Total DDT	4.31E-02	0.00E+00	7.62E-03	5.04E-05	0.00E+00	7.42E-04	7.92E-04	1.47E-01	5.56E+00	5.4E-03	1.4E-04
Aldrin	1.60E-03	0.00E+00	1.11E-03	1.87E-06	0.00E+00	1.08E-04	1.10E-04	2.00E-01	1.00E+00	5.5E-04	1.1E-04
Alpha-BHC	5.60E-03	0.00E+00	1.18E-03	6.55E-06	0.00E+00	1.15E-04	1.21E-04	1.40E-02	1.40E-01	8.7E-03	8.7E-04
Beta-BHC	9.80E-04	0.00E+00	1.78E-04	1.15E-06	0.00E+00	1.74E-05	1.85E-05	4.00E-01	2.00E+00	4.6E-05	9.3E-06
Alpha-Chlordane	2.30E-02	0.00E+00	5.64E-04	2.69E-05	0.00E+00	5.49E-05	8.18E-05	4.58E+00	9.16E+00	1.8E-05	8.9E-06
Aroclor-1254	8.40E-02	0.00E+00	1.06E-03	9.82E-05	0.00E+00	1.03E-04	2.01E-04	6.80E-02	6.80E-01	3.0E-03	3.0E-04
Aroclor-1260	1.50E-01	0.00E+00	4.35E-04	1.75E-04	0.00E+00	4.24E-05	2.18E-04	6.80E-02	6.80E-01	3.2E-03	3.2E-04
Dieldrin	7.64E-02	9.83E-06	3.13E-02	8.93E-05	1.72E-06	3.05E-03	3.14E-03	1.50E-02	1.27E+00	2.1E-01	2.5E-03
Endosulfan I	9.92E-03	0.00E+00	3.29E-03	1.16E-05	0.00E+00	3.21E-04	3.32E-04	1.50E-01	1.50E+00	2.2E-03	2.2E-04
Endosulfan II	1.60E-02	0.00E+00	5.31E-03	1.87E-05	0.00E+00	5.18E-04	5.36E-04	1.50E-01	1.50E+00	3.6E-03	3.6E-04
Endosulfan Sulfate	3.20E-03	0.00E+00	1.06E-03	3.74E-06	0.00E+00	1.04E-04	1.07E-04	1.50E-01	1.50E+00	7.2E-04	7.2E-05
Endrin	1.60E-02	0.00E+00	1.31E-03	1.87E-05	0.00E+00	1.27E-04	1.46E-04	9.20E-02	9.20E-01	1.6E-03	1.6E-04
Endrin Aldehyde	7.79E-03	0.00E+00	6.36E-04	9.11E-06	0.00E+00	6.19E-05	7.10E-05	9.20E-02	9.20E-01	7.7E-04	7.7E-05
Endrin Ketone	9.60E-03	0.00E+00	7.83E-04	1.12E-05	0.00E+00	7.63E-05	8.75E-05	9.20E-02	9.20E-01	9.5E-04	9.5E-05
Gamma-BHC (Lindane)	1.10E-03	0.00E+00	2.99E-04	1.29E-06	0.00E+00	2.92E-05	3.04E-05	8.00E+00	8.00E+01	3.8E-06	3.8E-07
Gamma-Chlordane	3.30E-02	0.00E+00	8.09E-04	3.86E-05	0.00E+00	7.88E-05	1.17E-04	4.58E+00	9.16E+00	2.6E-05	1.3E-05
Heptachlor	3.90E-03	0.00E+00	4.76E-04	4.56E-06	0.00E+00	4.64E-05	5.09E-05	1.00E-01	1.00E+00	5.1E-04	5.1E-05
Heptachlor Epoxide	1.00E-02	0.00E+00	2.80E-04	1.17E-05	0.00E+00	2.73E-05	3.90E-05	1.00E-01	1.00E+00	3.9E-04	3.9E-05
Methoxychlor	5.00E-03	0.00E+00	5.35E-04	5.85E-06	0.00E+00	5.21E-05	5.80E-05	4.00E+00	8.00E+00	1.4E-05	7.2E-06
Inorganics											
Antimony	4.21E+00	0.00E+00	1.52E-01	4.92E-03	0.00E+00	1.48E-02	1.97E-02	5.90E-02	2.76E+00	3.3E-01	7.1E-03
Arsenic	4.92E+00	0.00E+00	1.85E-01	5.75E-03	0.00E+00	1.80E-02	2.37E-02	1.04E+00	4.55E+00	2.3E-02	5.2E-03
Cadmium	2.08E+00	0.00E+00	9.28E-01	2.43E-03	0.00E+00	9.04E-02	9.28E-02	7.70E-01	6.90E+00	1.2E-01	1.3E-02
Chromium	2.05E+01	8.56E-04	8.41E-01	2.40E-02	1.50E-04	8.19E-02	1.06E-01	2.40E+00	5.82E+01	4.4E-02	1.8E-03
Copper	3.08E+01	0.00E+00	7.53E+00	3.60E-02	0.00E+00	7.33E-01	7.69E-01	5.60E+00	8.27E+01	1.4E-01	9.3E-03
Cyanide	1.19E+00	0.00E+00	1.04E+01	1.39E-03	0.00E+00	1.01E+00	1.02E+00	6.87E+01	6.87E+02	1.5E-02	1.5E-03
Lead	3.79E+01	1.85E-03	2.04E+00	4.43E-02	3.24E-04	1.98E-01	2.43E-01	4.70E+00	1.86E+02	5.2E-02	1.3E-03
Mercury	1.29E-01	0.00E+00	8.41E-02	1.51E-04	0.00E+00	8.19E-03	8.35E-03	3.20E-02	1.60E-01	2.6E-01	5.2E-02
Nickel	1.30E+01	7.68E-04	7.38E-01	1.52E-02	1.34E-04	7.19E-02	8.72E-02	1.70E+00	1.48E+01	5.1E-02	5.9E-03
Selenium	3.60E-01	0.00E+00	1.64E-01	4.21E-04	0.00E+00	1.60E-02	1.64E-02	1.43E-01	6.60E-01	1.2E-01	2.5E-02
Silver	1.26E+00	0.00E+00	1.76E-02	1.47E-03	0.00E+00	1.72E-03	3.19E-03	6.02E+00	1.19E+02	5.3E-04	2.7E-05
Thallium	4.19E-01	0.00E+00	1.68E-03	4.90E-04	0.00E+00	1.63E-04	6.53E-04	7.40E-03	7.40E-02	8.8E-02	8.8E-03
Vanadium	3.04E+01	1.40E+00	1.47E-01	3.55E-02	2.45E-01	1.44E-02	2.95E-01	4.16E+00	9.44E+00	7.1E-02	3.1E-02
Zinc	6.57E+01	1.05E-02	4.91E+01	7.68E-02	1.84E-03	4.78E+00	4.86E+00	7.54E+01	2.98E+02	6.4E-02	1.6E-02
Dioxins/Furans											
TEQ	8.53E-06	0.00E+00	3.67E-08	9.97E-09	0.00E+00	3.57E-09	1.35E-08	1.00E-06	1.00E-05	1.4E-02	1.4E-03

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	3.58E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	3.49E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Water Ingestion Rate = (Iw)	6.26E-03	L/day	Dose (water) = (Cw * Iw)(H)/BW
Soil Ingestion Rate = (Is)	4.19E-05	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	6.59E-02	acres	Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Cw = Contaminant concentration in water
			Total Dose = Dose (soil) + Dose (vegetation) + Dose (water)
			H=HR/CA (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentrat
NOAEL = No Observed Adverse Effects Concentration
SW = Surface Water

NV - soil-to-plant BAF not available, total dose is from soil ingestion only.

TABLE I-16

EARTHWORM BAFS FOR PESTICIDES

Parameter	Study Values: Worm Concentration: Dry Weight	Study Values: Worm Concentration: Wet Weight	Study Values: Soil Conc. (dry weight)	Study Values: Dry Weight BAF	Study Values: Wet Weight BAF	Calculated Values: Final Dry Weight[1] BAF	Calculated Values: Final Wet Weight[2] BAF	Reference	Comments
gamma-BHC	NA	NA	NA	5	1.5-4.2	5	1.5-4.2	1	agricultural soil (0.004 ppm gamma-BHC in soil)
Average dry/wet weight BAF from field studies[3]				***NA***	***NA***	***5***	***2.85***		
Heptachlor	NA	NA	NA	10	NA	10	1.60	1	soil type unknown (11-year field study)
Average dry/wet weight BAF from field studies[3]				***NA***	***NA***	***10***	***1.6***		
Aldrin	NA	NA	NA	3.3	NA	3.3	0.528	2	from data collected in 7 agricultural fields
Chlordane	NA	NA	NA	5	NA	5.0	0.8	2	from data collected in 7 agricultural fields
Endrin	NA	NA	NA	3.6	NA	3.6	0.576	2	from data collected in 26 agricultural fields
Heptachlor epoxide	NA	NA	NA	3	NA	3.0	0.48	2	from data collected in 9 agricultural fields

Notes:

BAF - bioaccumulation factor = worm concentration/soil concentration

NA - Not applicable

The percent solids of earthworms is assummed to be 0.16 [Sample et al., 1997])

(1) The calculated dry weight BAF was either obtained directly from the study or was calculated by dividing the wet weight BAF by 0.16

(2) The calculated wet weight BAF was either obtained directly from the study or was calculated by multiplying the dry weight BAF by 0.16

References

1 - Wheatly and Hardman, 1968

2 - Gish, 1970

APPENDIX I-16

SOIL BIOACCUMULATION FACTORS

Chemical concentrations in food items of herbivorous receptors represented by the quail and vole were calculated using soil-to-plant bioaccumulation factors (BAFs) shown in Table 7-3 of the ecological risk assessment. Chemical concentrations in food items of insectivorous receptors represented by the shrew and robin were calculated using soil-to-earthworm BAFs, also shown in Table 7-3 of the ecological risk assessment. The derivation of the BAF values is discussed below. All BAFs used in the Site 3 food chain model were dry weight BAFs.

Plant and earthworm BAFs indicated in Table 7-3 as "Eco-SSL" were taken from Tables 4a and 4b of Attachment 4-1 of the Eco-SSL document (USEPA, 2005). Most BAFs from the Eco-SSL document are regression equations. For these COPCs, estimated chemical concentrations in plants and earthworms were calculated by substituting the Site 3 soil concentration for the C_s term in the equations obtained from USEPA (2005). Only one soil-to-earthworm and soil-to-plant BAF was available for chemicals included in the USEPA (2005), so a single BAF was used for both the conservative and average food chain model scenarios at Site 3 for those chemicals.

Soil-to-plant BAFs not available in the Eco-SSL document (see Table 7-3 of the ecological risk assessment) were taken from ORNL (2007). Only one soil-to-plant BAF was available for these chemicals, so the same BAF was used for both the conservative and average food chain model scenarios.

The soil to earthworm BAFs for PAHs were taken from Table 4b of the Eco-SSL guidance document (USEPA, 2005), which assumes a total organic carbon content of 1 percent.

The Eco-SSL document did not include soil-to-earthworm BAFs for aldrin, endrin, BHC, chlordane, heptachlor, or their breakdown products, so BAFs for these compounds were calculated from various field studies (Table I-16).

The soil-to-earthworm BAF for TCDD was taken from Sample et al (1998). The TCDD BAF used in the conservative food chain model scenario was the 90th percentile value from Sample et al (1998) and the BAF in the average scenario was the median value from Sample et al (1998).

EXAMPLE CALCULATION OF HAZARD QUOTIENT FOR THE MINK
USING THE MAXIMUM SEDIMENT CONCENTRATION OF DIELDRIN
CONSERVATIVE SCENARIO
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NAS JRB, WILLOW GROVE, PENNSYLVANNIA

Equations

The predicted dose for representative receptors =

$$PD = [[(C_{food} \times I_f) + (C_{water} \times I_w) + (C_{sed} \times I_{sed})] \times AUF]/BW \qquad \text{(Equation 1)}$$

where:

PD	=	predicted dose from the ingestion of food and water and the incidental ingestion of sediment (mg/kg/day)
C_{food}	=	contaminant concentration in food (mg/kg)
I_f	=	food ingestion rate (kg/day)
C_{water}	=	contaminant concentration in water (mg/L)
I_w	=	water ingestion rate (L/day)
C_{sed}	=	contaminant concentration in sediment (mg/kg)
I_{sed}	=	sediment ingestion rate (kg/day)
AUF	=	area use factor (portion of home range that overlaps Site 3)
BW	=	weight of receptor (kg)

Chemical concentrations of *organic compounds* (see note below) in food items (C_{food} in Equation 1) of the mink and green heron were estimated using the following equation:

$$C_{food} = BSAF(C_s/f_{oc})f_l \qquad \text{(Equation 2)}$$

where:

C_{food}	=	chemical concentration in food (mg/kg)
C_s	=	chemical concentration in sediment (mg/kg)
BSAF	=	biota-sediment accumulation factor
f_{oc}	=	total organic carbon (TOC) content of sediment expressed as a decimal fraction
f_l	=	organism lipid content expressed as a decimal fraction

Note: Equation 2 was used to derive estimated concentrations of *organic compounds* in food items. BSAFs for metals are not normalized to lipids or TOC, so concentrations of *metals* were estimated by multiplying each metal's sediment concentration by its associated BSAF.

The food chain hazard quotient (HQ) is calculated by dividing the predicted dose by the toxicity reference value (TRV). The TRV is the NOAEL or the LOAEL, so a NOAEL-based HQ and a LOAEL-based HQ are calculated.

$$HQ_{NOAEL} = PD/NOAEL \qquad \text{(Equation 3)}$$
$$HQ_{LOAEL} = PD/LOAEL$$

PD	=	predicted dose from the ingestion of food and water and the incidental ingestion of sediment (mg/kg/day)
NOAEL & LOAEL	=	wildlife toxicity reference value (mg/kg/day)

**EXAMPLE CALCULATION OF HAZARD QUOTIENT FOR THE MINK
USING THE MAXIMUM SEDIMENT CONCENTRATION OF DIELDRIN
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Example Calculations

Equation 2:

BSAF for Dieldrin = 1.8 (Table 7-3)
C_s = 46.5 µg/kg (Table 7-14), which equals 0.0465 mg/kg)
f_{oc} = 1.0 percent = 0.01 (average TOC, see ERA, Section 7.3.3.2)
f_l = 3.6 percent wet weight, or 14.4 percent dry weight = 0.144 (see ERA, Section 7.3.3.2)
Using these values, C_{food} = (1.8 × 0.0465 mg/kg × 0.144) ÷ 0.01 = 1.20528 mg/kg; this is the estimated concentration in food (fish or benthic invertebrates).

Equation 1:

I_f = 0.0607 kg/day (Conservative scenario, Table 7-4
C_{sed} = 46.5 µg/kg = 0.0465 mg/kg (Table 7-14)
I_{sed} = 0.0057 kg/day (Conservative scenario, Table 7-4)
C_{water} = 0.011 µg/L = 0.000011 mg/L (Table 7-15)
I_w = 0.121 L/day (Conservative scenario, Table 7-4)
AUF assumed = 1.0.
BW = 0.550 kg (Conservative scenario, Table 7-4)
Using the above values in Equation 1,
Predicted dose = [(1.20528 mg/kg × 0.0607 kg/day) + (0.000011 mg/L × 0.121 L/day) + (0.0465 mg/kg × 0.0057 kg/day)] ÷ 0.550 kg
= 0.133 mg/kg/day (Table I-14)

Equation 3:

The mammal NOAEL for Dieldrin is 0.015 mg/kg/day (Table 7-1). Thus, the NOAEL-based HQ = 0.133 mg/kg/day ÷ 0.015 mg/kg/day = 8.8666 ≈ 8.9 (Table 7-12).

The mammal LOAEL for Dieldrin is 1.27 mg/kg/day (Table 7-1). Thus, the LOAEL-based HQ = 0.133 mg/kg/day ÷ 1.27 mg/kg/day = 0.1047 ≈ 0.105 (Table 7-12).

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APPENDIX J

HUMAN HEALTH RISK ASSESSMENT
RAGS D HUMAN HEALTH RISK TABLES

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SELECTION OF EXPOSURE PATHWAYS

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1.02 SELECTION OF EXPOSURE PATHWAYS - SURFACE SOIL AND SOIL* - HANGAR AREA
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TABLE 1.01
SELECTION OF EXPOSURE PATHWAYS - GROUNDWATER PLUME
SITE 3, NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Populations	Receptor Age	Exposure Routes	Type of Analysis	Rationale
Future	Groundwater	Groundwater	Contact with Groundwater During Construction Activities	Construction Worker	Adult	Ingestion	None	Receptor activity patterns would not result in significant exposure.
		Groundwater	Contact with Groundwater During Construction Activities	Construction Worker	Adult	Dermal	Quant	Receptor activity patterns could result in exposure.
		Vapors	Inhalation of Groundwater Vapors During Construction Activities	Construction Worker	Adult	Inhalation	Quant	Receptor activity patterns could result in exposure.
		Groundwater	Tap Water Contact with Groundwater	Resident	Adult	Ingestion	Quant	Receptor activity patterns could result in exposure.
		Groundwater	Tap Water Contact with Groundwater	Resident	Adult	Dermal	Quant*	Dermal exposure would occur during bathing or showering.
		Vapors	Inhalation of Groundwater Vapors During Showering	Resident	Adult	Inhalation	Quant	Receptor activity patterns could result in exposure.
		Groundwater	Tap Water Contact with Groundwater	Resident	Child	Ingestion	Quant	Receptor activity patterns could result in exposure.
		Groundwater	Tap Water Contact with Groundwater	Resident	Child	Dermal	Quant*	Dermal exposure would occur during bathing.
		Vapors	Inhalation of Groundwater Vapors During Bathing	Resident	Child	Inhalation	Qual	Receptor activity patterns could result in exposure, but bathing more likely than showering.
		Groundwater	Tap Water Contact with Groundwater	Resident	Child/Adult**	Ingestion	Quant	Receptor activity patterns could result in exposure.
		Groundwater	Tap Water Contact with Groundwater	Resident	Child/Adult**	Dermal	Quant	Receptor activity patterns could result in exposure.
		Vapors	Inhalation of Groundwater Vapors During Showering	Resident	Child/Adult**	Inhalation	Quant	Receptor activity patterns could result in exposure.

*Adult resident is assumed to take showers. Child resident is assumed to bathe, not shower.
**Resident Child/Adult represents cumulative (lifetime) exposure only applied to cancer risk.

TABLE 1.02
SELECTION OF EXPOSURE PATHWAYS - SURFACE SOIL AND SOIL* - HANGAR AREA
SITE 3, NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale
Current/Future	Surface Soil	Surface Soil	Contact with Hangar Area Surface Soil	Industrial Worker	Adult	Ingestion	Quant	Current industrial land use (Hangar Area) could involve outdoors maintenance workers.
		Surface Soil	Contact with Hangar Area Surface Soil	Industrial Worker	Adult	Dermal	Quant	Current industrial land use (Hangar Area) could involve outdoors maintenance workers.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Industrial Worker	Adult	Inhalation	Quant	Current industrial land use (Hangar Area) could involve outdoors maintenance workers.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Adult	Ingestion	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Adult	Dermal	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Recreational Person	Adult	Inhalation	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Child	Ingestion	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Child	Dermal	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Recreational Person	Child	Inhalation	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Child/Adult**	Ingestion	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Child/Adult**	Dermal	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Recreational Person	Child/Adult**	Inhalation	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
Future	Surface Soil	Surface Soil	Contact with Hangar Area Surface Soil	Resident	Adult	Ingestion	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Adult	Dermal	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Resident	Adult	Inhalation	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Child	Ingestion	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Child	Dermal	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Resident	Child	Inhalation	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Child/Adult**	Ingestion	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Child/Adult**	Dermal	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Resident	Child/Adult**	Inhalation	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
Future	Soil*	Surface Soil	Contact with Hangar Area Surface Soil	Industrial Worker	Adult	Ingestion	Quant	Current industrial land use (Hangar Area) could involve outdoors maintenance workers.
		Surface Soil	Contact with Hangar Area Surface Soil	Industrial Worker	Adult	Dermal	Quant	Current industrial land use (Hangar Area) could involve outdoors maintenance workers.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Industrial Worker	Adult	Inhalation	Quant	Current industrial land use (Hangar Area) could involve outdoors maintenance workers.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Adult	Ingestion	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Adult	Dermal	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Recreational Person	Adult	Inhalation	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Child	Ingestion	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Child	Dermal	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Recreational Person	Child	Inhalation	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Child/Adult**	Ingestion	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Recreational Person	Child/Adult**	Dermal	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Recreational Person	Child/Adult**	Inhalation	Quant	Land use is expected to remain industrial. Future recreational use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Adult	Ingestion	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Adult	Dermal	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Resident	Adult	Inhalation	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Child	Ingestion	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Child	Dermal	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Resident	Child	Inhalation	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Child/Adult**	Ingestion	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Surface Soil	Contact with Hangar Area Surface Soil	Resident	Child/Adult**	Dermal	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Hangar Area Surface Soil	Resident	Child/Adult**	Inhalation	Quant	Land use is expected to remain industrial. Future residential use not predicted but is possible.
Future	Soil*	Soil*	Contact with Hangar Area Soil*	Construction Worker	Adult	Ingestion	Quant	Current land use is industrial, but future construction is conceivable.
		Soil*	Contact with Hangar Area Soil*	Construction Worker	Adult	Dermal	Quant	Current land use is industrial, but future construction is conceivable.
		Particulates	Particulate Dust Inhalation from Hangar Area Soil*	Construction Worker	Adult	Inhalation	Quant	Current land use is industrial, but future construction is conceivable.

**Child/Adult represents cumulative (lifetime) exposure only applied to cancer risk.
"Soil*" Represents surface and subsurface soils that are mixed during future construction or landscaping.

TABLE 1.03
SELECTION OF EXPOSURE PATHWAYS - SURFACE SOIL AND SOIL* - NINTH STREET LANDFILL
SITE 3, NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale
Current/Future	Surface Soil	Surface Soil	Contact with Ninth Street Landfill Surface Soil	Industrial Worker	Adult	Ingestion	Quant	Current recreational land use (ball field and picnic area) could involve grounds maintenance workers.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Industrial Worker	Adult	Dermal	Quant	Current recreational land use (ball field and picnic area) could involve grounds maintenance workers.
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Industrial Worker	Adult	Inhalation	Quant	Current recreational land use (ball field and picnic area) could involve grounds maintenance workers.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Adult	Ingestion	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Adult	Dermal	Quant	Current land use is recreational (ball field and picnic area).
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Recreational Person	Adult	Inhalation	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Child	Ingestion	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Child	Dermal	Quant	Current land use is recreational (ball field and picnic area).
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Recreational Person	Child	Inhalation	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Child/Adult**	Ingestion	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Child/Adult**	Dermal	Quant	Current land use is recreational (ball field and picnic area).
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Recreational Person	Child/Adult**	Inhalation	Quant	Current land use is recreational (ball field and picnic area).
Future	Surface Soil	Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Adult	Ingestion	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Adult	Dermal	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Resident	Adult	Inhalation	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Child	Ingestion	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Child	Dermal	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Resident	Child	Inhalation	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Child/Adult**	Ingestion	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Child/Adult**	Dermal	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Resident	Child/Adult**	Inhalation	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
Future	Soil*	Surface Soil	Contact with Ninth Street Landfill Surface Soil	Industrial Worker	Adult	Ingestion	Quant	Current recreational land use or future industrial use could involve outdoors maintenance workers.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Industrial Worker	Adult	Dermal	Quant	Current recreational land use or future industrial use could involve outdoors maintenance workers.
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Industrial Worker	Adult	Inhalation	Quant	Current recreational land use or future industrial use could involve outdoors maintenance workers.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Adult	Ingestion	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Adult	Dermal	Quant	Current land use is recreational (ball field and picnic area).
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Recreational Person	Adult	Inhalation	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Child	Ingestion	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Child	Dermal	Quant	Current land use is recreational (ball field and picnic area).
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Recreational Person	Child	Inhalation	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Child/Adult**	Ingestion	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Recreational Person	Child/Adult**	Dermal	Quant	Current land use is recreational (ball field and picnic area).
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Recreational Person	Child/Adult**	Inhalation	Quant	Current land use is recreational (ball field and picnic area).
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Adult	Ingestion	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Adult	Dermal	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Resident	Adult	Inhalation	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Child	Ingestion	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Child	Dermal	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Resident	Child	Inhalation	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Child/Adult**	Ingestion	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Surface Soil	Contact with Ninth Street Landfill Surface Soil	Resident	Child/Adult**	Dermal	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Surface Soil	Resident	Child/Adult**	Inhalation	Quant	Land use is expected to remain recreational. Future residential use not predicted but is possible.
Future	Soil*	Soil*	Contact with Ninth Street Landfill Soil*	Construction Worker	Adult	Ingestion	Quant	Current land use is recreational, but future construction is conceivable.
		Soil*	Contact with Ninth Street Landfill Soil*	Construction Worker	Adult	Dermal	Quant	Current land use is recreational, but future construction is conceivable.
		Particulates	Particulate Dust Inhalation from Ninth Street Landfill Soil*	Construction Worker	Adult	Inhalation	Quant	Current land use is recreational, but future construction is conceivable.

**Child/Adult represents cumulative (lifetime) exposure only applied to cancer risk.
"Soil*" Represents surface and subsurface soils that are mixed during future construction or landscaping.

TABLE 1.04
SELECTION OF EXPOSURE PATHWAYS - SURFACE WATER AND SEDIMENT - CREEKS
SITE 3, NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Populations	Receptor Age	Exposure Routes	Type of Analysis	Rationale
Current/Future	Sediment	Sediment	Contact with Sediment During Wading	Recreational Person	Child	Ingestion	Quant	Receptor activity patterns could result in exposure.
		Sediment	Contact with Sediment During Wading	Recreational Person	Child	Dermal	Quant	Receptor activity patterns could result in exposure.
		Particulates	Particulate Dust Inhalation from Sediment During Wading	Recreational Person	Child	Inhalation	None	Sediments typically wet, which inhibits release of inhalable particulates.
		Sediment	Contact with Sediment During Wading	Recreational Person	Adult	Ingestion	Quant	Receptor activity patterns could result in exposure.
		Sediment	Contact with Sediment During Wading	Recreational Person	Adult	Dermal	Quant	Receptor activity patterns could result in exposure.
		Particulates	Particulate Dust Inhalation from Sediment During Wading	Recreational Person	Adult	Inhalation	None	Sediments typically wet, which inhibits release of inhalable particulates.
		Sediment	Contact with Sediment During Wading	Recreational Person	Child/Adult**	Ingestion	Quant	Receptor activity patterns could result in exposure.
		Sediment	Contact with Sediment During Wading	Recreational Person	Child/Adult**	Dermal	Quant	Receptor activity patterns could result in exposure.
		Particulates	Particulate Dust Inhalation from Sediment During Wading	Recreational Person	Child/Adult**	Inhalation	None	Sediments typically wet, which inhibits release of inhalable particulates
Current/Future	Surface Water	Surface Water	Contact with Surface Water During Wading	Recreational Person	Child	Ingestion	Quant	Receptor activity patterns could result in exposure.
		Surface Water	Contact with Surface Water During Wading	Recreational Person	Child	Dermal	Quant	Receptor activity patterns could result in exposure.
		Surface Water	Contact with Surface Water During Wading	Recreational Person	Child	Inhalation	None	Ambient inhalation exposure expected to be insignificant due to no detected VOCs.
		Surface Water	Contact with Surface Water During Wading	Recreational Person	Adult	Ingestion	Quant	Receptor activity patterns could result in exposure.
		Surface Water	Contact with Surface Water During Wading	Recreational Person	Adult	Dermal	Quant	Receptor activity patterns could result in exposure.
		Surface Water	Contact with Surface Water During Wading	Recreational Person	Adult	Inhalation	None	Ambient inhalation exposure expected to be insignificant due to no detected VOCs.
		Surface Water	Contact with Surface Water During Wading	Recreational Person	Child/Adult**	Ingestion	Quant	Receptor activity patterns could result in exposure.
		Surface Water	Contact with Surface Water During Wading	Recreational Person	Child/Adult**	Dermal	Quant	Receptor activity patterns could result in exposure.
		Surface Water	Contact with Surface Water During Wading	Recreational Person	Child/Adult**	Inhalation	None	Ambient inhalation exposure expected to be insignificant due to no detected VOCs.

**Child/Adult represents cumulative (lifetime) exposure only applied to cancer risk. Two age groups are used - 6 yr exposure duration (ED) as a child, age 0 to 6 and 24 yr. ED as an adult.

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TABLE 2.01
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 GROUNDWATE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Points (1)	CAS Number	Chemical	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (3)	Concentration Used for Screening (4)	Background Value (5)	Screening Toxicity Value (N/C) (6)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)
Tap Water Contact,	7429-90-5	Aluminum	89	2030	ug/L	03MW06I-20080314	5/20	80-80	2030		3700 N			N	BSL
Water Vapors at Showerhead,	7440-36-0	Antimony	0.08 J	1.2 J	ug/L	03MW01I-20080311	13/20	2-2	1.2		1.5 N			N	BSL
or Outdoor Contact	7440-38-2	**Arsenic**	0.4 J	9.1	ug/L	03MW06I-20080314	11/20	6-6	9.1		0.045 C			**Y**	**ASL**
During Construction (1)	7440-39-3	Barium	37	625	ug/L	03MW07S-20080319	20/20	N/A	625		730 N			N	BSL
	7440-41-7	Beryllium	0.09 J	0.6 J	ug/L	03MW08S-20080312	3/20	1-1	0.6		7.3 N			N	BSL
	7440-43-9	Cadmium	0.1 J	1.1	ug/L	03MW01SI-20080320	2/20	1-1	1.1		1.8 N			N	BSL
	7440-70-2	Calcium	7220	62900	ug/L	03MW07S-20080319	20/20	N/A	62900		N			N	NUT
	7440-47-3	Chromium	0.9 J	12	ug/L	03MW06I-20080314	12/12	N/A	12		5500 N			N	BSL
	7440-48-4	**Cobalt**	0.2 J	4 J	ug/L	03MW05I-20080311	8/20	6-6	4		1.1 N			**Y**	**ASL**
	7440-50-8	Copper	0.08 J	2.4 J	ug/L	03MW06I-20080314	10/14	6-6	2.4		150 N			N	BSL
	7439-89-6	Iron	20 J	2400 K	ug/L	03MW06I-20080314	14/20	70-70	2400		2600 N			N	BSL
	7439-92-1	Lead	0.04 J	1.4 J	ug/L	03MW06I-20080314	3/20	2-2	1.4		15 C			N	BSL
	7439-95-4	Magnesium	1880	16200	ug/L	03MW07S-20080319	20/20	N/A	16200		N			N	NUT
	7439-96-5	**Manganese**	0.4 J	103	ug/L	03MW06I-20080314	16/20	6-6	103		88 N			**Y**	**ASL**
	7439-97-6	Mercury	0.03 J	0.03 J	ug/L	03MW03SI-20080317	1/20	0.5-0.5	0.03		0.37 N			N	BSL
	7440-02-0	Nickel	0.7 J	9.6	ug/L	03MW06I-20080314	20/20	N/A	9.6		73 N			N	BSL
	7440-09-7	Potassium	600	3080	ug/L	03MW06I-20080314	19/20	560-560	3080		N			N	NUT
	7782-49-2	Selenium	1 J	5 J	ug/L	03MW06S-20080313	16/20	6-6	5		18 N			N	BSL
	7440-22-4	Silver	0.06 J	0.06 J	ug/L	03MW05I-20080311	1/11	1-1	0.06		18 N			N	BSL
	7440-23-5	Sodium	7020	22400	ug/L	03MW07S-20080319	20/20	N/A	22400		N			N	NUT
	7440-62-2	Vanadium	0.09 J	6.4	ug/L	03MW06I-20080314	7/15	1-1	6.4		18 N			N	BSL
	7440-66-6	Zinc	1.9 J	10.6	ug/L	03MW06I-20080314	13/20	6-6	10.6		1100 N			N	BSL
	117-81-7	**Bis(2-ethylhexyl) Phthalate**	6 J	11	ug/L	03MW06SI_19970618	2/19	10-11	11		4.8 C			**Y**	**ASL**
	71-55-6	1,1,1-Trichloroethane	2.6	4.1	ug/L	03MW08D-20081015	3/66	1-1	4.1		910 N			N	BSL
	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.34 J	0.37 J	ug/L	03MW07S	2/66	1-1	0.37		5900 N			N	BSL
	75-34-3	1,1-Dichloroethane	5.9	8.2	ug/L	03MW08D-20081015	3/66	1-1	8.2		2.4 C			Y*	ASL
	75-35-4	1,1-Dichloroethene	0.2 J	5.1	ug/L	03MW08D-20081015	4/66	1-1	5.1		34 N			N	BSL
	156-59-2	1,2-Dichloroethene (cis)	0.9 J	1.5	ug/L	03MW08D-20081015	3/66	1-1	1.5		7.3 N			N	BSL
	67-64-1	Acetone	3.4 J	3.4 J	ug/L	03MW02I	1/39	5-10	3.4		2200 N			N	BSL
	75-27-4	Bromodichloromethane	1.1	1.1	ug/L	03MW04S-20080314	1/66	1-1	1.1		0.12 C			Y*	ASL
	75-25-2	Bromoform	0.87 J	0.87 J	ug/L	03MW04S-20080314	1/66	1-1	0.87		8.5 C			N	BSL
	56-23-5	Carbon Tetrachloride	0.27 J	0.38 J	ug/L	03MW02I-20080318	4/66	1-1	0.38		0.44 C			Y*	ASL
	67-66-3	Chloroform	0.17 J	1.6	ug/L	03MW04S-20081016	8/66	1-1	1.6		0.19 C			Y*	ASL
	124-48-1	Dibromochloromethane	1.5	1.5	ug/L	03MW04S-20080314	1/66	1-1	1.5		0.15 C			Y*	ASL
	1634-04-4	Methyl tert-Butyl Ether (MTBE)	0.26 J	0.63 J	ug/L	03MW03S-20090401	3/66	1-1	0.63		12 C			N	BSL
	127-18-4	Tetrachloroethene	0.23 J	14	ug/L	03MW03S	50/66	1-1	14		0.11 C			Y*	ASL
	108-88-3	Toluene	0.19 J	0.22 J	ug/L	03MW06I	3/64	1-1	0.22		230 N			N	BSL
	79-01-6	Trichloroethene	1.5	3.1	ug/L	03MW08D-20081015	3/63	1-1	3.1		2 C			Y*	ASL

Footnotes:

1 - Exposure points considered are tap water ingestion, dermal contact, showering, and construction worker dermal contact and outdoor inhalation. RSLs based on tap water are generally overprotective for construction workers.

2 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.

3 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.

4 - The maximum detected concentration is used for screening purposes.

5 - A background comparison analysis was not performed so background comparison was not involved in selecting or eliminating COPCs.

6 - The EPA ORNL risk-based tap water COPC screening level for residential use is presented. The noncarcinogenic values (annotated "N") are divided by 10 to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (USEPA Region 3, November 2010).

7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level. An asterisk indicates volatile COPCs for evaluation of outdoor inhalation exposure.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(8) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 2.01
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 GROUNDWATE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Groundwater samples included in COPC screening and risk assessment:

SAMPLE I.D.	Volatiles	Semivolatiles	1,4-Dioxane	Pesticides	Metals	Chromium +6
03MW01I (Sampled 2006)	X					
03MW01I (Sampled 03/11/2008)	X		X		X	X
03MW01I (Sampled 10/17/2008)	X					
03MW01I-DUP (Sampled 2006)	X					
03MW01I (Sampled 06/25/1997)		X		X		
03MW01S (Sampled 2006)	X					
03MW01S (Sampled 03/11/2008)	X		X		X	X
03MW01S-D (Sampled 03/11/2008)	X		X		X	X
03MW01S (Sampled 10/16/2008)	X					
03MW01SI (Sampled 2006)	X					
03MW01SI (Sampled 03/20/2008)	X		X		X	
03MW01SI (Sampled 10/17/2008)	X					
03MW01S (Sampled 06/25/1997)		X		X		
03MW02I (Sampled 2006)	X					
03MW02I (Sampled 03/18/2008)	X		X		X	
03MW02I-L (Sampled 10/20/2008)	X					
03MW02I-L-D (Sampled 10/20/2008)	X					
03MW02I (Sampled 07/07/1997)		X		X		
03MW02S (Sampled 2006)	X					
03MW02S (Sampled 03/18/2008)	X		X		X	
03MW02S (Sampled 10/16/2008)	X					
03MW02SI (Sampled 2006)	X					
03MW02SI (Sampled 03/18/2008)	X		X		X	
03MW02SI (Sampled 10/17/2008)	X					
03MW02SI (Sampled 07/07/1997)		X		X		
03MW02S (Sampled 06/26/1997)		X		X		
03MW03I (Sampled 03/17/2008)	X		X		X	X
03MW03I (Sampled 10/21/2008)	X					
03MW03I (Sampled 04/01/2009)	X					
03MW03I (Sampled 06/30/1997)		X		X		
03MW03I-D (Sampled 06/30/1997)		X		X		
03MW03S (Sampled 2006)	X					
03MW03S (Sampled 03/17/2008)	X		X		X	
03MW03S (Sampled 10/20/2008)	X					
03MW03S (Sampled 04/01/2009)	X					
03MW03S-D (Sampled 04/01/2009)	X					
03MW03SI (Sampled 2006)	X					
03MW03SI (Sampled 03/17/2008)	X		X		X	
03MW03SI-D (Sampled 03/17/2008)	X		X		X	
03MW03SI (Sampled 10/21/2008)	X					
03MW03SI (Sampled 04/01/2009)	X					
03MW03SI (Sampled 06/25/1997)		X		X		
03MW03S (Sampled 06/25/1997)		X		X		
03MW04I (Sampled 2006)	X					
03MW04I (Sampled 03/14/2008)	X		X		X	
03MW04I (Sampled 10/14/2008)	X					

SAMPLE I.D.	Volatiles	Semivolatiles	1,4-Dioxane	Pesticides	Metals	Chromium +6
03MW04I (Sampled 04/02/2009)	X					
03MW04I (Sampled 06/30/1997)		X		X		
03MW04S (Sampled 2006)	X					
03MW04S (Sampled 03/14/2008)	X		X		X	
03MW04S (Sampled 10/16/2008)	X					
03MW04S (Sampled 04/02/2009)	X					
03MW04S-DUP (2006)	X					
03MW04SI (Sampled 2006)	X					
03MW04SI (Sampled 03/14/2008)	X		X		X	
03MW04SI (Sampled 10/14/2008)	X					
03MW04SI (Sampled 04/02/2009)	X					
03MW04SI (Sampled 06/25/1997)		X		X		
03MW04SI-D (Sampled 06/25/1997)		X		X		
03MW04S (Sampled 06/25/1997)		X		X		
03MW05I (Sampled 2006)	X					
03MW05I (Sampled 03/11/2008)	X		X		X	X
03MW05I (Sampled 10/16/2008)	X					
03MW05I (Sampled 06/18/1997)		X		X		
03MW05S (Sampled 2006)	X					
03MW05S (Sampled 03/12/2008)	X		X		X	X
03MW05S (Sampled 10/16/2008)	X					
03MW05S (Sampled 06/18/1997)		X		X		
03MW06I (Sampled 2006)	X					
03MW06I (Sampled 03/14/2008)	X		X		X	X
03MW06I-L (Sampled 10/15/2008)	X					
03MW06I (Sampled 06/25/1997)		X		X		
03MW06S (Sampled 2006)	X					
03MW06S (Sampled 03/13/2008)	X		X		X	X
03MW06S (Sampled 10/15/2008)	X					
03MW06SI (Sampled 2006)	X					
03MW06SI (Sampled 03/13/2008)	X		X		X	X
03MW06SI (Sampled 10/15/2008)	X					
03MW06SI (Sampled 06/18/1997)		X		X		
03MW06S (Sampled 06/30/1997)		X		X		
03MW07S (Sampled 2006)	X					
03MW07S (Sampled 03/19/2008)	X		X		X	
03MW07S (Sampled 10/21/2008)	X					
03MW07S (Sampled 04/02/2009)	X					
03MW07S (Sampled 07/07/1997)		X		X		
03MW08D (Sampled 2006)	X	X				
03MW08D (Sampled 03/12/2008)	X		X		X	
03MW08D (Sampled 10/15/2008)	X					
03MW08S (Sampled 2006)	X	X				
03MW08S-DUP (Sampled 2006)	X	X				
03MW08S (Sampled 03/12/2008)	X		X		X	
03MW08S (Sampled 10/15/2008)	X					

TABLE 2.02
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SITE 3 LANDFILL AREA SOIL TO GROUNDWATER
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Groundwater

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (7)
Tap Water Contact or	1746-01-6	**Total 2,3,7,8-TCDD Equiv.**	0.0045	0.34	ug/kg	03TP06-0809-03-20070501-D	5/5	N/A	0.34		0.000286 C	**Y**	**ASL**
Water Vapors at Showerhead	7429-90-5	**Aluminum**	8200	74700	mg/kg	03TP19-0304-02	115/115	N/A	74700		60500 N	**Y**	**ASL**
	7440-36-0	Antimony	0.22 L	281 L	mg/kg	03TP27-0304-01-D	41/90	0.2-10.3	281		N	N	NTX
	7440-38-2	**Arsenic**	0.37 J	49.9 J	mg/kg	03TP27-0304-01	108/108	N/A	49.9		0.00143 C	**Y**	**ASL**
	7440-39-3	**Barium**	45.2	859	mg/kg	03TP19-0304-02	115/115	N/A	859		330 N	**Y**	**ASL**
	7440-41-7	Beryllium	0.61	2 K	mg/kg	03-SS-23	79/79	N/A	2		63.8 N	N	BSL
	7440-43-9	**Cadmium**	0.22 J	300	mg/kg	03TP19-0607-01	49/90	0.03-1.4	300		1.54 N	**Y**	**ASL**
	7440-70-2	Calcium	253	86400	mg/kg	03SB06_19910906	110/110	N/A	86400		N	N	NUT
	7440-47-3	Chromium	4.2 K	348 J	mg/kg	03TP30-0506-01	114/115	17-17	348		108900000 C	N	BSL
	7440-48-4	**Cobalt**	2.5	121 J	mg/kg	03TP27-0304-01-D	115/115	N/A	121		0.55 N	**Y**	**ASL**
	7440-50-8	**Copper**	7.1	9660	mg/kg	03TP25-0607-02-D	115/115	N/A	9660		56.1 N	**Y**	**ASL**
	57-12-5	Cyanide	0.11	4.6	mg/kg	03TP06-0809-03-20070501	29/115	0.09-2.9	4.6		8.14 N	N	BSL
	7439-89-6	**Iron**	9570	236000 J	mg/kg	03TP27-0304-01-D	115/115	N/A	236000		704 N	**Y**	**ASL**
	7439-92-1	**Lead**	2.2	6480 J	mg/kg	03TP05-0910-02-20070430-D	115/115	N/A	6480		0.00001 C	**Y**	**ASL**
	7439-95-4	Magnesium	408	50200	mg/kg	03SB06_19910906	115/115	N/A	50200		N	N	NUT
	7439-96-5	**Manganese**	41.6	20000	mg/kg	03TP10-0405-01-20070503	115/115	N/A	20000		62.7 N	**Y**	**ASL**
	7439-97-6	**Mercury**	0.021 J	7.1	mg/kg	03TP20-0708-01	68/115	0.017-0.14	7.1		0.627 N	**Y**	**ASL**
	7440-02-0	**Nickel**	5.8	296 K	mg/kg	03TP05-0506-01-20070430	115/115	N/A	296		52.8 N	**Y**	**ASL**
	7440-09-7	Potassium	168	3010	mg/kg	03TP01_19910909	108/111	390-522	3010		N	N	NUT
	7782-49-2	Selenium	0.36 L	0.55 L	mg/kg	03TP08-0203-03-20070502	2/60	0.3-8	0.55		1.045 N	N	BSL
	7440-22-4	**Silver**	0.31	233	mg/kg	03TP06-0607-04-20070501	34/110	0.035-1.6	233		1.76 N	**Y**	**ASL**
	7440-23-5	Sodium	19.1 L	1830	mg/kg	03TP27-0304-01	54/87	18.8-1090	1830		N	N	NUT
	7440-28-0	Thallium	0.26 L	61.1 J	mg/kg	03TP27-0304-01-D	36/89	0.15-13.9	61.1		N	N	NTX
	7440-62-2	**Vanadium**	11.8	752 J	mg/kg	03TP27-0304-01	115/115	N/A	752		198 N	**Y**	**ASL**
	7440-66-6	**Zinc**	10.6	13700 J	mg/kg	03TP27-0304-01	115/115	N/A	13700		748 N	**Y**	**ASL**
	72-54-8	**4,4'-DDD**	0.83 J	72000	ug/kg	03TP06-0607-04-20070501	30/114	2-190	72000		72.6 C	**Y**	**ASL**
	72-55-9	**4,4'-DDE**	0.39 J	8700	ug/kg	03TP06-0607-04-20070501	30/107	2-190	8700		51.7 C	**Y**	**ASL**
	50-29-3	**4,4'-DDT**	0.39 J	270000	ug/kg	03TP06-0607-04-20070501	37/114	2-190	270000		73.7 C	**Y**	**ASL**
	309-00-2	Aldrin	0.27 J	9.7	ug/kg	03TP06-0809-03-20070501	17/114	2-2500	9.7		748000 C	N	BSL
	319-84-6	**Alpha-BHC**	0.7 J	16	ug/kg	03TP25-0607-02	7/114	2-2500	16		0.0682 C	**Y**	**ASL**
	5103-71-9	**Alpha-Chlordane**	0.26 J	330 J	ug/kg	03TP14-0203-01-20070504	23/106	2-2500	330		14.3 C	**Y**	**ASL**
	53469-21-9	Aroclor-1242	37	110	ug/kg	03TP12-0405-01-20070504	2/115	19-940	110		6380000 C	N	BSL
	12672-29-6	**Aroclor-1248**	92	560	ug/kg	03TP26-0506-01	2/115	19-940	560		5.72 C	**Y**	**ASL**
	11097-69-1	**Aroclor-1254**	13 J	4000	ug/kg	03TP24-0304-01	9/115	19-1900	4000		9.68 C	**Y**	**ASL**
	11096-82-5	**Aroclor-1260**	12 J	600	ug/kg	03TP06-0809-03-20070501	11/115	19-1900	600		26.4 C	**Y**	**ASL**
	319-85-7	**Beta-BHC**	0.8 J	14 J	ug/kg	03TP25-0607-02-D	4/111	1-2500	14		0.242 C	**Y**	**ASL**
	319-86-8	Delta-BHC	0.35 J	2.7	ug/kg	03TP12-0405-01-20070504	7/115	2-2500	2.7		C	N	NTX
	60-57-1	**Dieldrin**	0.24 J	10000	ug/kg	03TP06-0607-04-20070501	88/114	2-93	10000		0.187 C	**Y**	**ASL**
	959-98-8	Endosulfan I	0.25 J	580 J	ug/kg	03TP06-0607-04-20070501	14/115	2-94	580		N	N	NTX
	33213-65-9	Endosulfan II	0.49 J	16 J	ug/kg	03TP06-0809-03-20070501	9/114	2-2500	16		N	N	NTX
	1031-07-8	Endosulfan Sulfate	0.61 J	19	ug/kg	03TP06-0809-03-20070501	9/114	2-2500	19		N	N	NTX
	72-20-8	Endrin	0.61 J	25	ug/kg	03TP02-1_19910910	9/114	2-2500	25		N	N	NTX
	007421-93-4	Endrin Aldehyde	0.52 J	25 J	ug/kg	03TP19-0607-01	21/73	2-2500	25		N	N	NTX
	53494-70-5	Endrin Ketone	0.29 J	24 J	ug/kg	03TP27-0304-01	13/114	2-2500	24		N	N	NTX
	58-89-9	Gamma-BHC (Lindane)	0.69 J	6.9	ug/kg	03TP12-0304-02-20070504	11/115	2-2500	6.9		12100000 C	N	BSL
	5103-74-2	**Gamma-Chlordane**	0.36 J	620 J	ug/kg	03TP06-0607-04-20070501	26/108	2-940	620		14.3 C	**Y**	**ASL**
	76-44-8	**Heptachlor**	0.52 J	8 J	ug/kg	03TP06-0708-02-20070501	10/112	2-2500	8		1.32 C	**Y**	**ASL**
	1024-57-3	**Heptachlor Epoxide**	0.55 J	390 J	ug/kg	03TP06-0607-04-20070501	24/114	2-94	390		0.165 C	**Y**	**ASL**
	72-43-5	Methoxychlor	1 J	130 J	ug/kg	03TP19-0607-01	12/115	3.8-4800	130		10890 N	N	BSL

TABLE 2.02
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SITE 3 LANDFILL AREA SOIL TO GROUNDWATER
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Groundwater

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (7)
	95-94-3	1,2,4,5-Tetrachlorobenzene	36 J	36 J	ug/kg	03TP19-0607-01	1/63	190-20000	36		56.1 N	N	BSL
	95-50-1	**1,2-Dichlorobenzene**	39 J	3600	ug/kg	03TP04-2_19910911	9/115	4.7-19000	3600		396 N	**Y**	**ASL**
	106-46-7	**1,4-Dichlorobenzene**	39 J	880 J	ug/kg	03TP04-2_19910911	13/115	4.7-19000	880		0.451 C	**Y**	**ASL**
	90-12-0	**1-Methylnaphthalene**	0.74 J	560	ug/kg	03TP25-0607-02-D	14/21	9.8-14000	560		13.2 C	**Y**	**ASL**
	91-57-6	**2-Methylnaphthalene**	0.93 J	9500 J	ug/kg	03SB06_19910906	30/110	9.9-20000	9500		825 N	**Y**	**ASL**
	95-48-7	2-Methylphenol	190 J	290 J	ug/kg	03TP04-3_19910911	2/115	200-20000	290		1650 N	N	BSL
	83-32-9	**Acenaphthene**	0.8 J	33000	ug/kg	03SB06_19910906	30/111	9.9-2300	33000		25300 N	**Y**	**ASL**
	208-96-8	Acenaphthylene	0.64 J	280 J	ug/kg	03TP04-3_19910911	34/110	9.9-20000	280		29700 N	N	BSL
	120-12-7	Anthracene	0.82 J	66000	ug/kg	03SB06_19910906	44/110	9.9-2300	66000		396000 N	N	BSL
	56-55-3	**Benz(a)anthracene**	4.2 J	65000	ug/kg	03SB06_19910906	72/111	9.9-2300	65000		11 C	**Y**	**ASL**
	100-52-7	Benzaldehyde	29 J	83 J	ug/kg	03TP27-0304-01	9/63	200-20000	83		891 N	N	BSL
	50-32-8	**Benzo(a)pyrene**	5.1 J	48000	ug/kg	03SB06_19910906	73/112	9.9-2300	48000		3.85 C	**Y**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	7.2 J	58000	ug/kg	03SB06_19910906	77/113	9.9-2300	58000		38.5 C	**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	3.7 J	13000 J	ug/kg	03SB06_19910906	62/113	9.9-2300	13000		132000 N	N	BSL
	207-08-9	**Benzo(k)fluoranthene**	5 J	31000	ug/kg	03SB06_19910906	66/111	9.9-2300	31000		385 C	**Y**	**ASL**
	117-81-7	**Bis(2-ethylhexyl) Phthalate**	38 J	12000	ug/kg	03TP25-0506-01	42/103	200-20000	12000		1320 C	**Y**	**ASL**
	85-68-7	Butyl Benzyl Phthalate	330 J	330 J	ug/kg	03SS09_19970408	1/115	200-20000	330		561 C	N	BSL
	86-74-8	Carbazole	79 J	11000	ug/kg	03TP20-0708-01	5/75	200-2300	11000		C	N	NTX
	218-01-9	**Chrysene**	6.6 J	52000	ug/kg	03SB06_19910906	81/113	9.9-2300	52000		1210 C	**Y**	**ASL**
	84-74-2	Di-n-butyl Phthalate	60 J	370 J	ug/kg	03SS07_19910905	3/101	200-20000	370		10120 N	N	BSL
	117-84-0	Di-n-octyl Phthalate	220 J	220 J	ug/kg	03TP06-0809-03-20070501	1/115	200-20000	220		N	N	NTX
	53-70-3	**Dibenz(a,h)anthracene**	1.3 J	4800 J	ug/kg	03SB06_19910906	35/107	9.9-20000	4800		12.1 C	**Y**	**ASL**
	132-64-9	Dibenzofuran	73 J	29000	ug/kg	03SB06_19910906	7/115	200-20000	29000		N	N	NTX
	206-44-0	Fluoranthene	12	150000	ug/kg	03SB06_19910906	85/113	9.9-2300	150000		176000 N	N	BSL
	86-73-7	**Fluorene**	0.73 J	41000	ug/kg	03SB06_19910906	34/111	9.9-2300	41000		29700 N	**Y**	**ASL**
	193-39-5	**Indeno(1,2,3-cd)pyrene**	4.4 J	19000	ug/kg	03SB06_19910906	62/113	9.9-2300	19000		132 C	**Y**	**ASL**
	91-20-3	**Naphthalene**	3.1 J	14000	ug/kg	03TP20-0708-01	15/89	200-20000	14000		0.517 C	**Y**	**ASL**
	85-01-8	**Phenanthrene**	5.6 J	210000	ug/kg	03SB06_19910906	82/111	9.9-2300	210000		132000 N	**Y**	**ASL**
	129-00-0	**Pyrene**	11	140000	ug/kg	03SB06_19910906	86/113	9.9-2300	140000		132000 N	**Y**	**ASL**
	87-61-6	**1,2,3-Trichlorobenzene**	71 J	5700	ug/kg	03TP25-0506-01	3/62	4.7-320	5700		95.7 C	**Y**	**ASL**
	120-82-1	**1,2,4-Trichlorobenzene**	150 J	310 J	ug/kg	03TP25-0607-02-D	3/115	4.7-19000	310		7.48 N	**Y**	**ASL**
	78-93-3	2-Butanone	4 J	24	ug/kg	03TP19-0607-01	19/100	4.9-14000	24		1650 N	N	BSL
	67-64-1	Acetone	6.1 J	540 J	ug/kg	03TP25-0607-02	36/80	11-33	540		4950 N	N	BSL
	71-43-2	**Benzene**	1.4 J	78 J	ug/kg	03TP25-0607-02	10/106	4.7-5700	78		0.231 C	**Y**	**ASL**
	74-83-9	**Bromomethane**	8.2	8.2	ug/kg	03TP19-0607-01	1/106	4.7-5700	8.2		2.42 N	**Y**	**ASL**
	75-15-0	Carbon Disulfide	2.9 J	2.9 J	ug/kg	03TP24-0304-01	1/106	4.7-5700	2.9		341 N	N	BSL
	108-90-7	Chlorobenzene	2 J	2 J	ug/kg	03SB02_19910906	1/106	4.7-5700	2		68.2 N	N	BSL
	74-87-3	Chloromethane	2.1 J	16	ug/kg	03TP26-0506-01	4/106	4.7-5700	16		53.9 N	N	BSL
	75-71-8	Dichlorodifluoromethane	4.8 J	4.8 J	ug/kg	03TP24-0304-01	1/63	4.7-5700	4.8		671 N	N	BSL
	100-41-4	**Ethylbenzene**	380	7000	ug/kg	03TP25-0506-01	3/106	4.7-30	7000		1.87 C	**Y**	**ASL**
	179601-23-1	**M,p-xylene**	960	18000	ug/kg	03TP25-0506-01	3/63	9.5-21	18000		220 N	**Y**	**ASL**
	79-20-9	Methyl Acetate	5.5 J	450 J	ug/kg	03TP25-0607-02-D	2/63	4.7-5700	450		8250 N	N	BSL
	108-87-2	Methylcyclohexane	3500 J	3500 J	ug/kg	03TP25-0506-01	1/63	4.7-320	3500		N	N	NTX
	95-47-6	**O-xylene**	260 J	4000	ug/kg	03TP20-0708-01	3/63	4.7-10	4000		1320 N	**Y**	**ASL**
	100-42-5	**Styrene**	3300	3300	ug/kg	03TP20-0708-01	1/106	4.7-5700	3300		1980 N	**Y**	**ASL**
	127-18-4	**Tetrachloroethene**	4.8 J	210 J	ug/kg	03TP25-0607-02	4/106	4.7-5700	210		0.0539 C	**Y**	**ASL**
	108-88-3	**Toluene**	1.7 J	150000	ug/kg	03TP25-0506-01	14/99	4.7-30	150000		1760 N	**Y**	**ASL**
	79-01-6	**Trichloroethene**	2 J	2.7 J	ug/kg	03TP24-0304-01	2/106	4.7-5700	2.7		0.792 C	**Y**	**ASL**
	1330-20-7	**Xylenes (Total)**	1200	20000	ug/kg	03TP25-0506-01	3/80	4.7-30	20000		220 N	**Y**	**ASL**

TABLE 2.02
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SITE 3 LANDFILL AREA SOIL TO GROUNDWATER
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Groundwater

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (7)

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was performed but in this table COPCs were selected without elimination of metals statistically not above background, a separate table is presented to show the effects of background for on eliminating COPCs.
5 - The EPA ORNL risk-based soil to groundwater water COPC screening level for residential use is presented using a Dilution Attenuation Factor (DAF) of 1.1 and corresponds to a target hazard quotient of 1.0, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (USEPA Region 3, November 2010).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - The RBC for hexavalent chromium was utilized because the form of chromium in soil is not known.
8 - The RBC for methyl mercury was used because the form of mercury in soil is not known.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(9) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

Landfill Area Soil Samples:

03-SS-17	03SB07	03SS07 (sampled 9/5/1991)	03TP04-4	03TP14-0203-01	03SS32
03-SS-18	03SB08	03SS07 (sampled 4/8/1997)	03TP05-0506-01	03TP15-0405-01	03SS33
03-SS-19	03SB09	03SS08 (sampled 9/5/1991)	03TP05-0910-02	03TP16-0102-01	03SS34
03-SS-20	03SB10	03SS08 (sampled 4/8/1997)	03TP05-0910-02-D	03TP16-0102-01-D	03SS35
03-SS-21	03SB11	03SS09 (sampled 9/5/1991)	03TP06-0304-01	03TP17-0304-01	03SS35-D
03-SS-21-D	03SB12	03SS09 (sampled 4/8/1997)	03TP06-0607-04	03TP18-0203-01	03SS36
03-SS-22	03SB13	03SS10 (sampled 9/5/1991)	03TP06-0708-02	03TP18-0203-01-D	03SS37
03-SS-23	03SB14	03SS10 (sampled 4/8/1997)	03TP06-0809-03	03TP19-0304-02	03SS38
03-SS-24	03SB14-D	03SS11 (sampled 9/5/1991)	03TP06-0809-03-D	03TP19-0607-01	03SS39
03-SS-24-D	03SB15	03SS11 (sampled 4/8/1997)	03TP07-0203-02	03TP20-0708-01	03SS40
03-SS-25	03SB16	03SS12 (sampled 9/5/1991)	03TP07-0304-01	03TP23-0304-01	03SS41
03-SS-26	03SS01 (sampled 9/5/1991)	03SS12 (sampled 4/8/1997)	03TP08-0203-03	03TP24-0304-01	03SS41-D
03-SS-27	03SS01 (sampled 4/8/1997)	03SS13	03TP08-0304-02	03TP25-0506-01	03SS42
03-SS-28	03SS02 (sampled 9/5/1991)	03SS14	03TP08-0405-01	03TP25-0607-02	
03SB01-0204	03SS02 (sampled 4/8/1997)	03SS15	03TP09-0506-01	03TP25-0607-02-D	
03SB01-0608	03SS03 (sampled 9/5/1991)	03SS16	03TP09-0506-02	03TP26-0506-01	
03SB01-1416	03SS03 (sampled 4/8/1997)	03SS16-D	03TP10-0304-02	03TP27-0304-01	
03SB01	03SS04 (sampled 9/5/1991)	03TP01	03TP10-0405-01	03TP27-0304-01-D	
03SB02	03SS04 (sampled 4/8/1997)	03TP02-1	03TP11-0304-01	03TP27-0304-02	
03SB03	03SS05 (sampled 9/5/1991)	03TP02-2	03TP11-0405-02	03TP28-0203-01	
03SB04	03SS05 (sampled 4/8/1997)	03TP03	03TP12-0102-03	03TP29-0304-01	
03SB05	03SS06 (sampled 9/5/1991)	03TP04-1	03TP12-0304-02	03TP30-0506-01	
03SB06	03SS06 (sampled 4/8/1997)	03TP04-2	03TP12-0405-01	03TP30-0506-01-D	
03SB06-D	03SS06-D (sampled 4/8/1997)	03TP04-3	03TP13-0203-01	03SS31	

TABLE 2.03
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SITE 3 HANGAR AREA SOIL TO GROUNDWATEF
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Groundwater

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion
Tap Water Contact or	91-57-6	2-Methylnaphthalene	18 J	28 J	ug/kg	03SB19-0204	2/13	380-780	28		825 N			N	BSL
Water Vapors at Showerhead	83-32-9	Acenaphthene	62 J	230 J	ug/kg	03SB19-0204	3/13	380-440	230		25300 N			N	BSL
	208-96-8	Acenaphthylene	96 J	120 J	ug/kg	03SB19-0408	3/13	380-440	120		29700 N			N	BSL
	120-12-7	Anthracene	260 J	1800	ug/kg	03SB19-0204	3/13	380-440	1800		396000 N			N	BSL
	56-55-3	**Benz(a)anthracene**	36 J	4200	ug/kg	03SB19-0204	4/13	380-440	4200		11 C			**Y**	**ASL**
	50-32-8	**Benzo(a)pyrene**	40 J	3200	ug/kg	03SB19-0204	4/13	380-440	3200		3.85 C			**Y**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	68 J	4200	ug/kg	03SB19-0204	4/13	380-440	4200		38.5 C			**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	33 J	2100	ug/kg	03SB19-0204	4/13	380-440	2100		132000 N			N	BSL
	207-08-9	**Benzo(k)fluoranthene**	17 J	1400	ug/kg	03SB19-0204	4/13	380-440	1400		385 C			**Y**	**ASL**
	117-81-7	Bis(2-ethylhexyl) Phthalate	52 J	52 J	ug/kg	03SB18-0002	1/13	380-780	52		1320 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	30 J	38 J	ug/kg	03SB17-0406	5/13	380-780	38		561 C			N	BSL
	86-74-8	Carbazole	120 J	340 J	ug/kg	03SB19-0204	3/13	380-440	340		C			N	NTX
	218-01-9	**Chrysene**	53 J	3400	ug/kg	03SB19-0204	4/13	380-440	3400		1210 C			**Y**	**ASL**
	53-70-3	**Dibenz(a,h)anthracene**	180 J	580 J	ug/kg	03SB19-0204	3/13	380-440	580		12.1 C			**Y**	**ASL**
	132-64-9	Dibenzofuran	63 J	150 J	ug/kg	03SB19-0204	3/13	380-440	150		N			N	NTX
	206-44-0	Fluoranthene	91 J	6900 E	ug/kg	03SB19-0204	4/13	380-440	6900		176000 N			N	BSL
	86-73-7	Fluorene	110 J	260 J	ug/kg	03SB19-0204	3/13	380-440	260		29700 N			N	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	28 J	2000	ug/kg	03SB19-0204	4/13	380-440	2000		132 C			**Y**	**ASL**
	85-01-8	Phenanthrene	40 J	4100	ug/kg	03SB19-0204	4/13	380-440	4100		132000 N			N	BSL
	129-00-0	Pyrene	84 J	6600	ug/kg	03SB19-0204	4/13	380-440	6600		132000 N			N	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was not performed
so background comparison was not involved in selecting or eliminating COPCs.
5 - The EPA ORNL risk-based soil to groundwater water COPC screening level for residential use is presented using a Dilution Attenuation Factor (DAF) of 1.1 and corresponds to a target hazard quotient of 1.0, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (USEPA Region 3, November 2010).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Hangar Area Soil Samples:

03SB17-0406	03SB20-0608	03SB25-0608
03SB17-0608	03SB22-0406	03SB25-0809.9
03SB18-0002	03SB22-0608	03SB26-0406
03SB19-0204	03SB23-0406	
03SB19-0408	03SB24-0406	

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(7) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route
For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 2.04
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (7)
Site 3 Hangar Area Surface Soil	91-57-6	2-Methylnaphthalene	18 J	18 J	ug/kg	03SB18-0002	1/1	N/A	18		31000 N			N	BSL
	83-32-9	Acenaphthene	62 J	62 J	ug/kg	03SB18-0002	1/1	N/A	62		340000 N			N	BSL
	208-96-8	Acenaphthylene	96 J	96 J	ug/kg	03SB18-0002	1/1	N/A	96		230000 N			N	BSL
	120-12-7	Anthracene	260 J	260 J	ug/kg	03SB18-0002	1/1	N/A	260		1700000 N			N	BSL
	56-55-3	**Benz(a)anthracene**	780	780	ug/kg	03SB18-0002	1/1	N/A	780		150 C			**Y**	**ASL**
	50-32-8	**Benzo(a)pyrene**	860	860	ug/kg	03SB18-0002	1/1	N/A	860		15 C			**Y**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	1100	1100	ug/kg	03SB18-0002	1/1	N/A	1100		150 C			**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	740	740	ug/kg	03SB18-0002	1/1	N/A	740		170000 N			N	BSL
	207-08-9	Benzo(k)fluoranthene	410	410	ug/kg	03SB18-0002	1/1	N/A	410		1500 C			N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	52 J	52 J	ug/kg	03SB18-0002	1/1	N/A	52		35000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	33 J	33 J	ug/kg	03SB18-0002	1/1	N/A	33		260000 C			N	BSL
	86-74-8	Carbazole	120 J	120 J	ug/kg	03SB18-0002	1/1	N/A	120		C			N	NTX
	218-01-9	Chrysene	960	960	ug/kg	03SB18-0002	1/1	N/A	960		15000 C			N	BSL
	53-70-3	**Dibenz(a,h)anthracene**	180 J	180 J	ug/kg	03SB18-0002	1/1	N/A	180		15 C			**Y**	**ASL**
	132-64-9	Dibenzofuran	63 J	63 J	ug/kg	03SB18-0002	1/1	N/A	63		N			N	NTX
	206-44-0	Fluoranthene	2100	2100	ug/kg	03SB18-0002	1/1	N/A	2100		230000 N			N	BSL
	86-73-7	Fluorene	110 J	110 J	ug/kg	03SB18-0002	1/1	N/A	110		230000 N			N	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	680	680	ug/kg	03SB18-0002	1/1	N/A	680		150 C			**Y**	**ASL**
	85-01-8	Phenanthrene	1400	1400	ug/kg	03SB18-0002	1/1	N/A	1400		170000 N			N	BSL
	129-00-0	Pyrene	1500	1500	ug/kg	03SB18-0002	1/1	N/A	1500		170000 N			N	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.

2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.

3 - The maximum detected concentration is used for screening purposes.

4 - A background comparison analysis was performed but does not affect organics, so background comparison was not involved in selecting or eliminating COPCs.

5 - The EPA ORNL risk-based tap water COPC screening level for residential use is presented. The noncarcinogenic values (annotated "N") are divided by 10 to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (USEPA Region 3, November 2010).

6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Hangar Area Surface Soil Samples:

03SB18-0002

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered

N/A = Not Applicable or Not Available

COPC = Chemical of Potential Concern

C = Carcinogen

N = Non-Carcinogenic

J = Estimated Value

(7) Rationale Codes:

For Selection as a COPC:

ASL = Above Screening Level (and Background, if applicable)

NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:

BSL = Below Screening Level

BKG = Below Background Based on Statistical Tests

NUT = Essential Nutrient

NTX = No Toxicity Data

TABLE 2.05
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 HANGAR AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (7)
Site 3 Hangar Area Soil	91-57-6	2-Methylnaphthalene	18 J	28 J	ug/kg	03SB19-0204	2/13	380-780	28		31000 N			N	BSL
	83-32-9	Acenaphthene	62 J	230 J	ug/kg	03SB19-0204	3/13	380-440	230		340000 N			N	BSL
	208-96-8	Acenaphthylene	96 J	120 J	ug/kg	03SB19-0408	3/13	380-440	120		230000 N			N	BSL
	120-12-7	Anthracene	260 J	1800	ug/kg	03SB19-0204	3/13	380-440	1800		1700000 N			N	BSL
	56-55-3	**Benz(a)anthracene**	36 J	4200	ug/kg	03SB19-0204	4/13	380-440	4200		150 C			**Y**	**ASL**
	50-32-8	**Benzo(a)pyrene**	40 J	3200	ug/kg	03SB19-0204	4/13	380-440	3200		15 C			**Y**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	68 J	4200	ug/kg	03SB19-0204	4/13	380-440	4200		150 C			**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	33 J	2100	ug/kg	03SB19-0204	4/13	380-440	2100		170000 N			N	BSL
	207-08-9	Benzo(k)fluoranthene	17 J	1400	ug/kg	03SB19-0204	4/13	380-440	1400		1500 C			N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	52 J	52 J	ug/kg	03SB18-0002	1/13	380-780	52		35000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	30 J	38 J	ug/kg	03SB17-0406	5/13	380-780	38		260000 C			N	BSL
	86-74-8	Carbazole	120 J	340 J	ug/kg	03SB19-0204	3/13	380-440	340		C			N	NTX
	218-01-9	Chrysene	53 J	3400	ug/kg	03SB19-0204	4/13	380-440	3400		15000 C			N	BSL
	53-70-3	**Dibenz(a,h)anthracene**	180 J	580 J	ug/kg	03SB19-0204	3/13	380-440	580		15 C			**Y**	**ASL**
	132-64-9	Dibenzofuran	63 J	150 J	ug/kg	03SB19-0204	3/13	380-440	150		N			N	NTX
	206-44-0	Fluoranthene	91 J	6900 E	ug/kg	03SB19-0204	4/13	380-440	6900		230000 N			N	BSL
	86-73-7	Fluorene	110 J	260 J	ug/kg	03SB19-0204	3/13	380-440	260		230000 N			N	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	28 J	2000	ug/kg	03SB19-0204	4/13	380-440	2000		150 C			**Y**	**ASL**
	85-01-8	Phenanthrene	40 J	4100	ug/kg	03SB19-0204	4/13	380-440	4100		170000 N			N	BSL
	129-00-0	Pyrene	84 J	6600	ug/kg	03SB19-0204	4/13	380-440	6600		170000 N			N	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.

2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.

3 - The maximum detected concentration is used for screening purposes.

4 - A background comparison analysis was performed but does not affect organics, so background comparison was not involved in selecting or eliminating COPCs.

5 - The EPA ORNL risk-based tap water COPC screening level for residential use is presented. The noncarcinogenic values (annotated "N") are divided by 10 to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (USEPA Region 3, November 2010).

6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Hangar Area Soil Samples:

03SB17-0406	03SB20-0608	03SB25-0608
03SB17-0608	03SB22-0406	03SB25-0809.9
03SB18-0002	03SB22-0608	03SB26-0406
03SB19-0204	03SB23-0406	
03SB19-0408	03SB24-0406	

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(7) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 2.06
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
Site 3 Landfill Area Surface Soil	1746-01-6	**Total 2,3,7,8-TCDD Equiv.**	0.0045	0.0126	ug/kg	03SS04_19970408	2/2	N/A	0.0126		0.0045 C			**Y**	**ASL**
	7429-90-5	**Aluminum**	8200	24600	mg/kg	03SS41	68/68	N/A	24600		7700 N			**Y**	**ASL**
	7440-36-0	**Antimony**	0.22 L	10.4	mg/kg	03SB01_19910906	21/51	0.2-10.1	10.4		3.1 N			**Y**	**ASL**
	7440-38-2	**Arsenic**	0.37 J	13	mg/kg	03SB10_19910906	61/61	N/A	13		0.39 C			**Y**	**ASL**
	7440-39-3	Barium	47.6	246	mg/kg	03SS37	68/68	N/A	246		1500 N			N	BSL
	7440-41-7	Beryllium	0.62	2 K	mg/kg	03-SS-23	42/42	N/A	2		16 N			N	BSL
	7440-43-9	**Cadmium**	0.22 J	18.4	mg/kg	03SS09_19970408	23/49	0.03-1.4	18.4		7 N			**Y**	**ASL**
	7440-70-2	Calcium	372	86400	mg/kg	03SB06_19910906	68/68	N/A	86400		N			N	NUT
	7440-47-3	**Chromium**	6.4	35.8	mg/kg	03SS35	68/68	N/A	35.8		0.29 C			**Y**	**ASL**
	7440-48-4	**Cobalt**	5.2	12.2	mg/kg	03SB15_19910906	68/68	N/A	12.2		2.3 N			**Y**	**ASL**
	7440-50-8	Copper	9.9	182 K	mg/kg	03SS37	68/68	N/A	182		310 N			N	BSL
	57-12-5	Cyanide	0.11	2.3	mg/kg	03SS09_19970408	6/68	0.13-2.9	2.3		160 N			N	BSL
	7439-89-6	**Iron**	13800	70900 J	mg/kg	03SS35	68/68	N/A	70900		5500 N			**Y**	**ASL**
	7439-92-1	Lead	3.2	379 J	mg/kg	03SS35	68/68	N/A	379		400 C			N	BSL
	7439-95-4	Magnesium	553	50200	mg/kg	03SB06_19910906	68/68	N/A	50200		N			N	NUT
	7439-96-5	**Manganese**	318	1780	mg/kg	03SS11_19910905	68/68	N/A	1780		180 N			**Y**	**ASL**
	7439-97-6	Mercury	0.021 J	0.77	mg/kg	03-SS-23	29/68	0.09-0.14	0.77		0.78 N			N	BSL
	7440-02-0	Nickel	6.3	39	mg/kg	03SB06_19910906-D	68/68	N/A	39		150 N			N	BSL
	7440-09-7	Potassium	245	2130	mg/kg	03SS11_19970408	66/68	390-416	2130		N			N	NUT
	7782-49-2	Selenium	0.36 L	0.36 L	mg/kg	03SS32	1/33	0.3-1.2	0.36		39 N			N	BSL
	7440-22-4	Silver	0.36 K	26.3 J	mg/kg	03SS35	12/66	0.035-1.6	26.3		39 N			N	BSL
	7440-23-5	Sodium	26.2 L	884	mg/kg	03SB12_19910906	37/58	95.2-1010	884		N			N	NUT
	7440-28-0	Thallium	0.26 L	1.8 J	mg/kg	03-SS-20	24/61	0.15-0.73	1.8		N			N	NTX
	7440-62-2	**Vanadium**	16.5	45.7	mg/kg	03-SS-25	68/68	N/A	45.7		39 N			**Y**	**ASL**
	7440-66-6	Zinc	16.9	466	mg/kg	03-SS-23	68/68	N/A	466		2300 N			N	BSL
	72-54-8	4,4'-DDD	1.2 J	45	ug/kg	03-SS-18	13/68	2-190	45		2000 C			N	BSL
	72-55-9	4,4'-DDE	0.57 J	210	ug/kg	03SS35	17/68	2-190	210		1400 C			N	BSL
	50-29-3	4,4'-DDT	1.1 J	450	ug/kg	03SS35	17/67	2-190	450		1700 C			N	BSL
	309-00-2	Aldrin	0.27 J	1.6 J	ug/kg	03SS34	5/68	2-94	1.6		29 C			N	BSL
	319-84-6	Alpha-BHC	0.86 J	5.6	ug/kg	03SS38	3/68	2-94	5.6		77 C			N	BSL
	5103-71-9	Alpha-Chlordane	0.53 J	23 J	ug/kg	03TP12-0102-03-20070504	9/61	2-940	23		1600 C			N	BSL
	11097-69-1	Aroclor-1254	13 J	84 J	ug/kg	03SS09_19970408	3/68	19-1900	84		110 N			N	BSL
	11096-82-5	Aroclor-1260	12 J	150 J	ug/kg	03SS35-D	3/68	19-1900	150		220 C			N	BSL
	319-85-7	Beta-BHC	0.8 J	0.98 J	ug/kg	03-SS-24	2/66	1-94	0.98		270 C			N	BSL
	60-57-1	**Dieldrin**	1.6 J	620 J	ug/kg	03SS12_19970408	59/67	3.9-43	620		30 C			**Y**	**ASL**
	959-98-8	Endosulfan I	0.25 J	30	ug/kg	03SB13_19910906	6/68	2-94	30		37000 N			N	BSL
	33213-65-9	Endosulfan II	0.49 J	16 J	ug/kg	03SS35-D	5/68	2-190	16		37000 N			N	BSL
	1031-07-8	Endosulfan Sulfate	1.3 J	3.2 J	ug/kg	03SS34	2/68	2-190	3.2		37000 N			N	BSL

TABLE 2.06
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
Site 3 Landfill Area Surface Soil	72-20-8	Endrin	0.61 J	16 J	ug/kg	03SS35-D	2/67	2-190	16		1800 N			N	BSL
	007421-93-4	Endrin Aldehyde	0.61 J	8 J	ug/kg	03SS32	11/38	2-49	8		1800 N			N	BSL
	53494-70-5	Endrin Ketone	0.29 J	9.6 J	ug/kg	03SS38	5/68	2-190	9.6		1800 N			N	BSL
	58-89-9	Gamma-BHC (Lindane)	1.1 J	1.1 J	ug/kg	03TP12-0102-03-20070504	1/68	2-94	1.1		520 C			N	BSL
	5103-74-2	Gamma-Chlordane	0.58 J	33 J	ug/kg	03SS35-D	6/64	2-940	33		1600 C			N	BSL
	76-44-8	Heptachlor	0.71 J	3.9	ug/kg	03SS31	2/68	2-94	3.9		110 C			N	BSL
	1024-57-3	Heptachlor Epoxide	0.55 J	20 J	ug/kg	03SS35-D	12/67	2-94	20		53 C			N	BSL
	72-43-5	Methoxychlor	5 J	5 J	ug/kg	03SS32	1/68	3.8-940	5		31000 N			N	BSL
	95-50-1	1,2-Dichlorobenzene	39 J	330 J	ug/kg	03SB07_19910906	7/68	4.8-19000	330		190000 N			N	BSL
	106-46-7	1,4-Dichlorobenzene	39 J	160 J	ug/kg	03SB01_19910906	12/68	4.8-19000	160		2400 C			N	BSL
	90-12-0	1-Methylnaphthalene	0.74 J	3.5 J	ug/kg	03-SS-27	8/12	11-13	3.5		22000 C			N	BSL
	91-57-6	2-Methylnaphthalene	0.93 J	9500 J	ug/kg	03SB06_19910906	19/68	9.9-20000	9500		31000 N			N	BSL
	83-32-9	Acenaphthene	0.8 J	33000	ug/kg	03SB06_19910906	23/68	9.9-740	33000		340000 N			N	BSL
	208-96-8	Acenaphthylene	0.86 J	160 J	ug/kg	03SB01_19910906	26/68	200-20000	160		230000 N			N	BSL
	120-12-7	Anthracene	0.86 J	66000	ug/kg	03SB06_19910906	34/68	350-740	66000		1700000 N			N	BSL
	56-55-3	**Benz(a)anthracene**	4.2 J	65000	ug/kg	03SB06_19910906	55/68	370-430	65000		150 C			**Y**	**ASL**
	100-52-7	Benzaldehyde	29 J	77 J	ug/kg	03SS40	2/26	200-20000	77		780000 N			N	BSL
	50-32-8	**Benzo(a)pyrene**	5.1 J	48000	ug/kg	03SB06_19910906	55/68	370-430	48000		15 C			**Y**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	7.2 J	58000	ug/kg	03SB06_19910906	59/68	370-430	58000		150 C			**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	3.7 J	13000 J	ug/kg	03SB06_19910906	45/68	350-450	13000		170000 N			N	BSL
	207-08-9	**Benzo(k)fluoranthene**	5.2 J	31000	ug/kg	03SB06_19910906	53/68	370-450	31000		1500 C			**Y**	**ASL**
	117-81-7	Bis(2-ethylhexyl) Phthalate	38 J	690	ug/kg	03SS36	22/56	200-20000	690		35000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	330 J	330 J	ug/kg	03SS09_19970408	1/68	200-20000	330		260000 C			N	BSL
	86-74-8	Carbazole	79 J	3200 J	ug/kg	03TP12-0102-03-20070504	3/38	200-460	3200		C			N	NTX
	218-01-9	**Chrysene**	6.6 J	52000	ug/kg	03SB06_19910906	62/68	370-400	52000		15000 C			**Y**	**ASL**
	84-74-2	Di-n-butyl Phthalate	60 J	370 J	ug/kg	03SS07_19910905	2/59	200-20000	370		610000 N			N	BSL
	53-70-3	**Dibenz(a,h)anthracene**	1.7 J	4800 J	ug/kg	03SB06_19910906	26/65	350-20000	4800		15 C			**Y**	**ASL**
	132-64-9	Dibenzofuran	73 J	29000	ug/kg	03SB06_19910906	4/68	200-20000	29000		N			N	NTX
	206-44-0	Fluoranthene	15	150000	ug/kg	03SB06_19910906	65/68	380-400	150000		230000 N			N	BSL
	86-73-7	Fluorene	0.73 J	41000	ug/kg	03SB06_19910906	27/68	11-740	41000		230000 N			N	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	4.4 J	19000	ug/kg	03SB06_19910906	45/68	350-740	19000		150 C			**Y**	**ASL**
	91-20-3	**Naphthalene**	3.1 J	13000 J	ug/kg	03SB06_19910906	4/48	200-20000	13000		3600 C			**Y**	**ASL**
	85-01-8	**Phenanthrene**	5.6 J	210000	ug/kg	03SB06_19910906	64/68	380-400	210000		170000 N			**Y**	**ASL**
	129-00-0	Pyrene	11	140000	ug/kg	03SB06_19910906	65/68	380-400	140000		170000 N			N	BSL
	120-82-1	1,2,4-Trichlorobenzene	150 J	150 J	ug/kg	03SB07_19910906	1/68	4.8-19000	150		6200 N			N	BSL
	78-93-3	2-Butanone	4 J	20	ug/kg	03SS40	15/50	5-19	20		2800000 N			N	BSL
	67-64-1	Acetone	89	270	ug/kg	03-SS-26	20/37	11-22	270		6100000 N			N	BSL

TABLE 2.06
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
Site 3 Landfill Area Surface Soil	71-43-2	Benzene	1.4 J	1.4 J	ug/kg	03SS32	1/56	4.8-8	1.4		1100 C			N	BSL
	74-87-3	Chloromethane	2.1 J	3.6 J	ug/kg	03SS32	3/56	4.8-12	3.6		12000 N			N	BSL
	79-20-9	Methyl Acetate	5.5 J	5.5 J	ug/kg	03-SS-21	1/26	4.8-8	5.5		7800000 N			N	BSL
	108-88-3	Toluene	1.7 J	15	ug/kg	03-SS-18	9/56	4.8-7.8	15		500000 N			N	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was performed but in this table COPCs were selected without elimination of metals statistically not above background, a separate table is presented to show the effects of background for on eliminating COPCs.
5 - The EPA ORNL risk-based tap water COPC screening level for residential use is presented. The noncarcinogenic values (annotated "N") are divided by 10 to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (USEPA Region 3, November 2010).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - The RBC for hexavalent chromium was utilized because the form of chromium in soil is not known.
8 - The RBC for methyl mercury was used because the form of mercury in soil is not known.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(9) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

Landfill Area Surface Soil Samples:

03-SS-17	03-SS-28	03SB14-D	03SS06 (sampled 4/8/1997)	03SS13	03SS36
03-SS-18	03SB01	03SB15	03SS06-D (sampled 4/8/1997)	03SS14	03SS37
03-SS-19	03SB03	03SB16	03SS07 (sampled 9/5/1991)	03SS15	03SS38
03-SS-20	03SB05	03SS01 (sampled 9/5/1991)	03SS07 (sampled 4/8/1997)	03SS16	03SS39
03-SS-21	03SB06	03SS01 (sampled 4/8/1997)	03SS08 (sampled 9/5/1991)	03SS16-D	03SS40
03-SS-21-D	03SB06-D	03SS02 (sampled 9/5/1991)	03SS08 (sampled 4/8/1997)	03TP12-0102-03	03SS41
03-SS-22	03SB07	03SS02 (sampled 4/8/1997)	03SS09 (sampled 9/5/1991)	03TP16-0102-01	03SS41-D
03-SS-23	03SB08	03SS03 (sampled 9/5/1991)	03SS09 (sampled 4/8/1997)	03TP16-0102-01-D	03SS42
03-SS-24	03SB09	03SS03 (sampled 4/8/1997)	03SS10 (sampled 9/5/1991)	03SS31	
03-SS-24-D	03SB10	03SS04 (sampled 9/5/1991)	03SS10 (sampled 4/8/1997)	03SS32	
03-SS-25	03SB11	03SS04 (sampled 4/8/1997)	03SS11 (sampled 9/5/1991)	03SS33	
03-SS-26	03SB12	03SS05 (sampled 9/5/1991)	03SS11 (sampled 4/8/1997)	03SS34	
03-SS-27	03SB13	03SS05 (sampled 4/8/1997)	03SS12 (sampled 9/5/1991)	03SS35	
	03SB14	03SS06 (sampled 9/5/1991)	03SS12 (sampled 4/8/1997)	03SS35-D	

TABLE 2.07
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
WITH METALS ELIMINATED THAT ARE WITHIN THE RANGE OF BACKGROUND
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
Site 3 Landfill Area Surface Soil	1746-01-6	**Total 2,3,7,8-TCDD Equiv.**	0.0045	0.0126	ug/kg	03SS04_19970408	2/2	N/A	0.0126		0.0045 C			**Y**	**ASL**
	7429-90-5	**Aluminum**	8200	24600	mg/kg	03SS41	68/68	N/A	24600		7700 N			**Y**	**ASL**
	7440-36-0	**Antimony**	0.22 L	10.4	mg/kg	03SB01_19910906	21/51	0.2-10.1	10.4		3.1 N			**Y**	**ASL**
	7440-38-2	Arsenic	0.37 J	13	mg/kg	03SB10_19910906	61/61	N/A	13		0.39 C			N	BKG
	7440-39-3	Barium	47.6	246	mg/kg	03SS37	68/68	N/A	246		1500 N			N	BSL
	7440-41-7	Beryllium	0.62	2 K	mg/kg	03-SS-23	42/42	N/A	2		16 N			N	BSL
	7440-43-9	**Cadmium**	0.22 J	18.4	mg/kg	03SS09_19970408	23/49	0.03-1.4	18.4		7 N			**Y**	**ASL**
	7440-70-2	Calcium	372	86400	mg/kg	03SB06_19910906	68/68	N/A	86400		N			N	NUT
	7440-47-3	**Chromium**	6.4	35.8	mg/kg	03SS35	68/68	N/A	35.8		0.29 C			**Y**	**ASL**
	7440-48-4	**Cobalt**	5.2	12.2	mg/kg	03SB15_19910906	68/68	N/A	12.2		2.3 N			**Y**	**ASL**
	7440-50-8	Copper	9.9	182 K	mg/kg	03SS37	68/68	N/A	182		310 N			N	BSL
	57-12-5	Cyanide	0.11	2.3	mg/kg	03SS09_19970408	6/68	0.13-2.9	2.3		160 N			N	BSL
	7439-89-6	**Iron**	13800	70900 J	mg/kg	03SS35	68/68	N/A	70900		5500 N			**Y**	**ASL**
	7439-92-1	Lead	3.2	379 J	mg/kg	03SS35	68/68	N/A	379		400 C			N	BSL
	7439-95-4	Magnesium	553	50200	mg/kg	03SB06_19910906	68/68	N/A	50200		N			N	NUT
	7439-96-5	Manganese	318	1780	mg/kg	03SS11_19910905	68/68	N/A	1780		180 N			N	BKG
	7439-97-6	Mercury	0.021 J	0.77	mg/kg	03-SS-23	29/68	0.09-0.14	0.77		0.78 N			N	BSL
	7440-02-0	Nickel	6.3	39	mg/kg	03SB06_19910906-D	68/68	N/A	39		150 N			N	BSL
	7440-09-7	Potassium	245	2130	mg/kg	03SS11_19970408	66/68	390-416	2130		N			N	NUT
	7782-49-2	Selenium	0.36 L	0.36 L	mg/kg	03SS32	1/33	0.3-1.2	0.36		39 N			N	BSL
	7440-22-4	Silver	0.36 K	26.3 J	mg/kg	03SS35	12/66	0.035-1.6	26.3		39 N			N	BSL
	7440-23-5	Sodium	26.2 L	884	mg/kg	03SB12_19910906	37/58	95.2-1010	884		N			N	NUT
	7440-28-0	Thallium	0.26 L	1.8 J	mg/kg	03-SS-20	24/61	0.15-0.73	1.8		N			N	NTX, BKG
	7440-62-2	**Vanadium**	16.5	45.7	mg/kg	03-SS-25	68/68	N/A	45.7		39 N			**Y**	**ASL**
	7440-66-6	Zinc	16.9	466	mg/kg	03-SS-23	68/68	N/A	466		2300 N			N	BSL
	72-54-8	4,4'-DDD	1.2 J	45	ug/kg	03-SS-18	13/68	2-190	45		2000 C			N	BSL
	72-55-9	4,4'-DDE	0.57 J	210	ug/kg	03SS35	17/68	2-190	210		1400 C			N	BSL
	50-29-3	4,4'-DDT	1.1 J	450	ug/kg	03SS35	17/67	2-190	450		1700 C			N	BSL
	309-00-2	Aldrin	0.27 J	1.6 J	ug/kg	03SS34	5/68	2-94	1.6		29 C			N	BSL
	319-84-6	Alpha-BHC	0.86 J	5.6	ug/kg	03SS38	3/68	2-94	5.6		77 C			N	BSL
	5103-71-9	Alpha-Chlordane	0.53 J	23 J	ug/kg	03TP12-0102-03-20070504	9/61	2-940	23		1600 C			N	BSL
	11097-69-1	Aroclor-1254	13 J	84 J	ug/kg	03SS09_19970408	3/68	19-1900	84		110 N			N	BSL
	11096-82-5	Aroclor-1260	12 J	150 J	ug/kg	03SS35-D	3/68	19-1900	150		220 C			N	BSL
	319-85-7	Beta-BHC	0.8 J	0.98 J	ug/kg	03-SS-24	2/66	1-94	0.98		270 C			N	BSL
	60-57-1	**Dieldrin**	1.6 J	620 J	ug/kg	03SS12_19970408	59/67	3.9-43	620		30 C			**Y**	**ASL**
	959-98-8	Endosulfan I	0.25 J	30	ug/kg	03SB13_19910906	6/68	2-94	30		37000 N			N	BSL
	33213-65-9	Endosulfan II	0.49 J	16 J	ug/kg	03SS35-D	5/68	2-190	16		37000 N			N	BSL
	1031-07-8	Endosulfan Sulfate	1.3 J	3.2 J	ug/kg	03SS34	2/68	2-190	3.2		37000 N			N	BSL
	72-20-8	Endrin	0.61 J	16 J	ug/kg	03SS35-D	2/67	2-190	16		1800 N			N	BSL
	007421-93-4	Endrin Aldehyde	0.61 J	8 J	ug/kg	03SS32	11/38	2-49	8		1800 N			N	BSL

TABLE 2.07
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
WITH METALS ELIMINATED THAT ARE WITHIN THE RANGE OF BACKGROUND
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
	53494-70-5	Endrin Ketone	0.29 J	9.6 J	ug/kg	03SS38	5/68	2-190	9.6		1800 N			N	BSL
	58-89-9	Gamma-BHC (Lindane)	1.1 J	1.1 J	ug/kg	03TP12-0102-03-20070504	1/68	2-94	1.1		520 C			N	BSL
	5103-74-2	Gamma-Chlordane	0.58 J	33 J	ug/kg	03SS35-D	6/64	2-940	33		1600 C			N	BSL
	76-44-8	Heptachlor	0.71 J	3.9	ug/kg	03SS31	2/68	2-94	3.9		110 C			N	BSL
	1024-57-3	Heptachlor Epoxide	0.55 J	20 J	ug/kg	03SS35-D	12/67	2-94	20		53 C			N	BSL
	72-43-5	Methoxychlor	5 J	5 J	ug/kg	03SS32	1/68	3.8-940	5		31000 N			N	BSL
	95-50-1	1,2-Dichlorobenzene	39 J	330 J	ug/kg	03SB07_19910906	7/68	4.8-19000	330		190000 N			N	BSL
	106-46-7	1,4-Dichlorobenzene	39 J	160 J	ug/kg	03SB01_19910906	12/68	4.8-19000	160		2400 C			N	BSL
	90-12-0	1-Methylnaphthalene	0.74 J	3.5 J	ug/kg	03-SS-27	8/12	11-13	3.5		22000 C			N	BSL
	91-57-6	2-Methylnaphthalene	0.93 J	9500 J	ug/kg	03SB06_19910906	19/68	9.9-20000	9500		31000 N			N	BSL
	83-32-9	Acenaphthene	0.8 J	33000	ug/kg	03SB06_19910906	23/68	9.9-740	33000		340000 N			N	BSL
	208-96-8	Acenaphthylene	0.86 J	160 J	ug/kg	03SB01_19910906	26/68	200-20000	160		230000 N			N	BSL
	120-12-7	Anthracene	0.86 J	66000	ug/kg	03SB06_19910906	34/68	350-740	66000		1700000 N			N	BSL
	56-55-3	**Benz(a)anthracene**	4.2 J	65000	ug/kg	03SB06_19910906	55/68	370-430	65000		150 C			**Y**	**ASL**
	100-52-7	Benzaldehyde	29 J	77 J	ug/kg	03SS40	2/26	200-20000	77		780000 N			N	BSL
	50-32-8	**Benzo(a)pyrene**	5.1 J	48000	ug/kg	03SB06_19910906	55/68	370-430	48000		15 C			**Y**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	7.2 J	58000	ug/kg	03SB06_19910906	59/68	370-430	58000		150 C			**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	3.7 J	13000 J	ug/kg	03SB06_19910906	45/68	350-450	13000		170000 N			N	BSL
	207-08-9	**Benzo(k)fluoranthene**	5.2 J	31000	ug/kg	03SB06_19910906	53/68	370-450	31000		1500 C			**Y**	**ASL**
	117-81-7	Bis(2-ethylhexyl) Phthalate	38 J	690	ug/kg	03SS36	22/56	200-20000	690		35000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	330 J	330 J	ug/kg	03SS09_19970408	1/68	200-20000	330		260000 C			N	BSL
	86-74-8	Carbazole	79 J	3200 J	ug/kg	03TP12-0102-03-20070504	3/38	200-460	3200		C			N	NTX
	218-01-9	**Chrysene**	6.6 J	52000	ug/kg	03SB06_19910906	62/68	370-400	52000		15000 C			**Y**	**ASL**
	84-74-2	Di-n-butyl Phthalate	60 J	370 J	ug/kg	03SS07_19910905	2/59	200-20000	370		610000 N			N	BSL
	53-70-3	**Dibenz(a,h)anthracene**	1.7 J	4800 J	ug/kg	03SB06_19910906	26/65	350-20000	4800		15 C			**Y**	**ASL**
	132-64-9	Dibenzofuran	73 J	29000	ug/kg	03SB06_19910906	4/68	200-20000	29000		N			N	NTX
	206-44-0	Fluoranthene	15	150000	ug/kg	03SB06_19910906	65/68	380-400	150000		230000 N			N	BSL
	86-73-7	Fluorene	0.73 J	41000	ug/kg	03SB06_19910906	27/68	11-740	41000		230000 N			N	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	4.4 J	19000	ug/kg	03SB06_19910906	45/68	350-740	19000		150 C			**Y**	**ASL**
	91-20-3	**Naphthalene**	3.1 J	13000 J	ug/kg	03SB06_19910906	4/48	200-20000	13000		3600 C			**Y**	**ASL**
	85-01-8	**Phenanthrene**	5.6 J	210000	ug/kg	03SB06_19910906	64/68	380-400	210000		170000 N			**Y**	**ASL**
	129-00-0	Pyrene	11	140000	ug/kg	03SB06_19910906	65/68	380-400	140000		170000 N			N	BSL
	120-82-1	1,2,4-Trichlorobenzene	150 J	150 J	ug/kg	03SB07_19910906	1/68	4.8-19000	150		6200 N			N	BSL
	78-93-3	2-Butanone	4 J	20	ug/kg	03SS40	15/50	5-19	20		2800000 N			N	BSL
	67-64-1	Acetone	89	270	ug/kg	03-SS-26	20/37	11-22	270		6100000 N			N	BSL
	71-43-2	Benzene	1.4 J	1.4 J	ug/kg	03SS32	1/56	4.8-8	1.4		1100 C			N	BSL
	74-87-3	Chloromethane	2.1 J	3.6 J	ug/kg	03SS32	3/56	4.8-12	3.6		12000 N			N	BSL
	79-20-9	Methyl Acetate	5.5 J	5.5 J	ug/kg	03-SS-21	1/26	4.8-8	5.5		7800000 N			N	BSL
	108-88-3	Toluene	1.7 J	15	ug/kg	03-SS-18	9/56	4.8-7.8	15		500000 N			N	BSL

TABLE 2.07
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NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
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Exposure Medium: Surface Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was performed and COPCs were selected after elimination of metals statistically not above background, a separate table is presented to show the effects of background for on eliminating COPCs.
5 - The EPA ORNL risk-based tap water COPC screening level for residential use is presented. The noncarcinogenic values (annotated "N") are divided by 10 to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (USEPA Region 3, November 2010).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - The RBC for hexavalent chromium was utilized because the form of chromium in soil is not known.
8 - The RBC for methyl mercury was used because the form of mercury in soil is not known.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(9) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route
For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

Landfill Area Surface Soil Samples:

03-SS-17	03-SS-28	03SB14-D	03SS06 (sampled 4/8/1997)	03SS13	03SS36
03-SS-18	03SB01	03SB15	03SS06-D (sampled 4/8/1997)	03SS14	03SS37
03-SS-19	03SB03	03SB16	03SS07 (sampled 9/5/1991)	03SS15	03SS38
03-SS-20	03SB05	03SS01 (sampled 9/5/1991)	03SS07 (sampled 4/8/1997)	03SS16	03SS39
03-SS-21	03SB06	03SS01 (sampled 4/8/1997)	03SS08 (sampled 9/5/1991)	03SS16-D	03SS40
03-SS-21-D	03SB06-D	03SS02 (sampled 9/5/1991)	03SS08 (sampled 4/8/1997)	03TP12-0102-03	03SS41
03-SS-22	03SB07	03SS02 (sampled 4/8/1997)	03SS09 (sampled 9/5/1991)	03TP16-0102-01	03SS41-D
03-SS-23	03SB08	03SS03 (sampled 9/5/1991)	03SS09 (sampled 4/8/1997)	03TP16-0102-01-D	03SS42
03-SS-24	03SB09	03SS03 (sampled 4/8/1997)	03SS10 (sampled 9/5/1991)	03SS31	
03-SS-24-D	03SB10	03SS04 (sampled 9/5/1991)	03SS10 (sampled 4/8/1997)	03SS32	
03-SS-25	03SB11	03SS04 (sampled 4/8/1997)	03SS11 (sampled 9/5/1991)	03SS33	
03-SS-26	03SB12	03SS05 (sampled 9/5/1991)	03SS11 (sampled 4/8/1997)	03SS34	
03-SS-27	03SB13	03SS05 (sampled 4/8/1997)	03SS12 (sampled 9/5/1991)	03SS35	
	03SB14	03SS06 (sampled 9/5/1991)	03SS12 (sampled 4/8/1997)	03SS35-D	

TABLE 2.08
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 LANDFILL AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
Site 3 Landfill Area Soil	1746-01-6	**Total 2,3,7,8-TCDD Equiv.**	0.0045	0.34	ug/kg	03TP06-0809-03-20070501-D	5/5	N/A	0.34		0.0045 C			**Y**	**ASL**
	7429-90-5	**Aluminum**	8200	74700	mg/kg	03TP19-0304-02	115/115	N/A	74700		7700 N			**Y**	**ASL**
	7440-36-0	**Antimony**	0.22 L	281 L	mg/kg	03TP27-0304-01-D	41/90	0.2-10.3	281		3.1 N			**Y**	**ASL**
	7440-38-2	**Arsenic**	0.37 J	49.9 J	mg/kg	03TP27-0304-01	108/108	N/A	49.9		0.39 C			**Y**	**ASL**
	7440-39-3	Barium	45.2	859	mg/kg	03TP19-0304-02	115/115	N/A	859		1500 N			N	BSL
	7440-41-7	Beryllium	0.61	2 K	mg/kg	03-SS-23	79/79	N/A	2		16 N			N	BSL
	7440-43-9	**Cadmium**	0.22 J	300	mg/kg	03TP19-0607-01	49/90	0.03-1.4	300		7 N			**Y**	**ASL**
	7440-70-2	Calcium	253	86400	mg/kg	03SB06_19910906	110/110	N/A	86400		N			N	NUT
	7440-47-3	**Chromium**	4.2 K	348 J	mg/kg	03TP30-0506-01	114/115	17-17	348		0.29 C			**Y**	**ASL**
	7440-48-4	**Cobalt**	2.5	121 J	mg/kg	03TP27-0304-01-D	115/115	N/A	121		2.3 N			**Y**	**ASL**
	7440-50-8	**Copper**	7.1	9660	mg/kg	03TP25-0607-02-D	115/115	N/A	9660		310 N			**Y**	**ASL**
	57-12-5	Cyanide	0.11	4.6	mg/kg	03TP06-0809-03-20070501	29/115	0.09-2.9	4.6		160 N			N	BSL
	7439-89-6	**Iron**	9570	236000 J	mg/kg	03TP27-0304-01-D	115/115	N/A	236000		5500 N			**Y**	**ASL**
	7439-92-1	**Lead**	2.2	6480 J	mg/kg	03TP05-0910-02-20070430-D	115/115	N/A	6480		400 C			**Y**	**ASL**
	7439-95-4	Magnesium	408	50200	mg/kg	03SB06_19910906	115/115	N/A	50200		N			N	NUT
	7439-96-5	**Manganese**	41.6	20000	mg/kg	03TP10-0405-01-20070503	115/115	N/A	20000		180 N			**Y**	**ASL**
	7439-97-6	**Mercury**	0.021 J	7.1	mg/kg	03TP20-0708-01	68/115	0.017-0.14	7.1		0.78 N			**Y**	**ASL**
	7440-02-0	**Nickel**	5.8	296 K	mg/kg	03TP05-0506-01-20070430	115/115	N/A	296		150 N			**Y**	**ASL**
	7440-09-7	Potassium	168	3010	mg/kg	03TP01_19910909	108/111	390-522	3010		N			N	NUT
	7782-49-2	Selenium	0.36 L	0.55 L	mg/kg	03TP08-0203-03-20070502	2/60	0.3-8	0.55		39 N			N	BSL
	7440-22-4	**Silver**	0.31	233	mg/kg	03TP06-0607-04-20070501	34/110	0.035-1.6	233		39 N			**Y**	**ASL**
	7440-23-5	Sodium	19.1 L	1830	mg/kg	03TP27-0304-01	54/87	18.8-1090	1830		N			N	NUT
	7440-28-0	Thallium	0.26 L	61.1 J	mg/kg	03TP27-0304-01-D	36/89	0.15-13.9	61.1		N			N	NTX
	7440-62-2	**Vanadium**	11.8	752 J	mg/kg	03TP27-0304-01	115/115	N/A	752		39 N			**Y**	**ASL**
	7440-66-6	**Zinc**	10.6	13700 J	mg/kg	03TP27-0304-01	115/115	N/A	13700		2300 N			**Y**	**ASL**
	72-54-8	**4,4'-DDD**	0.83 J	72000	ug/kg	03TP06-0607-04-20070501	30/114	2-190	72000		2000 C			**Y**	**ASL**
	72-55-9	**4,4'-DDE**	0.39 J	8700	ug/kg	03TP06-0607-04-20070501	30/107	2-190	8700		1400 C			**Y**	**ASL**
	50-29-3	**4,4'-DDT**	0.39 J	270000	ug/kg	03TP06-0607-04-20070501	37/114	2-190	270000		1700 C			**Y**	**ASL**
	309-00-2	Aldrin	0.27 J	9.7	ug/kg	03TP06-0809-03-20070501	17/114	2-2500	9.7		29 C			N	BSL
	319-84-6	Alpha-BHC	0.7 J	16	ug/kg	03TP25-0607-02	7/114	2-2500	16		77 C			N	BSL
	5103-71-9	Alpha-Chlordane	0.26 J	330 J	ug/kg	03TP14-0203-01-20070504	23/106	2-2500	330		1600 C			N	BSL
	53469-21-9	Aroclor-1242	37	110	ug/kg	03TP12-0405-01-20070504	2/115	19-940	110		220 C			N	BSL
	12672-29-6	**Aroclor-1248**	92	560	ug/kg	03TP26-0506-01	2/115	19-940	560		220 C			**Y**	**ASL**
	11097-69-1	**Aroclor-1254**	13 J	4000	ug/kg	03TP24-0304-01	9/115	19-1900	4000		110 N			**Y**	**ASL**
	11096-82-5	**Aroclor-1260**	12 J	600	ug/kg	03TP06-0809-03-20070501	11/115	19-1900	600		220 C			**Y**	**ASL**
	319-85-7	Beta-BHC	0.8 J	14 J	ug/kg	03TP25-0607-02-D	4/111	1-2500	14		270 C			N	BSL
	319-86-8	Delta-BHC	0.35 J	2.7	ug/kg	03TP12-0405-01-20070504	7/115	2-2500	2.7		C			N	NTX
	60-57-1	**Dieldrin**	0.24 J	10000	ug/kg	03TP06-0607-04-20070501	88/114	2-93	10000		30 C			**Y**	**ASL**
	959-98-8	Endosulfan I	0.25 J	580 J	ug/kg	03TP06-0607-04-20070501	14/115	2-94	580		37000 N			N	BSL
	33213-65-9	Endosulfan II	0.49 J	16 J	ug/kg	03TP06-0809-03-20070501	9/114	2-2500	16		37000 N			N	BSL
	1031-07-8	Endosulfan Sulfate	0.61 J	19	ug/kg	03TP06-0809-03-20070501	9/114	2-2500	19		37000 N			N	BSL
	72-20-8	Endrin	0.61 J	25	ug/kg	03TP02-1_19910910	9/114	2-2500	25		1800 N			N	BSL

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Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
	007421-93-4	Endrin Aldehyde	0.52 J	25 J	ug/kg	03TP19-0607-01	21/73	2-2500	25		1800 N			N	BSL
	53494-70-5	Endrin Ketone	0.29 J	24 J	ug/kg	03TP27-0304-01	13/114	2-2500	24		1800 N			N	BSL
	58-89-9	Gamma-BHC (Lindane)	0.69 J	6.9	ug/kg	03TP12-0304-02-20070504	11/115	2-2500	6.9		520 C			N	BSL
	5103-74-2	Gamma-Chlordane	0.36 J	620 J	ug/kg	03TP06-0607-04-20070501	26/108	2-940	620		1600 C			N	BSL
	76-44-8	Heptachlor	0.52 J	8 J	ug/kg	03TP06-0708-02-20070501	10/112	2-2500	8		110 C			N	BSL
	1024-57-3	**Heptachlor Epoxide**	0.55 J	390 J	ug/kg	03TP06-0607-04-20070501	24/114	2-94	390		53 C			**Y**	**ASL**
	72-43-5	Methoxychlor	1 J	130 J	ug/kg	03TP19-0607-01	12/115	3.8-4800	130		31000 N			N	BSL
	95-94-3	1,2,4,5-Tetrachlorobenzene	36 J	36 J	ug/kg	03TP19-0607-01	1/63	190-20000	36		1800 N			N	BSL
	95-50-1	1,2-Dichlorobenzene	39 J	3600	ug/kg	03TP04-2_19910911	9/115	4.7-19000	3600		190000 N			N	BSL
	106-46-7	1,4-Dichlorobenzene	39 J	880 J	ug/kg	03TP04-2_19910911	13/115	4.7-19000	880		2400 C			N	BSL
	90-12-0	1-Methylnaphthalene	0.74 J	560	ug/kg	03TP25-0607-02-D	14/21	9.8-14000	560		22000 C			N	BSL
	91-57-6	2-Methylnaphthalene	0.93 J	9500 J	ug/kg	03SB06_19910906	30/110	9.9-20000	9500		31000 N			N	BSL
	95-48-7	2-Methylphenol	190 J	290 J	ug/kg	03TP04-3_19910911	2/115	200-20000	290		310000 N			N	BSL
	83-32-9	Acenaphthene	0.8 J	33000	ug/kg	03SB06_19910906	30/111	9.9-2300	33000		340000 N			N	BSL
	208-96-8	Acenaphthylene	0.64 J	280 J	ug/kg	03TP04-3_19910911	34/110	9.9-20000	280		230000 N			N	BSL
	120-12-7	Anthracene	0.82 J	66000	ug/kg	03SB06_19910906	44/110	9.9-2300	66000		1700000 N			N	BSL
	56-55-3	**Benz(a)anthracene**	4.2 J	65000	ug/kg	03SB06_19910906	72/111	9.9-2300	65000		150 C			**Y**	**ASL**
	100-52-7	Benzaldehyde	29 J	83 J	ug/kg	03TP27-0304-01	9/63	200-20000	83		780000 N			N	BSL
	50-32-8	**Benzo(a)pyrene**	5.1 J	48000	ug/kg	03SB06_19910906	73/112	9.9-2300	48000		15 C			**Y**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	7.2 J	58000	ug/kg	03SB06_19910906	77/113	9.9-2300	58000		150 C			**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	3.7 J	13000 J	ug/kg	03SB06_19910906	62/113	9.9-2300	13000		170000 N			N	BSL
	207-08-9	**Benzo(k)fluoranthene**	5 J	31000	ug/kg	03SB06_19910906	66/111	9.9-2300	31000		1500 C			**Y**	**ASL**
	117-81-7	Bis(2-ethylhexyl) Phthalate	38 J	12000	ug/kg	03TP25-0506-01	42/103	200-20000	12000		35000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	330 J	330 J	ug/kg	03SS09_19970408	1/115	200-20000	330		260000 C			N	BSL
	86-74-8	Carbazole	79 J	11000	ug/kg	03TP20-0708-01	5/75	200-2300	11000		C			N	NTX
	218-01-9	**Chrysene**	6.6 J	52000	ug/kg	03SB06_19910906	81/113	9.9-2300	52000		15000 C			**Y**	**ASL**
	84-74-2	Di-n-butyl Phthalate	60 J	370 J	ug/kg	03SS07_19910905	3/101	200-20000	370		610000 N			N	BSL
	117-84-0	Di-n-octyl Phthalate	220 J	220 J	ug/kg	03TP06-0809-03-20070501	1/115	200-20000	220		N			N	NTX
	53-70-3	**Dibenz(a,h)anthracene**	1.3 J	4800 J	ug/kg	03SB06_19910906	35/107	9.9-20000	4800		15 C			**Y**	**ASL**
	132-64-9	Dibenzofuran	73 J	29000	ug/kg	03SB06_19910906	7/115	200-20000	29000		N			N	NTX
	206-44-0	Fluoranthene	12	150000	ug/kg	03SB06_19910906	85/113	9.9-2300	150000		230000 N			N	BSL
	86-73-7	Fluorene	0.73 J	41000	ug/kg	03SB06_19910906	34/111	9.9-2300	41000		230000 N			N	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	4.4 J	19000	ug/kg	03SB06_19910906	62/113	9.9-2300	19000		150 C			**Y**	**ASL**
	91-20-3	**Naphthalene**	3.1 J	14000	ug/kg	03TP20-0708-01	15/89	200-20000	14000		3600 C			**Y**	**ASL**
	85-01-8	**Phenanthrene**	5.6 J	210000	ug/kg	03SB06_19910906	82/111	9.9-2300	210000		170000 N			**Y**	**ASL**
	129-00-0	Pyrene	11	140000	ug/kg	03SB06_19910906	86/113	9.9-2300	140000		170000 N			N	BSL
	87-61-6	1,2,3-Trichlorobenzene	71 J	5700	ug/kg	03TP25-0506-01	3/62	4.7-320	5700		49000 C			N	NTX
	120-82-1	1,2,4-Trichlorobenzene	150 J	310 J	ug/kg	03TP25-0607-02-D	3/115	4.7-19000	310		6200 N			N	BSL
	78-93-3	2-Butanone	4 J	24	ug/kg	03TP19-0607-01	19/100	4.9-14000	24		2800000 N			N	BSL
	67-64-1	Acetone	6.1 J	540 J	ug/kg	03TP25-0607-02	36/80	11-33	540		6100000 N			N	BSL
	71-43-2	Benzene	1.4 J	78 J	ug/kg	03TP25-0607-02	10/106	4.7-5700	78		1100 C			N	BSL
	74-83-9	Bromomethane	8.2	8.2	ug/kg	03TP19-0607-01	1/106	4.7-5700	8.2		730 N			N	BSL

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Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
	75-15-0	Carbon Disulfide	2.9 J	2.9 J	ug/kg	03TP24-0304-01	1/106	4.7-5700	2.9		82000 N			N	BSL
	108-90-7	Chlorobenzene	2 J	2 J	ug/kg	03SB02_19910906	1/106	4.7-5700	2		29000 N			N	BSL
	74-87-3	Chloromethane	2.1 J	16	ug/kg	03TP26-0506-01	4/106	4.7-5700	16		12000 N			N	BSL
	75-71-8	Dichlorodifluoromethane	4.8 J	4.8 J	ug/kg	03TP24-0304-01	1/63	4.7-5700	4.8		18000 N			N	BSL
	100-41-4	**Ethylbenzene**	380	7000	ug/kg	03TP25-0506-01	3/106	4.7-30	7000		5400 C			**Y**	**ASL**
	179601-23-1	M,p-xylene	960	18000	ug/kg	03TP25-0506-01	3/63	9.5-21	18000		63000 N			N	BSL
	79-20-9	Methyl Acetate	5.5 J	450 J	ug/kg	03TP25-0607-02-D	2/63	4.7-5700	450		7800000 N			N	BSL
	108-87-2	Methylcyclohexane	3500 J	3500 J	ug/kg	03TP25-0506-01	1/63	4.7-320	3500		N			N	NTX
	95-47-6	O-xylene	260 J	4000	ug/kg	03TP20-0708-01	3/63	4.7-10	4000		380000 N			N	BSL
	100-42-5	Styrene	3300	3300	ug/kg	03TP20-0708-01	1/106	4.7-5700	3300		630000 N			N	BSL
	127-18-4	Tetrachloroethene	4.8 J	210 J	ug/kg	03TP25-0607-02	4/106	4.7-5700	210		550 C			N	BSL
	108-88-3	Toluene	1.7 J	150000	ug/kg	03TP25-0506-01	14/99	4.7-30	150000		500000 N			N	BSL
	79-01-6	Trichloroethene	2 J	2.7 J	ug/kg	03TP24-0304-01	2/106	4.7-5700	2.7		2800 C			N	BSL
	1330-20-7	Xylenes (Total)	1200	20000	ug/kg	03TP25-0506-01	3/80	4.7-30	20000		63000 N			N	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.

2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.

3 - The maximum detected concentration is used for screening purposes.

4 - A background comparison analysis was performed but in this table COPCs were selected without elimination of metals statistically not above background, a separate table is presented to show the effects of background for on eliminating COPCs.

5 - The EPA ORNL risk-based tap water COPC screening level for residential use is presented. The noncarcinogenic values (annotated "N") are divided by 10 to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (USEPA Region 3, November 2010).

6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

7 - The RBC for hexavalent chromium was utilized because the form of chromium in soil is not known.

8 - The RBC for methyl mercury was used because the form of mercury in soil is not known.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(9) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

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Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
Landfill Area Soil Samples:															
03-SS-17		03SB07		03SS07 (sampled 9/5/1991)		03TP04-4		03TP14-0203-01			03SS32				
03-SS-18		03SB08		03SS07 (sampled 4/8/1997)		03TP05-0506-01		03TP15-0405-01			03SS33				
03-SS-19		03SB09		03SS08 (sampled 9/5/1991)		03TP05-0910-02		03TP16-0102-01			03SS34				
03-SS-20		03SB10		03SS08 (sampled 4/8/1997)		03TP05-0910-02-D		03TP16-0102-01-D			03SS35				
03-SS-21		03SB11		03SS09 (sampled 9/5/1991)		03TP06-0304-01		03TP17-0304-01			03SS35-D				
03-SS-21-D		03SB12		03SS09 (sampled 4/8/1997)		03TP06-0607-04		03TP18-0203-01			03SS36				
03-SS-22		03SB13		03SS10 (sampled 9/5/1991)		03TP06-0708-02		03TP18-0203-01-D			03SS37				
03-SS-23		03SB14		03SS10 (sampled 4/8/1997)		03TP06-0809-03		03TP19-0304-02			03SS38				
03-SS-24		03SB14-D		03SS11 (sampled 9/5/1991)		03TP06-0809-03-D		03TP19-0607-01			03SS39				
03-SS-24-D		03SB15		03SS11 (sampled 4/8/1997)		03TP07-0203-02		03TP20-0708-01			03SS40				
03-SS-25		03SB16		03SS12 (sampled 9/5/1991)		03TP07-0304-01		03TP23-0304-01			03SS41				
03-SS-26		03SS01 (sampled 9/5/1991)		03SS12 (sampled 4/8/1997)		03TP08-0203-03		03TP24-0304-01			03SS41-D				
03-SS-27		03SS01 (sampled 4/8/1997)		03SS13		03TP08-0304-02		03TP25-0506-01			03SS42				
03-SS-28		03SS02 (sampled 9/5/1991)		03SS14		03TP08-0405-01		03TP25-0607-02							
03SB01-0204		03SS02 (sampled 4/8/1997)		03SS15		03TP09-0506-01		03TP25-0607-02-D							
03SB01-0608		03SS03 (sampled 9/5/1991)		03SS16		03TP09-0506-02		03TP26-0506-01							
03SB01-1416		03SS03 (sampled 4/8/1997)		03SS16-D		03TP10-0304-02		03TP27-0304-01							
03SB01		03SS04 (sampled 9/5/1991)		03TP01		03TP10-0405-01		03TP27-0304-01-D							
03SB02		03SS04 (sampled 4/8/1997)		03TP02-1		03TP11-0304-01		03TP27-0304-02							
03SB03		03SS05 (sampled 9/5/1991)		03TP02-2		03TP11-0405-02		03TP28-0203-01							
03SB04		03SS05 (sampled 4/8/1997)		03TP03		03TP12-0102-03		03TP29-0304-01							
03SB05		03SS06 (sampled 9/5/1991)		03TP04-1		03TP12-0304-02		03TP30-0506-01							
03SB06		03SS06 (sampled 4/8/1997)		03TP04-2		03TP12-0405-01		03TP30-0506-01-D							
03SB06-D		03SS06-D (sampled 4/8/1997)		03TP04-3		03TP13-0203-01		03SS31							

TABLE 2.09
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 LANDFILL AREA SOIL
WITH METALS ELIMINATED THAT ARE WITHIN THE RANGE OF BACKGROUNI
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
Site 3 Landfill Area Soil	1746-01-6	**Total 2,3,7,8-TCDD Equiv.**	0.0045	0.34	ug/kg	03TP06-0809-03-20070501-D	5/5	N/A	0.34		0.0045 C			**Y**	**ASL**
	7429-90-5	**Aluminum**	8200	74700	mg/kg	03TP19-0304-02	115/115	N/A	74700		7700 N			**Y**	**ASL**
	7440-36-0	**Antimony**	0.22 L	281 L	mg/kg	03TP27-0304-01-D	41/90	0.2-10.3	281		3.1 N			**Y**	**ASL**
	7440-38-2	Arsenic	0.37 J	49.9 J	mg/kg	03TP27-0304-01	108/108	N/A	49.9		0.39 C			N	BKG
	7440-39-3	Barium	45.2	859	mg/kg	03TP19-0304-02	115/115	N/A	859		1500 N			N	BSL
	7440-41-7	Beryllium	0.61	2 K	mg/kg	03-SS-23	79/79	N/A	2		16 N			N	BSL
	7440-43-9	**Cadmium**	0.22 J	300	mg/kg	03TP19-0607-01	49/90	0.03-1.4	300		7 N			**Y**	**ASL**
	7440-70-2	Calcium	253	86400	mg/kg	03SB06_19910906	110/110	N/A	86400		N			N	NUT
	7440-47-3	**Chromium**	4.2 K	348 J	mg/kg	03TP30-0506-01	114/115	17-17	348		0.29 C			**Y**	**ASL**
	7440-48-4	**Cobalt**	2.5	121 J	mg/kg	03TP27-0304-01-D	115/115	N/A	121		2.3 N			**Y**	**ASL**
	7440-50-8	**Copper**	7.1	9660	mg/kg	03TP25-0607-02-D	115/115	N/A	9660		310 N			**Y**	**ASL**
	57-12-5	Cyanide	0.11	4.6	mg/kg	03TP06-0809-03-20070501	29/115	0.09-2.9	4.6		160 N			N	BSL
	7439-89-6	**Iron**	9570	236000 J	mg/kg	03TP27-0304-01-D	115/115	N/A	236000		5500 N			**Y**	**ASL**
	7439-92-1	**Lead**	2.2	6480 J	mg/kg	03TP05-0910-02-20070430-D	115/115	N/A	6480		400 C			**Y**	**ASL**
	7439-95-4	Magnesium	408	50200	mg/kg	03SB06_19910906	115/115	N/A	50200		N			N	NUT
	7439-96-5	**Manganese**	41.6	20000	mg/kg	03TP10-0405-01-20070503	115/115	N/A	20000		180 N			**Y**	**ASL**
	7439-97-6	**Mercury**	0.021 J	7.1	mg/kg	03TP20-0708-01	68/115	0.017-0.14	7.1		0.78 N			**Y**	**ASL**
	7440-02-0	**Nickel**	5.8	296 K	mg/kg	03TP05-0506-01-20070430	115/115	N/A	296		150 N			**Y**	**ASL**
	7440-09-7	Potassium	168	3010	mg/kg	03TP01_19910909	108/111	390-522	3010		N			N	NUT
	7782-49-2	Selenium	0.36 L	0.55 L	mg/kg	03TP08-0203-03-20070502	2/60	0.3-8	0.55		39 N			N	BSL
	7440-22-4	**Silver**	0.31	233	mg/kg	03TP06-0607-04-20070501	34/110	0.035-1.6	233		39 N			**Y**	**ASL**
	7440-23-5	Sodium	19.1 L	1830	mg/kg	03TP27-0304-01	54/87	18.8-1090	1830		N			N	NUT
	7440-28-0	Thallium	0.26 L	61.1 J	mg/kg	03TP27-0304-01-D	36/89	0.15-13.9	61.1		N			N	NTX
	7440-62-2	**Vanadium**	11.8	752 J	mg/kg	03TP27-0304-01	115/115	N/A	752		39 N			**Y**	**ASL**
	7440-66-6	**Zinc**	10.6	13700 J	mg/kg	03TP27-0304-01	115/115	N/A	13700		2300 N			**Y**	**ASL**
	72-54-8	**4,4'-DDD**	0.83 J	72000	ug/kg	03TP06-0607-04-20070501	30/114	2-190	72000		2000 C			**Y**	**ASL**
	72-55-9	**4,4'-DDE**	0.39 J	8700	ug/kg	03TP06-0607-04-20070501	30/107	2-190	8700		1400 C			**Y**	**ASL**
	50-29-3	**4,4'-DDT**	0.39 J	270000	ug/kg	03TP06-0607-04-20070501	37/114	2-190	270000		1700 C			**Y**	**ASL**
	309-00-2	Aldrin	0.27 J	9.7	ug/kg	03TP06-0809-03-20070501	17/114	2-2500	9.7		29 C			N	BSL
	319-84-6	Alpha-BHC	0.7 J	16	ug/kg	03TP25-0607-02	7/114	2-2500	16		77 C			N	BSL
	5103-71-9	Alpha-Chlordane	0.26 J	330 J	ug/kg	03TP14-0203-01-20070504	23/106	2-2500	330		1600 C			N	BSL
	53469-21-9	Aroclor-1242	37	110	ug/kg	03TP12-0405-01-20070504	2/115	19-940	110		220 C			N	BSL
	12672-29-6	**Aroclor-1248**	92	560	ug/kg	03TP26-0506-01	2/115	19-940	560		220 C			**Y**	**ASL**
	11097-69-1	**Aroclor-1254**	13 J	4000	ug/kg	03TP24-0304-01	9/115	19-1900	4000		110 N			**Y**	**ASL**
	11096-82-5	**Aroclor-1260**	12 J	600	ug/kg	03TP06-0809-03-20070501	11/115	19-1900	600		220 C			**Y**	**ASL**
	319-85-7	Beta-BHC	0.8 J	14 J	ug/kg	03TP25-0607-02-D	4/111	1-2500	14		270 C			N	BSL
	319-86-8	Delta-BHC	0.35 J	2.7	ug/kg	03TP12-0405-01-20070504	7/115	2-2500	2.7		C			N	NTX
	60-57-1	**Dieldrin**	0.24 J	10000	ug/kg	03TP06-0607-04-20070501	88/114	2-93	10000		30 C			**Y**	**ASL**
	959-98-8	Endosulfan I	0.25 J	580 J	ug/kg	03TP06-0607-04-20070501	14/115	2-94	580		37000 N			N	BSL
	33213-65-9	Endosulfan II	0.49 J	16 J	ug/kg	03TP06-0809-03-20070501	9/114	2-2500	16		37000 N			N	BSL
	1031-07-8	Endosulfan Sulfate	0.61 J	19	ug/kg	03TP06-0809-03-20070501	9/114	2-2500	19		37000 N			N	BSL
	72-20-8	Endrin	0.61 J	25	ug/kg	03TP02-1_19910910	9/114	2-2500	25		1800 N			N	BSL
	007421-93-4	Endrin Aldehyde	0.52 J	25 J	ug/kg	03TP19-0607-01	21/73	2-2500	25		1800 N			N	BSL
	53494-70-5	Endrin Ketone	0.29 J	24 J	ug/kg	03TP27-0304-01	13/114	2-2500	24		1800 N			N	BSL
	58-89-9	Gamma-BHC (Lindane)	0.69 J	6.9	ug/kg	03TP12-0304-02-20070504	11/115	2-2500	6.9		520 C			N	BSL
	5103-74-2	Gamma-Chlordane	0.36 J	620 J	ug/kg	03TP06-0607-04-20070501	26/108	2-940	620		1600 C			N	BSL
	76-44-8	Heptachlor	0.52 J	8 J	ug/kg	03TP06-0708-02-20070501	10/112	2-2500	8		110 C			N	BSL
	1024-57-3	**Heptachlor Epoxide**	0.55 J	390 J	ug/kg	03TP06-0607-04-20070501	24/114	2-94	390		53 C			**Y**	**ASL**

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NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
	72-43-5	Methoxychlor	1 J	130 J	ug/kg	03TP19-0607-01	12/115	3.8-4800	130		31000 N			N	BSL
	95-94-3	1,2,4,5-Tetrachlorobenzene	36 J	36 J	ug/kg	03TP19-0607-01	1/63	190-20000	36		1800 N			N	BSL
	95-50-1	1,2-Dichlorobenzene	39 J	3600	ug/kg	03TP04-2_19910911	9/115	4.7-19000	3600		190000 N			N	BSL
	106-46-7	1,4-Dichlorobenzene	39 J	880 J	ug/kg	03TP04-2_19910911	13/115	4.7-19000	880		2400 C			N	BSL
	90-12-0	1-Methylnaphthalene	0.74 J	560	ug/kg	03TP25-0607-02-D	14/21	9.8-14000	560		22000 C			N	BSL
	91-57-6	2-Methylnaphthalene	0.93 J	9500 J	ug/kg	03SB06_19910906	30/110	9.9-20000	9500		31000 N			N	BSL
	95-48-7	2-Methylphenol	190 J	290 J	ug/kg	03TP04-3_19910911	2/115	200-20000	290		310000 N			N	BSL
	83-32-9	Acenaphthene	0.8 J	33000	ug/kg	03SB06_19910906	30/111	9.9-2300	33000		340000 N			N	BSL
	208-96-8	Acenaphthylene	0.64 J	280 J	ug/kg	03TP04-3_19910911	34/110	9.9-20000	280		230000 N			N	BSL
	120-12-7	Anthracene	0.82 J	66000	ug/kg	03SB06_19910906	44/110	9.9-2300	66000		1700000 N			N	BSL
	56-55-3	**Benz(a)anthracene**	4.2 J	65000	ug/kg	03SB06_19910906	72/111	9.9-2300	65000		150 C			**Y**	**ASL**
	100-52-7	Benzaldehyde	29 J	83 J	ug/kg	03TP27-0304-01	9/63	200-20000	83		780000 N			N	BSL
	50-32-8	**Benzo(a)pyrene**	5.1 J	48000	ug/kg	03SB06_19910906	73/112	9.9-2300	48000		15 C			**Y**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	7.2 J	58000	ug/kg	03SB06_19910906	77/113	9.9-2300	58000		150 C			**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	3.7 J	13000 J	ug/kg	03SB06_19910906	62/113	9.9-2300	13000		170000 N			N	BSL
	207-08-9	**Benzo(k)fluoranthene**	5 J	31000	ug/kg	03SB06_19910906	66/111	9.9-2300	31000		1500 C			**Y**	**ASL**
	117-81-7	Bis(2-ethylhexyl) Phthalate	38 J	12000	ug/kg	03TP25-0506-01	42/103	200-20000	12000		35000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	330 J	330 J	ug/kg	03SS09_19970408	1/115	200-20000	330		260000 C			N	BSL
	86-74-8	Carbazole	79 J	11000	ug/kg	03TP20-0708-01	5/75	200-2300	11000		C			N	NTX
	218-01-9	**Chrysene**	6.6 J	52000	ug/kg	03SB06_19910906	81/113	9.9-2300	52000		15000 C			**Y**	**ASL**
	84-74-2	Di-n-butyl Phthalate	60 J	370 J	ug/kg	03SS07_19910905	3/101	200-20000	370		610000 N			N	BSL
	117-84-0	Di-n-octyl Phthalate	220 J	220 J	ug/kg	03TP06-0809-03-20070501	1/115	200-20000	220		N			N	NTX
	53-70-3	**Dibenz(a,h)anthracene**	1.3 J	4800 J	ug/kg	03SB06_19910906	35/107	9.9-20000	4800		15 C			**Y**	**ASL**
	132-64-9	Dibenzofuran	73 J	29000	ug/kg	03SB06_19910906	7/115	200-20000	29000		N			N	NTX
	206-44-0	Fluoranthene	12	150000	ug/kg	03SB06_19910906	85/113	9.9-2300	150000		230000 N			N	BSL
	86-73-7	Fluorene	0.73 J	41000	ug/kg	03SB06_19910906	34/111	9.9-2300	41000		230000 N			N	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	4.4 J	19000	ug/kg	03SB06_19910906	62/113	9.9-2300	19000		150 C			**Y**	**ASL**
	91-20-3	**Naphthalene**	3.1 J	14000	ug/kg	03TP20-0708-01	15/89	200-20000	14000		3600 C			**Y**	**ASL**
	85-01-8	**Phenanthrene**	5.6 J	210000	ug/kg	03SB06_19910906	82/111	9.9-2300	210000		170000 N			**Y**	**ASL**
	129-00-0	Pyrene	11	140000	ug/kg	03SB06_19910906	86/113	9.9-2300	140000		170000 N			N	BSL
	87-61-6	1,2,3-Trichlorobenzene	71 J	5700	ug/kg	03TP25-0506-01	3/62	4.7-320	5700		49000 C			N	NTX
	120-82-1	1,2,4-Trichlorobenzene	150 J	310 J	ug/kg	03TP25-0607-02-D	3/115	4.7-19000	310		6200 N			N	BSL
	78-93-3	2-Butanone	4 J	24	ug/kg	03TP19-0607-01	19/100	4.9-14000	24		2800000 N			N	BSL
	67-64-1	Acetone	6.1 J	540 J	ug/kg	03TP25-0607-02	36/80	11-33	540		6100000 N			N	BSL
	71-43-2	Benzene	1.4 J	78 J	ug/kg	03TP25-0607-02	10/106	4.7-5700	78		1100 C			N	BSL
	74-83-9	Bromomethane	8.2	8.2	ug/kg	03TP19-0607-01	1/106	4.7-5700	8.2		730 N			N	BSL
	75-15-0	Carbon Disulfide	2.9 J	2.9 J	ug/kg	03TP24-0304-01	1/106	4.7-5700	2.9		82000 N			N	BSL
	108-90-7	Chlorobenzene	2 J	2 J	ug/kg	03SB02_19910906	1/106	4.7-5700	2		29000 N			N	BSL
	74-87-3	Chloromethane	2.1 J	16	ug/kg	03TP26-0506-01	4/106	4.7-5700	16		12000 N			N	BSL
	75-71-8	Dichlorodifluoromethane	4.8 J	4.8 J	ug/kg	03TP24-0304-01	1/63	4.7-5700	4.8		18000 N			N	BSL
	100-41-4	**Ethylbenzene**	380	7000	ug/kg	03TP25-0506-01	3/106	4.7-30	7000		5400 C			**Y**	**ASL**
	179601-23-1	M,p-xylene	960	18000	ug/kg	03TP25-0506-01	3/63	9.5-21	18000		63000 N			N	BSL
	79-20-9	Methyl Acetate	5.5 J	450 J	ug/kg	03TP25-0607-02-D	2/63	4.7-5700	450		7800000 N			N	BSL
	108-87-2	Methylcyclohexane	3500 J	3500 J	ug/kg	03TP25-0506-01	1/63	4.7-320	3500		N			N	NTX
	95-47-6	O-xylene	260 J	4000	ug/kg	03TP20-0708-01	3/63	4.7-10	4000		380000 N			N	BSL
	100-42-5	Styrene	3300	3300	ug/kg	03TP20-0708-01	1/106	4.7-5700	3300		630000 N			N	BSL
	127-18-4	Tetrachloroethene	4.8 J	210 J	ug/kg	03TP25-0607-02	4/106	4.7-5700	210		550 C			N	BSL

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NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
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Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (9)
	108-88-3	Toluene	1.7 J	150000	ug/kg	03TP25-0506-01	14/99	4.7-30	150000		500000 N			N	BSL
	79-01-6	Trichloroethene	2 J	2.7 J	ug/kg	03TP24-0304-01	2/106	4.7-5700	2.7		2800 C			N	BSL
	1330-20-7	Xylenes (Total)	1200	20000	ug/kg	03TP25-0506-01	3/80	4.7-30	20000		63000 N			N	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was performed but in this table COPCs were selected without elimination of metals statistically not above background, a separate table is presented to show the effects of background for on eliminating COPCs.
5 - The EPA ORNL risk-based tap water COPC screening level for residential use is presented. The noncarcinogenic values (annotated "N") are divided by 10 to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (USEPA Region 3, November 2010).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - The RBC for hexavalent chromium was utilized because the form of chromium in soil is not known.
8 - The RBC for methyl mercury was used because the form of mercury in soil is not known.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(9) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route
For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

Landfill Area Soil Samples:

03-SS-17	03SB07	03SS07 (sampled 9/5/1991)	03TP04-4	03TP14-0203-01	03SS32
03-SS-18	03SB08	03SS07 (sampled 4/8/1997)	03TP05-0506-01	03TP15-0405-01	03SS33
03-SS-19	03SB09	03SS08 (sampled 9/5/1991)	03TP05-0910-02	03TP16-0102-01	03SS34
03-SS-20	03SB10	03SS08 (sampled 4/8/1997)	03TP05-0910-02-D	03TP16-0102-01-D	03SS35
03-SS-21	03SB11	03SS09 (sampled 9/5/1991)	03TP06-0304-01	03TP17-0304-01	03SS35-D
03-SS-21-D	03SB12	03SS09 (sampled 4/8/1997)	03TP06-0607-04	03TP18-0203-01	03SS36
03-SS-22	03SB13	03SS10 (sampled 9/5/1991)	03TP06-0708-02	03TP18-0203-01-D	03SS37
03-SS-23	03SB14	03SS10 (sampled 4/8/1997)	03TP06-0809-03	03TP19-0304-02	03SS38
03-SS-24	03SB14-D	03SS11 (sampled 9/5/1991)	03TP06-0809-03-D	03TP19-0607-01	03SS39
03-SS-24-D	03SB15	03SS11 (sampled 4/8/1997)	03TP07-0203-02	03TP20-0708-01	03SS40
03-SS-25	03SB16	03SS12 (sampled 9/5/1991)	03TP07-0304-01	03TP23-0304-01	03SS41
03-SS-26	03SS01 (sampled 9/5/1991)	03SS12 (sampled 4/8/1997)	03TP08-0203-03	03TP24-0304-01	03SS41-D
03-SS-27	03SS01 (sampled 4/8/1997)	03SS13	03TP08-0304-02	03TP25-0506-01	03SS42
03-SS-28	03SS02 (sampled 9/5/1991)	03SS14	03TP08-0405-01	03TP25-0607-02	
03SB01-0204	03SS02 (sampled 4/8/1997)	03SS15	03TP09-0506-01	03TP25-0607-02-D	
03SB01-0608	03SS03 (sampled 9/5/1991)	03SS16	03TP09-0506-02	03TP26-0506-01	
03SB01-1416	03SS03 (sampled 4/8/1997)	03SS16-D	03TP10-0304-02	03TP27-0304-01	
03SB01	03SS04 (sampled 9/5/1991)	03TP01	03TP10-0405-01	03TP27-0304-01-D	
03SB02	03SS04 (sampled 4/8/1997)	03TP02-1	03TP11-0304-01	03TP27-0304-02	
03SB03	03SS05 (sampled 9/5/1991)	03TP02-2	03TP11-0405-02	03TP28-0203-01	
03SB04	03SS05 (sampled 4/8/1997)	03TP03	03TP12-0102-03	03TP29-0304-01	
03SB05	03SS06 (sampled 9/5/1991)	03TP04-1	03TP12-0304-02	03TP30-0506-01	
03SB06	03SS06 (sampled 4/8/1997)	03TP04-2	03TP12-0405-01	03TP30-0506-01-D	
03SB06-D	03SS06-D (sampled 4/8/1997)	03TP04-3	03TP13-0203-01	03SS31	

TABLE 2.10
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (6)	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)
Site 3 Hangar Area Surface Soil Emissions to Ambient Air	91-57-6	2-Methylnaphthalene	18 J	18 J	ug/kg	03SB18-0002	1/1	N/A	18		N			N	NTX
	83-32-9	Acenaphthene	62 J	62 J	ug/kg	03SB18-0002	1/1	N/A	62		N			N	NTX
	208-96-8	Acenaphthylene	96 J	96 J	ug/kg	03SB18-0002	1/1	N/A	96		N			N	NTX
	120-12-7	Anthracene	260 J	260 J	ug/kg	03SB18-0002	1/1	N/A	260		N			N	NTX
	56-55-3	Benz(a)anthracene	780	780	ug/kg	03SB18-0002	1/1	N/A	780		12000000 C			N	BSL
	50-32-8	Benzo(a)pyrene	860	860	ug/kg	03SB18-0002	1/1	N/A	860		1200000 C			N	BSL
	205-99-2	Benzo(b)fluoranthene	1100	1100	ug/kg	03SB18-0002	1/1	N/A	1100		12000000 C			N	BSL
	191-24-2	Benzo(g,h,i)perylene	740	740	ug/kg	03SB18-0002	1/1	N/A	740		N			N	NTX
	207-08-9	Benzo(k)fluoranthene	410	410	ug/kg	03SB18-0002	1/1	N/A	410		12000000 C			N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	52 J	52 J	ug/kg	03SB18-0002	1/1	N/A	52		1400000000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	33 J	33 J	ug/kg	03SB18-0002	1/1	N/A	33		C			N	NTX
	86-74-8	Carbazole	120 J	120 J	ug/kg	03SB18-0002	1/1	N/A	120		C			N	NTX
	218-01-9	Chrysene	960	960	ug/kg	03SB18-0002	1/1	N/A	960		120000000 C			N	BSL
	53-70-3	Dibenz(a,h)anthracene	180 J	180 J	ug/kg	03SB18-0002	1/1	N/A	180		1100000 C			N	BSL
	132-64-9	Dibenzofuran	63 J	63 J	ug/kg	03SB18-0002	1/1	N/A	63		N			N	NTX
	206-44-0	Fluoranthene	2100	2100	ug/kg	03SB18-0002	1/1	N/A	2100		N			N	NTX
	86-73-7	Fluorene	110 J	110 J	ug/kg	03SB18-0002	1/1	N/A	110		N			N	NTX
	193-39-5	Indeno(1,2,3-cd)pyrene	680	680	ug/kg	03SB18-0002	1/1	N/A	680		12000000 C			N	BSL
	85-01-8	Phenanthrene	1400	1400	ug/kg	03SB18-0002	1/1	N/A	1400		N			N	NTX
	129-00-0	Pyrene	1500	1500	ug/kg	03SB18-0002	1/1	N/A	1500		N			N	NTX

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.

2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.

3 - The maximum detected concentration is used for screening purposes.

4 - A background comparison analysis was performed but does not affect organics, so background comparison was not involved in selecting or eliminating COPCs.

5 - The EPA soil to air screening level calculator for residential use was used. The noncarcinogenic values (annotated "N") are divided by 10. to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (URL: http://rais.ornl.gov/cgi-bin/epa/ssl1.cgi.).

6 - The soil to air screening levels are based upon the more conservative of either fugitive dust emissions or volatilization from soil.

7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Hangar Area Surface Soil Samples:

03SB18-0002

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(8) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 2.11
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 HANGAR AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (6)	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)
Site 3 Hangar Area Soil Emissions to Ambient Air	91-57-6	2-Methylnaphthalene	18 J	28 J	ug/kg	03SB19-0204	2/13	380-780	28		N			N	NTX
	83-32-9	Acenaphthene	62 J	230 J	ug/kg	03SB19-0204	3/13	380-440	230		N			N	NTX
	208-96-8	Acenaphthylene	96 J	120 J	ug/kg	03SB19-0408	3/13	380-440	120		N			N	NTX
	120-12-7	Anthracene	260 J	1800	ug/kg	03SB19-0204	3/13	380-440	1800		N			N	NTX
	56-55-3	Benz(a)anthracene	36 J	4200	ug/kg	03SB19-0204	4/13	380-440	4200		12000000 C			N	BSL
	50-32-8	Benzo(a)pyrene	40 J	3200	ug/kg	03SB19-0204	4/13	380-440	3200		1200000 C			N	BSL
	205-99-2	Benzo(b)fluoranthene	68 J	4200	ug/kg	03SB19-0204	4/13	380-440	4200		12000000 C			N	BSL
	191-24-2	Benzo(g,h,i)perylene	33 J	2100	ug/kg	03SB19-0204	4/13	380-440	2100		N			N	NTX
	207-08-9	Benzo(k)fluoranthene	17 J	1400	ug/kg	03SB19-0204	4/13	380-440	1400		12000000 C			N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	52 J	52 J	ug/kg	03SB18-0002	1/13	380-780	52		1400000000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	30 J	38 J	ug/kg	03SB17-0406	5/13	380-780	38		C			N	NTX
	86-74-8	Carbazole	120 J	340 J	ug/kg	03SB19-0204	3/13	380-440	340		C			N	NTX
	218-01-9	Chrysene	53 J	3400	ug/kg	03SB19-0204	4/13	380-440	3400		120000000 C			N	BSL
	53-70-3	Dibenz(a,h)anthracene	180 J	580 J	ug/kg	03SB19-0204	3/13	380-440	580		1100000 C			N	BSL
	132-64-9	Dibenzofuran	63 J	150 J	ug/kg	03SB19-0204	3/13	380-440	150		N			N	NTX
	206-44-0	Fluoranthene	91 J	6900 E	ug/kg	03SB19-0204	4/13	380-440	6900		N			N	NTX
	86-73-7	Fluorene	110 J	260 J	ug/kg	03SB19-0204	3/13	380-440	260		N			N	NTX
	193-39-5	Indeno(1,2,3-cd)pyrene	28 J	2000	ug/kg	03SB19-0204	4/13	380-440	2000		12000000 C			N	BSL
	85-01-8	Phenanthrene	40 J	4100	ug/kg	03SB19-0204	4/13	380-440	4100		N			N	NTX
	129-00-0	Pyrene	84 J	6600	ug/kg	03SB19-0204	4/13	380-440	6600		N			N	NTX

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was performed but does not affect organics,
so background comparison was not involved in selecting or eliminating COPCs.
5 - The EPA soil to air screening level calculator for residential use was used. The noncarcinogenic values (annotated "N") are divided by 10.
to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (URL: http://rais.ornl.gov/cgi-bin/epa/ssl1.cgi.).
6 - The soil to air screening levels are based upon the more conservative of either fugitive dust emissions or volatilization from soil.
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Hangar Area Soil Samples:

03SB17-0406	03SB20-0608	03SB25-0608
03SB17-0608	03SB22-0406	03SB25-0809.9
03SB18-0002	03SB22-0608	03SB26-0406
03SB19-0204	03SB23-0406	
03SB19-0408	03SB24-0406	

Definitions:

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N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
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J = Estimated Value

(8) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route
For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 2.12
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (6)	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)
Site 3 Landfill Area Surface Soil Emissions to Ambient Air	1746-01-6	Total 2,3,7,8-TCDD Equiv.	0.0045	0.0126	ug/kg	03SS04_19970408	2/2	N/A	0.0126		87 C			N	BSL
	7429-90-5	Aluminum	8200	24600	mg/kg	03SS41	68/68	N/A	24600		710000 N			N	BSL
	7440-36-0	Antimony	0.22 L	10.4	mg/kg	03SB01_19910906	21/51	0.2-10.1	10.4		28000 N			N	BSL
	7440-38-2	Arsenic	0.37 J	13	mg/kg	03SB10_19910906	61/61	N/A	13		770 C			N	BSL
	7440-39-3	Barium	47.6	246	mg/kg	03SS37	68/68	N/A	246		71000 N			N	BSL
	7440-41-7	Beryllium	0.62	2 K	mg/kg	03-SS-23	42/42	N/A	2		1400 C			N	BSL
	7440-43-9	Cadmium	0.22 J	18.4	mg/kg	03SS09_19970408	23/49	0.03-1.4	18.4		1400 N			N	BSL
	7440-70-2	Calcium	372	86400	mg/kg	03SB06_19910906	68/68	N/A	86400		N			N	NUT
	7440-47-3	**Chromium**	6.4	35.8	mg/kg	03SS35	68/68	N/A	35.8		16 C			**Y**	**ASL**
	7440-48-4	Cobalt	5.2	12.2	mg/kg	03SB15_19910906	68/68	N/A	12.2		370 C			N	BSL
	7440-50-8	Copper	9.9	182 K	mg/kg	03SS37	68/68	N/A	182		N			N	NTX
	57-12-5	Cyanide	0.11	2.3	mg/kg	03SS09_19970408	6/68	0.13-2.9	2.3		N			N	BSL
	7439-89-6	Iron	13800	70900 J	mg/kg	03SS35	68/68	N/A	70900		N			N	NTX
	7439-92-1	Lead	3.2	379 J	mg/kg	03SS35	68/68	N/A	379		C			N	NTX
	7439-95-4	Magnesium	553	50200	mg/kg	03SB06_19910906	68/68	N/A	50200		N			N	NUT
	7439-96-5	Manganese	318	1780	mg/kg	03SS11_19910905	68/68	N/A	1780		7100 N			N	BSL
	7439-97-6	Mercury	0.021 J	0.77	mg/kg	03-SS-23	29/68	0.09-0.14	0.77		N			N	NTX
	7440-02-0	Nickel	6.3	39	mg/kg	03SB06_19910906-D	68/68	N/A	39		13000 N			N	BSL
	7440-09-7	Potassium	245	2130	mg/kg	03SS11_19970408	66/68	390-416	2130		N			N	NUT
	7782-49-2	Selenium	0.36 L	0.36 L	mg/kg	03SS32	1/33	0.3-1.2	0.36		2800000 N			N	BSL
	7440-22-4	Silver	0.36 K	26.3 J	mg/kg	03SS35	12/66	0.035-1.6	26.3		N			N	NTX
	7440-23-5	Sodium	26.2 L	884	mg/kg	03SB12_19910906	37/58	95.2-1010	884		N			N	NUT
	7440-28-0	Thallium	0.26 L	1.8 J	mg/kg	03-SS-20	24/61	0.15-0.73	1.8		N			N	NTX
	7440-62-2	Vanadium	16.5	45.7	mg/kg	03-SS-25	68/68	N/A	45.7		N			N	NTX
	7440-66-6	Zinc	16.9	466	mg/kg	03-SS-23	68/68	N/A	466		N			N	NTX
	72-54-8	4,4'-DDD	1.2 J	45	ug/kg	03-SS-18	13/68	2-190	45		48000000 C			N	BSL
	72-55-9	4,4'-DDE	0.57 J	210	ug/kg	03SS35	17/68	2-190	210		34000000 C			N	BSL
	50-29-3	4,4'-DDT	1.1 J	450	ug/kg	03SS35	17/67	2-190	450		34000000 C			N	BSL
	309-00-2	Aldrin	0.27 J	1.6 J	ug/kg	03SS34	5/68	2-94	1.6		680000 C			N	BSL
	319-84-6	Alpha-BHC	0.86 J	5.6	ug/kg	03SS38	3/68	2-94	5.6		1800000 C			N	BSL
	5103-71-9	Alpha-Chlordane	0.53 J	23 J	ug/kg	03TP12-0102-03-20070504	9/61	2-940	23		33000000 C			N	BSL
	11097-69-1	Aroclor-1254	13 J	84 J	ug/kg	03SS09_19970408	3/68	19-1900	84		5800000 C			N	BSL
	11096-82-5	Aroclor-1260	12 J	150 J	ug/kg	03SS35-D	3/68	19-1900	150		5800000 C			N	BSL
	319-85-7	Beta-BHC	0.8 J	0.98 J	ug/kg	03-SS-24	2/66	1-94	0.98		6200000 C			N	BSL
	60-57-1	Dieldrin	1.6 J	620 J	ug/kg	03SS12_19970408	59/67	3.9-43	620		720000 C			N	BSL
	959-98-8	Endosulfan I	0.25 J	30	ug/kg	03SB13_19910906	6/68	2-94	30		N			N	NTX
	33213-65-9	Endosulfan II	0.49 J	16 J	ug/kg	03SS35-D	5/68	2-190	16		N			N	NTX
	1031-07-8	Endosulfan Sulfate	1.3 J	3.2 J	ug/kg	03SS34	2/68	2-190	3.2		N			N	NTX
	72-20-8	Endrin	0.61 J	16 J	ug/kg	03SS35-D	2/67	2-190	16		N			N	NTX
	007421-93-4	Endrin Aldehyde	0.61 J	8 J	ug/kg	03SS32	11/38	2-49	8		N			N	NTX
	53494-70-5	Endrin Ketone	0.29 J	9.6 J	ug/kg	03SS38	5/68	2-190	9.6		N			N	NTX

TABLE 2.12
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (6)	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)
	58-89-9	Gamma-BHC (Lindane)	1.1 J	1.1 J	ug/kg	03TP12-0102-03-20070504	1/68	2-94	1.1		11000000 C			N	BSL
	5103-74-2	Gamma-Chlordane	0.58 J	33 J	ug/kg	03SS35-D	6/64	2-940	33		33000000 C			N	BSL
	76-44-8	Heptachlor	0.71 J	3.9	ug/kg	03SS31	2/68	2-94	3.9		2500000 C			N	BSL
	1024-57-3	Heptachlor Epoxide	0.55 J	20 J	ug/kg	03SS35-D	12/67	2-94	20		1300000 C			N	BSL
	72-43-5	Methoxychlor	5 J	5 J	ug/kg	03SS32	1/68	3.8-940	5		N			N	NTX
	95-50-1	1,2-Dichlorobenzene	39 J	330 J	ug/kg	03SB07_19910906	7/68	4.8-19000	330		260000 N			N	BSL
	106-46-7	1,4-Dichlorobenzene	39 J	160 J	ug/kg	03SB01_19910906	12/68	4.8-19000	160		2500 C			N	BSL
	90-12-0	1-Methylnaphthalene	0.74 J	3.5 J	ug/kg	03-SS-27	8/12	11-13	3.5		C			N	NTX
	91-57-6	2-Methylnaphthalene	0.93 J	9500 J	ug/kg	03SB06_19910906	19/68	9.9-20000	9500		N			N	NTX
	83-32-9	Acenaphthene	0.8 J	33000	ug/kg	03SB06_19910906	23/68	9.9-740	33000		N			N	NTX
	208-96-8	Acenaphthylene	0.86 J	160 J	ug/kg	03SB01_19910906	26/68	200-20000	160		N			N	NTX
	120-12-7	Anthracene	0.86 J	66000	ug/kg	03SB06_19910906	34/68	350-740	66000		N			N	NTX
	56-55-3	Benz(a)anthracene	4.2 J	65000	ug/kg	03SB06_19910906	55/68	370-430	65000		12000000 C			N	BSL
	100-52-7	Benzaldehyde	29 J	77 J	ug/kg	03SS40	2/26	200-20000	77		N			N	NTX
	50-32-8	Benzo(a)pyrene	5.1 J	48000	ug/kg	03SB06_19910906	55/68	370-430	48000		1200000 C			N	BSL
	205-99-2	Benzo(b)fluoranthene	7.2 J	58000	ug/kg	03SB06_19910906	59/68	370-430	58000		12000000 C			N	BSL
	191-24-2	Benzo(g,h,i)perylene	3.7 J	13000 J	ug/kg	03SB06_19910906	45/68	350-450	13000		N			N	NTX
	207-08-9	Benzo(k)fluoranthene	5.2 J	31000	ug/kg	03SB06_19910906	53/68	370-450	31000		12000000 C			N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	38 J	690	ug/kg	03SS36	22/56	200-20000	690		1400000000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	330 J	330 J	ug/kg	03SS09_19970408	1/68	200-20000	330		C			N	NTX
	86-74-8	Carbazole	79 J	3200 J	ug/kg	03TP12-0102-03-20070504	3/38	200-460	3200		C			N	NTX
	218-01-9	Chrysene	6.6 J	52000	ug/kg	03SB06_19910906	62/68	370-400	52000		120000000 C			N	BSL
	84-74-2	Di-n-butyl Phthalate	60 J	370 J	ug/kg	03SS07_19910905	2/59	200-20000	370		N			N	NTX
	53-70-3	Dibenz(a,h)anthracene	1.7 J	4800 J	ug/kg	03SB06_19910906	26/65	350-20000	4800		1100000 C			N	BSL
	132-64-9	Dibenzofuran	73 J	29000	ug/kg	03SB06_19910906	4/68	200-20000	29000		N			N	NTX
	206-44-0	Fluoranthene	15	150000	ug/kg	03SB06_19910906	65/68	380-400	150000		N			N	NTX
	86-73-7	Fluorene	0.73 J	41000	ug/kg	03SB06_19910906	27/68	11-740	41000		N			N	NTX
	193-39-5	Indeno(1,2,3-cd)pyrene	4.4 J	19000	ug/kg	03SB06_19910906	45/68	350-740	19000		12000000 C			N	BSL
	91-20-3	**Naphthalene**	3.1 J	13000 J	ug/kg	03SB06_19910906	4/48	200-20000	13000		3600 C			**Y**	**ASL**
	85-01-8	Phenanthrene	5.6 J	210000	ug/kg	03SB06_19910906	64/68	380-400	210000		N			N	NTX
	129-00-0	Pyrene	11	140000	ug/kg	03SB06_19910906	65/68	380-400	140000		N			N	NTX
	120-82-1	1,2,4-Trichlorobenzene	150 J	150 J	ug/kg	03SB07_19910906	1/68	4.8-19000	150		6700 N			N	BSL
	78-93-3	2-Butanone	4 J	20	ug/kg	03SS40	15/50	5-19	20		6900000 N			N	BSL
	67-64-1	Acetone	89	270	ug/kg	03-SS-26	20/37	11-22	270		47000000 N			N	BSL
	71-43-2	Benzene	1.4 J	1.4 J	ug/kg	03SS32	1/56	4.8-8	1.4		1200 C			N	BSL
	74-87-3	Chloromethane	2.1 J	3.6 J	ug/kg	03SS32	3/56	4.8-12	3.6		12000 N			N	BSL
	79-20-9	Methyl Acetate	5.5 J	5.5 J	ug/kg	03-SS-21	1/26	4.8-8	5.5		N			N	NTX
	108-88-3	Toluene	1.7 J	15	ug/kg	03-SS-18	9/56	4.8-7.8	15		2400000 N			N	BSL

TABLE 2.12
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (6)	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was performed but in this table COPCs were selected without elimination of metals statistically not above background, so background comparison was not involved in selecting or eliminating COPCs.
5 - The EPA soil to air screening level calculator for residential use was used. The noncarcinogenic values (annotated "N") are divided by 10. to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (URL: http://rais.ornl.gov/cgi-bin/epa/ssl1.cgi.).
6 - The soil to air screening levels are based upon the more conservative of either fugitive dust emissions or volatilization from soil.
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(8) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

Landfill Area Surface Soil Samples:

03-SS-17	03-SS-28	03SB14-D	03SS06 (sampled 4/8/1997)	03SS13	
03-SS-18	03SB01	03SB15	03SS06-D (sampled 4/8/1997)	03SS14	
03-SS-19	03SB03	03SB16	03SS07 (sampled 9/5/1991)	03SS15	
03-SS-20	03SB05	03SS01 (sampled 9/5/1991)	03SS07 (sampled 4/8/1997)	03SS16	
03-SS-21	03SB06	03SS01 (sampled 4/8/1997)	03SS08 (sampled 9/5/1991)	03SS16-D	
03-SS-21-D	03SB06-D	03SS02 (sampled 9/5/1991)	03SS08 (sampled 4/8/1997)	03TP12-0102-03	
03-SS-22	03SB07	03SS02 (sampled 4/8/1997)	03SS09 (sampled 9/5/1991)	03TP16-0102-01	03SS36
03-SS-23	03SB08	03SS03 (sampled 9/5/1991)	03SS09 (sampled 4/8/1997)	03TP16-0102-01-D	03SS37
03-SS-24	03SB09	03SS03 (sampled 4/8/1997)	03SS10 (sampled 9/5/1991)	03SS31	03SS38
03-SS-24-D	03SB10	03SS04 (sampled 9/5/1991)	03SS10 (sampled 4/8/1997)	03SS32	03SS39
03-SS-25	03SB11	03SS04 (sampled 4/8/1997)	03SS11 (sampled 9/5/1991)	03SS33	03SS40
03-SS-26	03SB12	03SS05 (sampled 9/5/1991)	03SS11 (sampled 4/8/1997)	03SS34	03SS41
03-SS-27	03SB13	03SS05 (sampled 4/8/1997)	03SS12 (sampled 9/5/1991)	03SS35	03SS41-D
	03SB14	03SS06 (sampled 9/5/1991)	03SS12 (sampled 4/8/1997)	03SS35-D	03SS42

TABLE 2.13
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 LANDFILL AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (6)	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)
Site 3 Landfill Area Soil	1746-01-6	Total 2,3,7,8-TCDD Equiv.	0.0045	0.34	ug/kg	03TP06-0809-03-20070501-D	5/5	N/A	0.34		87 C			N	BSL
Emissions to Ambient Air	7429-90-5	Aluminum	8200	74700	mg/kg	03TP19-0304-02	115/115	N/A	74700		710000 N			N	BSL
	7440-36-0	Antimony	0.22 L	281 L	mg/kg	03TP27-0304-01-D	41/90	0.2-10.3	281		28000 N			N	BSL
	7440-38-2	Arsenic	0.37 J	49.9 J	mg/kg	03TP27-0304-01	108/108	N/A	49.9		770 C			N	BSL
	7440-39-3	Barium	45.2	859	mg/kg	03TP19-0304-02	115/115	N/A	859		71000 N			N	BSL
	7440-41-7	Beryllium	0.61	2 K	mg/kg	03-SS-23	79/79	N/A	2		1400 C			N	BSL
	7440-43-9	Cadmium	0.22 J	300	mg/kg	03TP19-0607-01	49/90	0.03-1.4	300		1400 N			N	BSL
	7440-70-2	Calcium	253	86400	mg/kg	03SB06_19910906	110/110	N/A	86400		N			N	NUT
	7440-47-3	**Chromium**	4.2 K	348 J	mg/kg	03TP30-0506-01	114/115	17-17	348		16 C			**Y**	**ASL**
	7440-48-4	Cobalt	2.5	121 J	mg/kg	03TP27-0304-01-D	115/115	N/A	121		370 C			N	BSL
	7440-50-8	Copper	7.1	9660	mg/kg	03TP25-0607-02-D	115/115	N/A	9660		N			N	NTX
	57-12-5	Cyanide	0.11	4.6	mg/kg	03TP06-0809-03-20070501	29/115	0.09-2.9	4.6		N			N	NTX
	7439-89-6	Iron	9570	236000 J	mg/kg	03TP27-0304-01-D	115/115	N/A	236000		N			N	NTX
	7439-92-1	Lead	2.2	6480 J	mg/kg	03TP05-0910-02-20070430-D	115/115	N/A	6480		C			N	NTX
	7439-95-4	Magnesium	408	50200	mg/kg	03SB06_19910906	115/115	N/A	50200		N			N	NUT
	7439-96-5	**Manganese**	41.6	20000	mg/kg	03TP10-0405-01-20070503	115/115	N/A	20000		7100 N			**Y**	**ASL**
	7439-97-6	Mercury	0.021 J	7.1	mg/kg	03TP20-0708-01	68/115	0.017-0.14	7.1		N			N	NTX
	7440-02-0	Nickel	5.8	296 K	mg/kg	03TP05-0506-01-20070430	115/115	N/A	296		13000 N			N	BSL
	7440-09-7	Potassium	168	3010	mg/kg	03TP01_19910909	108/111	390-522	3010		N			N	NUT
	7782-49-2	Selenium	0.36 L	0.55 L	mg/kg	03TP08-0203-03-20070502	2/60	0.3-8	0.55		2800000 N			N	BSL
	7440-22-4	Silver	0.31	233	mg/kg	03TP06-0607-04-20070501	34/110	0.035-1.6	233		N			N	NTX
	7440-23-5	Sodium	19.1 L	1830	mg/kg	03TP27-0304-01	54/87	18.8-1090	1830		N			N	NUT
	7440-28-0	Thallium	0.26 L	61.1 J	mg/kg	03TP27-0304-01-D	36/89	0.15-13.9	61.1		N			N	NTX
	7440-62-2	Vanadium	11.8	752 J	mg/kg	03TP27-0304-01	115/115	N/A	752		N			N	NTX
	7440-66-6	Zinc	10.6	13700 J	mg/kg	03TP27-0304-01	115/115	N/A	13700		N			N	NTX
	72-54-8	4,4'-DDD	0.83 J	72000	ug/kg	03TP06-0607-04-20070501	30/114	2-190	72000		48000000 C			N	BSL
	72-55-9	4,4'-DDE	0.39 J	8700	ug/kg	03TP06-0607-04-20070501	30/107	2-190	8700		34000000 C			N	BSL
	50-29-3	4,4'-DDT	0.39 J	270000	ug/kg	03TP06-0607-04-20070501	37/114	2-190	270000		34000000 C			N	BSL
	309-00-2	Aldrin	0.27 J	9.7	ug/kg	03TP06-0809-03-20070501	17/114	2-2500	9.7		680000 C			N	BSL
	319-84-6	Alpha-BHC	0.7 J	16	ug/kg	03TP25-0607-02	7/114	2-2500	16		1800000 C			N	BSL
	5103-71-9	Alpha-Chlordane	0.26 J	330 J	ug/kg	03TP14-0203-01-20070504	23/106	2-2500	330		33000000 C			N	BSL
	53469-21-9	Aroclor-1242	37	110	ug/kg	03TP12-0405-01-20070504	2/115	19-940	110		5800000 C			N	BSL
	12672-29-6	Aroclor-1248	92	560	ug/kg	03TP26-0506-01	2/115	19-940	560		5800000 C			N	BSL
	11097-69-1	Aroclor-1254	13 J	4000	ug/kg	03TP24-0304-01	9/115	19-1900	4000		5800000 C			N	BSL
	11096-82-5	Aroclor-1260	12 J	600	ug/kg	03TP06-0809-03-20070501	11/115	19-1900	600		5800000 C			N	BSL
	319-85-7	Beta-BHC	0.8 J	14 J	ug/kg	03TP25-0607-02-D	4/111	1-2500	14		6200000 C			N	BSL
	319-86-8	Delta-BHC	0.35 J	2.7	ug/kg	03TP12-0405-01-20070504	7/115	2-2500	2.7		C			N	NTX

TABLE 2.13
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 LANDFILL AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (6)	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)
	60-57-1	Dieldrin	0.24 J	10000	ug/kg	03TP06-0607-04-20070501	88/114	2-93	10000		720000 C			N	BSL
	959-98-8	Endosulfan I	0.25 J	580 J	ug/kg	03TP06-0607-04-20070501	14/115	2-94	580		N			N	NTX
	33213-65-9	Endosulfan II	0.49 J	16 J	ug/kg	03TP06-0809-03-20070501	9/114	2-2500	16		N			N	NTX
	1031-07-8	Endosulfan Sulfate	0.61 J	19	ug/kg	03TP06-0809-03-20070501	9/114	2-2500	19		N			N	NTX
	72-20-8	Endrin	0.61 J	25	ug/kg	03TP02-1_19910910	9/114	2-2500	25		N			N	NTX
	007421-93-4	Endrin Aldehyde	0.52 J	25 J	ug/kg	03TP19-0607-01	21/73	2-2500	25		N			N	NTX
	53494-70-5	Endrin Ketone	0.29 J	24 J	ug/kg	03TP27-0304-01	13/114	2-2500	24		N			N	NTX
	58-89-9	Gamma-BHC (Lindane)	0.69 J	6.9	ug/kg	03TP12-0304-02-20070504	11/115	2-2500	6.9		11000000 C			N	BSL
	5103-74-2	Gamma-Chlordane	0.36 J	620 J	ug/kg	03TP06-0607-04-20070501	26/108	2-940	620		33000000 C			N	BSL
	76-44-8	Heptachlor	0.52 J	8 J	ug/kg	03TP06-0708-02-20070501	10/112	2-2500	8		2500000 C			N	BSL
	1024-57-3	Heptachlor Epoxide	0.55 J	390 J	ug/kg	03TP06-0607-04-20070501	24/114	2-94	390		1300000 C			N	BSL
	72-43-5	Methoxychlor	1 J	130 J	ug/kg	03TP19-0607-01	12/115	3.8-4800	130		N			N	NTX
	95-94-3	1,2,4,5-Tetrachlorobenzene	36 J	36 J	ug/kg	03TP19-0607-01	1/63	190-20000	36		N			N	NTX
	95-50-1	1,2-Dichlorobenzene	39 J	3600	ug/kg	03TP04-2_19910911	9/115	4.7-19000	3600		260000 N			N	BSL
	106-46-7	1,4-Dichlorobenzene	39 J	880 J	ug/kg	03TP04-2_19910911	13/115	4.7-19000	880		2500 C			N	BSL
	90-12-0	1-Methylnaphthalene	0.74 J	560	ug/kg	03TP25-0607-02-D	14/21	9.8-14000	560		C			N	NTX
	91-57-6	2-Methylnaphthalene	0.93 J	9500 J	ug/kg	03SB06_19910906	30/110	9.9-20000	9500		N			N	NTX
	95-48-7	2-Methylphenol	190 J	290 J	ug/kg	03TP04-3_19910911	2/115	200-20000	290		1000000000 N			N	BSL
	83-32-9	Acenaphthene	0.8 J	33000	ug/kg	03SB06_19910906	30/111	9.9-2300	33000		N			N	NTX
	208-96-8	Acenaphthylene	0.64 J	280 J	ug/kg	03TP04-3_19910911	34/110	9.9-20000	280		N			N	NTX
	120-12-7	Anthracene	0.82 J	66000	ug/kg	03SB06_19910906	44/110	9.9-2300	66000		N			N	NTX
	56-55-3	Benz(a)anthracene	4.2 J	65000	ug/kg	03SB06_19910906	72/111	9.9-2300	65000		12000000 C			N	BSL
	100-52-7	Benzaldehyde	29 J	83 J	ug/kg	03TP27-0304-01	9/63	200-20000	83		N			N	NTX
	50-32-8	Benzo(a)pyrene	5.1 J	48000	ug/kg	03SB06_19910906	73/112	9.9-2300	48000		1200000 C			N	BSL
	205-99-2	Benzo(b)fluoranthene	7.2 J	58000	ug/kg	03SB06_19910906	77/113	9.9-2300	58000		12000000 C			N	BSL
	191-24-2	Benzo(g,h,i)perylene	3.7 J	13000 J	ug/kg	03SB06_19910906	62/113	9.9-2300	13000		N			N	NTX
	207-08-9	Benzo(k)fluoranthene	5 J	31000	ug/kg	03SB06_19910906	66/111	9.9-2300	31000		12000000 C			N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	38 J	12000	ug/kg	03TP25-0506-01	42/103	200-20000	12000		1400000000 C			N	BSL
	85-68-7	Butyl Benzyl Phthalate	330 J	330 J	ug/kg	03SS09_19970408	1/115	200-20000	330		C			N	NTX
	86-74-8	Carbazole	79 J	11000	ug/kg	03TP20-0708-01	5/75	200-2300	11000		C			N	NTX
	218-01-9	Chrysene	6.6 J	52000	ug/kg	03SB06_19910906	81/113	9.9-2300	52000		120000000 C			N	BSL
	84-74-2	Di-n-butyl Phthalate	60 J	370 J	ug/kg	03SS07_19910905	3/101	200-20000	370		N			N	NTX
	117-84-0	Di-n-octyl Phthalate	220 J	220 J	ug/kg	03TP06-0809-03-20070501	1/115	200-20000	220		N			N	NTX
	53-70-3	Dibenz(a,h)anthracene	1.3 J	4800 J	ug/kg	03SB06_19910906	35/107	9.9-20000	4800		1100000 C			N	BSL
	132-64-9	Dibenzofuran	73 J	29000	ug/kg	03SB06_19910906	7/115	200-20000	29000		N			N	NTX
	206-44-0	Fluoranthene	12	150000	ug/kg	03SB06_19910906	85/113	9.9-2300	150000		N			N	NTX
	86-73-7	Fluorene	0.73 J	41000	ug/kg	03SB06_19910906	34/111	9.9-2300	41000		N			N	NTX

TABLE 2.13
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 LANDFILL AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (6)	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)
	193-39-5	Indeno(1,2,3-cd)pyrene	4.4 J	19000	ug/kg	03SB06_19910906	62/113	9.9-2300	19000		12000000 C			N	BSL
	91-20-3	**Naphthalene**	3.1 J	14000	ug/kg	03TP20-0708-01	15/89	200-20000	14000		3600 C			**Y**	**ASL**
	85-01-8	Phenanthrene	5.6 J	210000	ug/kg	03SB06_19910906	82/111	9.9-2300	210000		N			N	NTX
	129-00-0	Pyrene	11	140000	ug/kg	03SB06_19910906	86/113	9.9-2300	140000		N			N	NTX
	87-61-6	1,2,3-Trichlorobenzene	71 J	5700	ug/kg	03TP25-0506-01	3/62	4.7-320	5700		C			N	NTX
	120-82-1	1,2,4-Trichlorobenzene	150 J	310 J	ug/kg	03TP25-0607-02-D	3/115	4.7-19000	310		6700 N			N	BSL
	78-93-3	2-Butanone	4 J	24	ug/kg	03TP19-0607-01	19/100	4.9-14000	24		6900000 N			N	BSL
	67-64-1	Acetone	6.1 J	540 J	ug/kg	03TP25-0607-02	36/80	11-33	540		47000000 N			N	BSL
	71-43-2	Benzene	1.4 J	78 J	ug/kg	03TP25-0607-02	10/106	4.7-5700	78		1200 C			N	BSL
	74-83-9	Bromomethane	8.2	8.2	ug/kg	03TP19-0607-01	1/106	4.7-5700	8.2		790 N			N	BSL
	75-15-0	Carbon Disulfide	2.9 J	2.9 J	ug/kg	03TP24-0304-01	1/106	4.7-5700	2.9		92000 N			N	BSL
	108-90-7	Chlorobenzene	2 J	2 J	ug/kg	03SB02_19910906	1/106	4.7-5700	2		36000 N			N	BSL
	74-87-3	Chloromethane	2.1 J	16	ug/kg	03TP26-0506-01	4/106	4.7-5700	16		12000 N			N	BSL
	75-71-8	Dichlorodifluoromethane	4.8 J	4.8 J	ug/kg	03TP24-0304-01	1/63	4.7-5700	4.8		19000 N			N	BSL
	100-41-4	**Ethylbenzene**	380	7000	ug/kg	03TP25-0506-01	3/106	4.7-30	7000		5900 C			**Y**	**ASL**
	179601-23-1	M,p-xylene	960	18000	ug/kg	03TP25-0506-01	3/63	9.5-21	18000		65000 N			N	BSL
	79-20-9	Methyl Acetate	5.5 J	450 J	ug/kg	03TP25-0607-02-D	2/63	4.7-5700	450		N			N	NTX
	108-87-2	Methylcyclohexane	3500 J	3500 J	ug/kg	03TP25-0506-01	1/63	4.7-320	3500		N			N	NTX
	95-47-6	O-xylene	260 J	4000	ug/kg	03TP20-0708-01	3/63	4.7-10	4000		510000 N			N	BSL
	100-42-5	Styrene	3300	3300	ug/kg	03TP20-0708-01	1/106	4.7-5700	3300		1100000 N			N	BSL
	127-18-4	Tetrachloroethene	4.8 J	210 J	ug/kg	03TP25-0607-02	4/106	4.7-5700	210		1000 C			N	BSL
	108-88-3	Toluene	1.7 J	150000	ug/kg	03TP25-0506-01	14/99	4.7-30	150000		2400000 N			N	BSL
	79-01-6	Trichloroethene	2 J	2.7 J	ug/kg	03TP24-0304-01	2/106	4.7-5700	2.7		2900 C			N	BSL
	1330-20-7	Xylenes (Total)	1200	20000	ug/kg	03TP25-0506-01	3/80	4.7-30	20000		65000 N			N	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was performed but in this table COPCs were selected without elimination of metals statistically not above background, so background comparison was not involved in selecting or eliminating COPCs.
5 - The EPA soil to air screening level calculator for residential use was used. The noncarcinogenic values (annotated "N") are divided by 10. to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") (URL: http://rais.ornl.gov/cgi-bin/epa/ssl1.cgi.).
6 - The soil to air screening levels are based upon the more conservative of either fugitive dust emissions or volatilization from soil.
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(8) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 2.13
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 LANDFILL AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (6)	COPC Flag (7)	Rationale for Contaminant Selection or Deletion (8)
Landfill Area Soil Samples:															
03-SS-17		03SB07	03SS07 (sampled 9/5/1991)			03TP04-4		03TP14-0203-01			03SS32				
03-SS-18		03SB08	03SS07 (sampled 4/8/1997)			03TP05-0506-01		03TP15-0405-01			03SS33				
03-SS-19		03SB09	03SS08 (sampled 9/5/1991)			03TP05-0910-02		03TP16-0102-01			03SS34				
03-SS-20		03SB10	03SS08 (sampled 4/8/1997)			03TP05-0910-02-D		03TP16-0102-01-D			03SS35				
03-SS-21		03SB11	03SS09 (sampled 9/5/1991)			03TP06-0304-01		03TP17-0304-01			03SS35-D				
03-SS-21-D		03SB12	03SS09 (sampled 4/8/1997)			03TP06-0607-04		03TP18-0203-01			03SS36				
03-SS-22		03SB13	03SS10 (sampled 9/5/1991)			03TP06-0708-02		03TP18-0203-01-D			03SS37				
03-SS-23		03SB14	03SS10 (sampled 4/8/1997)			03TP06-0809-03		03TP19-0304-02			03SS38				
03-SS-24		03SB14-D	03SS11 (sampled 9/5/1991)			03TP06-0809-03-D		03TP19-0607-01			03SS39				
03-SS-24-D		03SB15	03SS11 (sampled 4/8/1997)			03TP07-0203-02		03TP20-0708-01			03SS40				
03-SS-25		03SB16	03SS12 (sampled 9/5/1991)			03TP07-0304-01		03TP23-0304-01			03SS41				
03-SS-26		03SS01 (sampled 9/5/1991)	03SS12 (sampled 4/8/1997)			03TP08-0203-03		03TP24-0304-01			03SS41-D				
03-SS-27		03SS01 (sampled 4/8/1997)	03SS13			03TP08-0304-02		03TP25-0506-01			03SS42				
03-SS-28		03SS02 (sampled 9/5/1991)	03SS14			03TP08-0405-01		03TP25-0607-02							
03SB01-0204		03SS02 (sampled 4/8/1997)	03SS15			03TP09-0506-01		03TP25-0607-02-D							
03SB01-0608		03SS03 (sampled 9/5/1991)	03SS16			03TP09-0506-02		03TP26-0506-01							
03SB01-1416		03SS03 (sampled 4/8/1997)	03SS16-D			03TP10-0304-02		03TP27-0304-01							
03SB01		03SS04 (sampled 9/5/1991)	03TP01			03TP10-0405-01		03TP27-0304-01-D							
03SB02		03SS04 (sampled 4/8/1997)	03TP02-1			03TP11-0304-01		03TP27-0304-02							
03SB03		03SS05 (sampled 9/5/1991)	03TP02-2			03TP11-0405-02		03TP28-0203-01							
03SB04		03SS05 (sampled 4/8/1997)	03TP03			03TP12-0102-03		03TP29-0304-01							
03SB05		03SS06 (sampled 9/5/1991)	03TP04-1			03TP12-0304-02		03TP30-0506-01							
03SB06		03SS06 (sampled 4/8/1997)	03TP04-2			03TP12-0405-01		03TP30-0506-01-D							
03SB06-D		03SS06-D (sampled 4/8/1997)	03TP04-3			03TP13-0203-01		03SS31							

TABLE 2.14
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (7)
Site 3 Surface Water	7429-90-5	Aluminum	120 K	317 K	ug/L	03-SW-17	7/8	80-80	317		37000 N			N	BSL
	7440-39-3	Barium	32.5	113	ug/L	03SW11-20080319	8/8	N/A	113		7300 N			N	BSL
	7440-70-2	Calcium	13200	22300	ug/L	03SW11-20080319	8/8	N/A	22300		N			N	NUT
	7440-47-3	**Chromium**	1.1	1.3	ug/L	03-SW-14	4/6	0.87-0.87	1.3		0.43 C			**Y**	**ASL**
	7440-48-4	Cobalt	0.2 J	0.2 J	ug/L	03SW11-20080319	1/8	0.62-6	0.2		11 N			N	BSL
	7439-89-6	Iron	185	1060	ug/L	03SW11-20080319	8/8	N/A	1060		26000 N			N	BSL
	7439-92-1	Lead	0.07 J	2.7	ug/L	03-SW-16	8/8	2-2	2.7		15 C			N	BSL
	7439-95-4	Magnesium	3750	7470	ug/L	03SW11-20080319	8/8	N/A	7470		N			N	NUT
	7439-96-5	Manganese	30.9	197	ug/L	03SW11-20080319	8/8	N/A	197		880 N			N	BSL
	7440-02-0	Nickel	1.2 J	2 J	ug/L	03SW11-20080319	2/8	0.98-0.98	2		730 N			N	BSL
	7440-09-7	Potassium	1430 L	1880	ug/L	03SW11-20080319	8/8	N/A	1880		N			N	NUT
	7440-23-5	Sodium	6240	18800	ug/L	03SW11-20080319	5/5	N/A	18800		N			N	NUT
	7440-62-2	Vanadium	1.4	1.4	ug/L	03SW11-20080319	1/1	N/A	1.4		180 N			N	BSL
	7440-66-6	Zinc	3.6 J	16	ug/L	03SW11-20080319	3/3	N/A	16		11000 N			N	BSL
	60-57-1	Dieldrin	0.008 J	0.011 J	ug/L	03-SW-14	6/6	N/A	0.011		0.042 C			N	BSL
	208-96-8	Acenaphthylene	0.016 J	0.016 J	ug/L	03-SW-14	1/6	0.2-0.22	0.016		1500 N			N	BSL
	56-55-3	Benz(a)anthracene	0.027 J	0.027 J	ug/L	03-SW-14	1/6	0.2-0.22	0.027		0.29 C			N	BSL
	50-32-8	**Benzo(a)pyrene**	0.013 J	0.047 J	ug/L	03-SW-14	3/6	0.2-0.22	0.047		0.029 C			**Y**	**ASL**
	205-99-2	Benzo(b)fluoranthene	0.014 J	0.097 J	ug/L	03-SW-14	5/6	0.2-0.2	0.097		0.29 C			N	BSL
	191-24-2	Benzo(g,h,i)perylene	0.018 J	0.036 J	ug/L	03-SW-14	2/6	0.2-0.22	0.036		1100 N			N	BSL
	207-08-9	Benzo(k)fluoranthene	0.013 J	0.085 J	ug/L	03-SW-14	4/6	0.2-0.22	0.085		2.9 C			N	BSL
	218-01-9	Chrysene	0.053 J	0.053 J	ug/L	03-SW-14	1/6	0.2-0.22	0.053		29 C			N	BSL
	53-70-3	Dibenz(a,h)anthracene	0.012 J	0.012 J	ug/L	03-SW-15-D	1/6	0.2-0.22	0.012		0.029 C			N	BSL
	206-44-0	Fluoranthene	0.012 J	0.12 J	ug/L	03-SW-14	3/6	0.2-0.22	0.12		1500 N			N	BSL
	86-73-7	Fluorene	0.59	0.69	ug/L	03-SW-14	6/6	N/A	0.69		1500 N			N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.01 J	0.042 J	ug/L	03-SW-14	6/6	0.22-0.22	0.042		0.29 C			N	BSL
	85-01-8	Phenanthrene	0.096 J	0.096 J	ug/L	03-SW-14	1/6	0.2-0.22	0.096		1100 N			N	BSL
	129-00-0	Pyrene	0.012 J	0.099 J	ug/L	03-SW-14	6/6	N/A	0.099		1100 N			N	BSL
	67-64-1	Acetone	1.3 J	3.8	ug/L	03-SW-17	3/8	2.5-10	3.8		22000 N			N	BSL
	108-88-3	Toluene	0.21 J	0.21 J	ug/L	03SW10-20080319	1/12	0.5-1	0.21		2300 N			N	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was performed but in this table COPCs were selected without elimination of metals statistically not above background, a separate table is presented to show the effects of background for on eliminating COPCs.
5 - The EPA ORNL risk-based tap water COPC screening level for residential tap water use is multiplied by 10 to account for lower intake from incidental contact with surface water. The noncarcinogenic values (annotated "N") are then divided by 10 to correspond to a target hazard quotient of 0.1, while RBCs for carcinogens (annotated "C") correspond to an incremental cancer risk of 1.0E-06 (USEPA Region 3, November 2010).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - The RBC for hexavalent chromium was utilized because the form of chromium in sediment is not known.

Surface Water Samples:

03-SW-12	03-SW-15-D	03SW10-20081013	03SW11-20081013
03-SW-13	03-SW-16	03SW10-20090401	03SW11-20090401
03-SW-14	03-SW-17	03SW10-20090401-D	
03-SW-15	03SW10-20080319	03SW11-20080319	

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(7) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 2.15
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (7)
Site 3 Sediment	7429-90-5	Aluminum	5110	16400	mg/kg	03-SD-17	6/6	N/A	16400		77000 N			N	BSL
	7440-38-2	**Arsenic**	3.1	11.1	mg/kg	03-SD-17	3/3	N/A	11.1		3.9 C			**Y**	**ASL**
	7440-39-3	Barium	49.6	127	mg/kg	03-SD-15-D	6/6	N/A	127		15000 N			N	BSL
	7440-41-7	Beryllium	0.72 K	1.9 K	mg/kg	03-SD-17	5/5	N/A	1.9		160 N			N	BSL
	7440-43-9	Cadmium	0.29 L	0.48 L	mg/kg	03-SD-12	3/4	0.06-0.06	0.48		70 N			N	BSL
	7440-70-2	Calcium	889	2290	mg/kg	03-SD-17	6/6	N/A	2290		N			N	NUT
	7440-47-3	**Chromium**	8.9	34.8	mg/kg	03-SD-17	6/6	N/A	34.8		2.9 C			**Y**	**ASL**
	7440-48-4	Cobalt	2.5	11.3	mg/kg	03-SD-17	6/6	N/A	11.3		23 N			N	BSL
	7440-50-8	Copper	8.4	30.5	mg/kg	03-SD-17	6/6	N/A	30.5		3100 N			N	BSL
	7439-89-6	Iron	6470	37600	mg/kg	03-SD-17	6/6	N/A	37600		55000 N			N	BSL
	7439-92-1	Lead	12 J	95.6 J	mg/kg	03-SD-17	6/6	N/A	95.6		400 C			N	BSL
	7439-95-4	Magnesium	676	2990	mg/kg	03-SD-17	6/6	N/A	2990		N			N	NUT
	7439-96-5	Manganese	52.7 J	631 J	mg/kg	03-SD-17	6/6	N/A	631		1800 N			N	BSL
	7439-97-6	Mercury	0.038	0.062	mg/kg	03-SD-15	5/6	0.026-0.026	0.062		7.8 N			N	BSL
	7440-02-0	Nickel	5	18.5	mg/kg	03-SD-17	6/6	N/A	18.5		1500 N			N	BSL
	7440-09-7	Potassium	305 J	1500 J	mg/kg	03-SD-17	6/6	N/A	1500		N			N	NUT
	7782-49-2	Selenium	0.92 K	1.2 K	mg/kg	03-SD-15	3/6	0.58-1.2	1.2		390 N			N	BSL
	7440-23-5	Sodium	366 K	719 K	mg/kg	03-SD-17	6/6	N/A	719		N			N	NUT
	7440-62-2	Vanadium	11.9	62.1	mg/kg	03-SD-17	6/6	N/A	62.1		390 N			N	BSL
	7440-66-6	Zinc	25.6	134	mg/kg	03-SD-17	6/6	N/A	134		23000 N			N	BSL
	72-54-8	4,4'-DDD	2.2 J	2.2 J	ug/kg	03-SD-12	1/6	4.2-28	2.2		20000 C			N	BSL
	72-55-9	4,4'-DDE	3.3 J	29 J	ug/kg	03-SD-14	3/5	4.2-28	29		14000 C			N	BSL
	50-29-3	4,4'-DDT	2.4 J	11 J	ug/kg	03-SD-14	4/6	4.2-28	11		17000 C			N	BSL
	309-00-2	Aldrin	0.85 J	8.1 J	ug/kg	03-SD-15	5/6	4.6-4.6	8.1		290 C			N	BSL
	5103-71-9	Alpha-Chlordane	4.6 J	8.4 J	ug/kg	03-SD-12	2/2	N/A	8.4		16000 C			N	BSL
	319-86-8	Delta-BHC	0.38 J	0.38 J	ug/kg	03-SD-12	1/6	2.2-15	0.38		C			N	NTX
	60-57-1	Dieldrin	4.4	47	ug/kg	03-SD-15-D	6/6	N/A	47		300 C			N	BSL
	33213-65-9	Endosulfan II	15 J	15 J	ug/kg	03-SD-15-D	1/6	4.2-28	15		370000 N			N	BSL
	007421-93-4	Endrin Aldehyde	0.94 J	8.9 J	ug/kg	03-SD-12	3/4	28-28	8.9		18000 N			N	BSL
	53494-70-5	Endrin Ketone	2.8 J	6.4 J	ug/kg	03-SD-17	3/6	4.2-28	6.4		18000 N			N	BSL
	5103-74-2	Gamma-Chlordane	1.3 J	5.7 J	ug/kg	03-SD-15-D	4/4	N/A	5.7		16000 C			N	BSL
	76-44-8	Heptachlor	0.81 J	0.98 J	ug/kg	03-SD-17	2/6	2.2-15	0.98		1100 C			N	BSL
	1024-57-3	Heptachlor Epoxide	2.9 J	2.9 J	ug/kg	03-SD-17	1/4	2.8-15	2.9		530 C			N	BSL
	72-43-5	Methoxychlor	11 J	11 J	ug/kg	03-SD-12	1/6	22-150	11		310000 N			N	BSL
	90-12-0	1-Methylnaphthalene	39	75	ug/kg	03-SD-14	2/2	N/A	75		220000 C			N	BSL
	91-57-6	2-Methylnaphthalene	37	65	ug/kg	03-SD-14	2/2	N/A	65		310000 N			N	BSL
	83-32-9	Acenaphthene	97	200 J	ug/kg	03-SD-14	2/2	N/A	200		3400000 N			N	BSL

TABLE 2.15
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - EXPOSURE TO SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point(s)	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (2)	Concentration Used for Screening (3)	Background Value (4)	Screening Toxicity Value (N/C) (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (6)	Rationale for Contaminant Selection or Deletion (7)
	208-96-8	Acenaphthylene	33	280 J	ug/kg	03-SD-14	5/5	N/A	280		2300000 N			N	BSL
	120-12-7	Anthracene	30	700 J	ug/kg	03-SD-14	6/6	N/A	700		17000000 N			N	BSL
	56-55-3	Benz(a)anthracene	61	1200 J	ug/kg	03-SD-14	6/6	N/A	1200		1500 C			N	BSL
	50-32-8	**Benzo(a)pyrene**	75	1400 J	ug/kg	03-SD-14	6/6	N/A	1400		150 C			**Y**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	80	2500	ug/kg	03-SD-12	6/6	N/A	2500		1500 C			**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	52	970 J	ug/kg	03-SD-14	6/6	N/A	970		1700000 N			N	BSL
	207-08-9	Benzo(k)fluoranthene	89 J	1400 J	ug/kg	03-SD-14	6/6	N/A	1400		15000 C			N	BSL
	86-74-8	Carbazole	79 J	240 J	ug/kg	03-SD-14	3/6	220-460	240		C			N	NTX
	218-01-9	Chrysene	89 J	2300	ug/kg	03-SD-12	6/6	N/A	2300		150000 C			N	BSL
	53-70-3	**Dibenz(a,h)anthracene**	50	380 J	ug/kg	03-SD-14	5/5	N/A	380		150 C			**Y**	**ASL**
	206-44-0	Fluoranthene	210	9600	ug/kg	03-SD-14	6/6	N/A	9600		2300000 N			N	BSL
	86-73-7	Fluorene	29	290 J	ug/kg	03-SD-14	3/3	N/A	290		2300000 N			N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	64	1300 J	ug/kg	03-SD-14	6/6	N/A	1300		1500 C			N	BSL
	91-20-3	Naphthalene	47	89	ug/kg	03-SD-14	2/2	N/A	89		36000 C			N	BSL
	85-01-8	Phenanthrene	130 J	7200	ug/kg	03-SD-14	6/6	N/A	7200		1700000 N			N	BSL
	129-00-0	Pyrene	150	6800	ug/kg	03-SD-14	6/6	N/A	6800		1700000 N			N	BSL
	78-93-3	2-Butanone	13 J	31	ug/kg	03-SD-15	4/6	14-30	31		28000000 N			N	BSL
	67-64-1	Acetone	26	180	ug/kg	03-SD-17	6/6	N/A	180		61000000 N			N	BSL
	75-15-0	Carbon Disulfide	2 J	6.2 J	ug/kg	03-SD-13	3/6	9.1-12	6.2		820000 N			N	BSL

Footnotes:

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits or sample-specific instrument detection limits.
3 - The maximum detected concentration is used for screening purposes.
4 - A background comparison analysis was performed but in this table COPCs were selected without elimination of metals statistically not above background, a separate table is presented to show the effects of background for on eliminating COPCs.
5 - The EPA ORNL risk-based COPC screening level for residential soil contact is multiplied by 10 to account for lower contact rate during recreation. The noncarcinogenic values (annotated "N") are then divided by 10 to correspond to a target hazard quotient of 0.1, to correspond to a target hazard quotient of 0.1, while RBCs for carcinogens (annotated "C") correspond to an incremental cancer risk of 1.0E-06 (USEPA Region 3, November 2010).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - The RBC for hexavalent chromium was utilized because the form of chromium in sediment is not known.
9 - The RBC for methyl mercury was used because the form of mercury in sediment is not known.

Sediment Samples:

03-SD-12
03-SD-13
03-SD-14
03-SD-15
03-SD-15-D
03-SD-16
03-SD-17

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogen
N = Non-Carcinogenic
J = Estimated Value

(7) Rationale Codes:

For Selection as a COPC:
ASL = Above Screening Level (and Background, if applicable)
NoSCR = No Screening Level applicable for this exposure route

For Elimination as a COPC:
BSL = Below Screening Level
BKG = Below Background Based on Statistical Tests
NUT = Essential Nutrient
NTX = No Toxicity Data

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TABLE 3.01
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Tap Water Contact,	Arsenic	ug/L	1.91	4.52	9.1	4.52	ug/L	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.0<σ≤1.5; n<40; ND<50%
Water Vapors at Showerhead,	Cobalt	ug/L	1.38	2.40	4 J	2.40	ug/L	95% KM (BCA) UCL	Non-disc Dist; 1.0 < σ ≤ 1.5; All n; ND≥50%
or Outdoor Contact	Manganese	ug/L	12.9	43.3	103	43.3	ug/L	97.5% KM (Chebyshev) UCL	Lognormal; 1.0 < σ ≤ 1.5; n<40; ND<50%
During Construction	Bis(2-ethylhexyl) Phthalate	ug/L	8.5	6.9	11	11	ug/L	Maximum	Number of detects=5; Max<1.5xDL
	1,1-Dichloroethane	ug/L	6.8	6.01	8.2	8.2	ug/L	Maximum	Number of detects=3; Max = 95% KM % Bootstrap UCL
	Bromodichloromethane	ug/L	0.5	N/A	1.1	1.1	ug/L	Maximum	Number of detects = 1; use Max
	Carbon Tetrachloride	ug/L	0.313	0.36	0.38 J	0.38 J	ug/L	Maximum	Number of detects<5; Max < DL
	Chloroform	ug/L	0.824	0.523	1.6	0.523	ug/L	95% KM (t) UCL	Approx Gamma; 1<k≤2; All n; ND ≥ 40%
	Dibromochloromethane	ug/L	0.52	N/A	1.5	1.5	ug/L	Maximum	Number of detects = 1; use Max
	Tetrachloroethene	ug/L	4.0912	5.26	14	5.26	ug/L	95% KM (Chebyshev) UCL	Approx. Gamma; k ≤ 1; All n; ND ≤ 30%
	Trichloroethene	ug/L	2.17	1.58	3.1	3.1	ug/L	Maximum	Number of detects=3; Max = 95% KM % Bootstrap UCL

Note: These COPCs were selected for all groundwater pathways. Exposure to volatilization is considered limited to only COPCs that are VOCs with Henry's Law Constants > 1×10^{-5}.

TABLE 3.02
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 LANDFILL AREA SOIL-TO-GROUNDWATER
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Tap Water Contact or Water Vapors at Showerhead	Total 2,3,7,8-TCDD Equiv.	ug/kg	0.141	NA	0.243	0.243	ug/kg	Maximum	N<5; use Maximum
	Aluminum	mg/kg	18566	19800	74700	19800	mg/kg	95% KM (BCA) UCL	Non-disc Dist; σ ≤ 0.5; All n
	Arsenic	mg/kg	5.52	6.21	32.4	6.21	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Barium	mg/kg	163	NA*	859	NA			
	Cadmium	mg/kg	29.3	47.1	300	47.1	mg/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Cobalt	mg/kg	10.7	12.3	82.8	12.3	mg/kg	95% KM (BCA) UCL	Non-disc Dist; σ ≤ 0.5; All n
	Copper	mg/kg	311.0	967.0	9230	967.0	mg/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥50
	Iron	mg/kg	28980	33600	193000	33600	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Lead	mg/kg	322	800	4640	322	mg/kg	Mean-N	IEUBK Uses AVG
	Manganese	mg/kg	946	1320	20000	1320	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Mercury	mg/kg	0.682	1.15	7.1	1.15	mg/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Nickel	mg/kg	28.6	37.4	296 K	37.4	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Silver	mg/kg	18.4	16.0	233	16.0	mg/kg	95% KM (Chebyshev) UCL	Lognormal Dist; 1.5<σ≤2; n>40-50; ND≥50%
	Vanadium	mg/kg	34.7	44.5	559	44.5	mg/kg	95% KM (BCA) UCL	Non-disc Dist; σ ≤ 0.5; All n
	Zinc	mg/kg	522	1380	10135	1380	mg/kg	97.5% Chebyshev (Mean, Sd) UCL	Non-disc Dist; 1.0 < σ ≤ 2.0; n≥50
	4,4'-DDD	ug/kg	2410	4630	72000	4630	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	4,4'-DDE	ug/kg	311	603	8700	603	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	4,4'-DDT	ug/kg	7340	17300	270000	17300	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Aroclor-1248	ug/kg	326	N/A	560	560	ug/kg	Maximum	Number detects=2; Max ≤ 2x top 5% DLs
	Aroclor-1254	ug/kg	728	134	4000	134	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Aroclor-1260	ug/kg	173	45.1	600	45.1	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Alpha-BHC	ug/kg	15.3	NA*	16	NA			
	Alpha-Chlordane	ug/kg	47	NA*	46.6	NA			
	Beta-BHC	ug/kg	15.2	NA*	14	NA			
	Dieldrin	ug/kg	196	701	10000	701	ug/kg	97.5% KM (Chebyshev) UCL	Lognormal; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Gamma-Chlordane	ug/kg	39.1	NA*	620	NA			
	Heptachlor	ug/kg	15.5	NA*	8	NA			
	Heptachlor Epoxide	ug/kg	21.6	12.8	390 J	12.8	ug/kg	95% KM (BCA) UCL	Non-disc Dist; 1.0 < σ ≤ 1.5; All n; ND≥50%
	1,2-Dichlorobenzene	ug/kg	223	NA*	3600	NA			
	1,4-Dichlorobenzene	ug/kg	194	NA*	880	NA			

TABLE 3.02
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 LANDFILL AREA SOIL-TO-GROUNDWATER
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
	1-Methylnaphthalene	ug/kg	361	NA*	560	NA			
	2-Methylnaphthalene	ug/kg	356	NA*	9500	NA			
	Acenaphthene	ug/kg	491	NA*	33000	NA			
	Benz(a)anthracene	ug/kg	1575	3920	44500	3920	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Benzo(a)pyrene	ug/kg	1170	2890	34000	2890	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Benzo(b)fluoranthene	ug/kg	1265	3210	37500	3210	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Benzo(k)fluoranthene	ug/kg	958	2140	24500	2140	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Bis(2-ethylhexyl) Phthalate	ug/kg	566	NA*	12000	NA			
	Chrysene	ug/kg	1372	3580	36500	3580	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Dibenz(a,h)anthracene	ug/kg	172	280	2810	280	ug/kg	97.5% KM (Chebyshev) UCL	Lognormal; σ > 2-3; n≥50-60; ND>0%
	Fluorene	ug/kg	582	NA*	41000	NA			
	Indeno(1,2,3-cd)pyrene	ug/kg	647	1300	13800	1300	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Naphthalene	ug/kg	2224	776	14000	776	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Phenanthrene	ug/kg	3899	12500	151000	12500	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Pyrene	ug/kg	2190	NA*	140000	NA			
	1,2,3-Trichlorobenzene	ug/kg	100	NA*	5700	NA			
	1,2,4-Trichlorobenzene	ug/kg	204	NA*	310	NA			
	Benzene	ug/kg	33	NA*	78	NA			
	Bromomethane	ug/kg	34	NA*	8.2	NA			
	Ethylbenzene	ug/kg	2782	655	7000	655	ug/kg	95% KM (t) UCL	Number of detects=3; Detects exceed all DLs
	M,p-Xylene	ug/kg	409	NA*	18000	NA			
	O-Xylene	ug/kg	106	NA*	4000	NA			
	Styrene	ug/kg	63	NA*	3300	NA			
	Tetrachloroethene	ug/kg	33	NA*	210	NA			
	Toluene	ug/kg	1560	NA*	150000	NA			
	Trichloroethene	ug/kg	33	NA*	2.7	NA			
	Xylenes (Total)	ug/kg	398	NA*	20000	NA			

NA* - EPCs for soil-to-groundwater COPCs were not calculated separately because risk analysis was qualitative. (The only EPCs shown are those for substances also selected as COPCs for direct contact with soil exposure.)

TABLE 3.03
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 HANGAR AREA SOIL-TO-GROUNDWATER
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Groundwate

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Tap Water Contact or Water Vapors at Showerhead	Benz(a)anthracene	ug/kg	2029	1398.3463	4200	4200	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL
	Benzo(a)pyrene	ug/kg	1675	1133.749	3200	3200	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL
	Benzo(b)fluoranthene	ug/kg	2067	1412.6795	4200	4200	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL
	Benzo(k)fluoranthene	ug/kg	377	NA*	1400	NA*			
	Chrysene	ug/kg	684	NA*	3400	NA*			
	Dibenz(a,h)anthracene	ug/kg	420	314.59	580 J	580	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL
	Indeno(1,2,3-cd)pyrene	ug/kg	1102	736.0795	2000	2000	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL

NA* - EPCs for soil-to-groundwater COPCs were not calculated separately because risk analysis was qualitative. (The only EPCs shown are those for substances also selected as COPCs for direct contact with soil exposure.)

TABLE 3.04
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Hangar Area Surface Soil	Benz(a)anthracene	ug/kg	780	N/A	780	780	ug/kg	Maximum	n = 1
	Benzo(a)pyrene	ug/kg	860	N/A	860	860	ug/kg	Maximum	n = 1
	Benzo(b)fluoranthene	ug/kg	1100	N/A	1100	1100	ug/kg	Maximum	n = 1
	Dibenz(a,h)anthracene	ug/kg	180	N/A	180 J	180	ug/kg	Maximum	n = 1
	Indeno(1,2,3-cd)pyrene	ug/kg	680	N/A	680	680	ug/kg	Maximum	n = 1

TABLE 3.05
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 HANGAR AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Hangar Area Soil	Benz(a)anthracene	ug/kg	2029	1398	4200	4200	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL
	Benzo(a)pyrene	ug/kg	1675	1134	3200	3200	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL
	Benzo(b)fluoranthene	ug/kg	2067	1413	4200	4200	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL
	Dibenz(a,h)anthracene	ug/kg	420	315	580 J	580	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL
	Indeno(1,2,3-cd)pyrene	ug/kg	1102	736	2000	2000	ug/kg	Maximum	Number of detects<5; n=13, max<=10xDL

TABLE 3.06
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soi

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Landfill Area Surface Soil	Total 2,3,7,8-TCDD Equiv.	ug/kg	0.00855	N/A	0.0126	0.0126	ug/kg	Maximum	n<5,use Max
	Aluminum	mg/kg	15700	16400	24250	16400	mg/kg	95% Approximate Gamma UCL	Approx. Gamma; k ≥ 0.5; All n
	Antimony	mg/kg	1.38	1.33	10.4	1.33	mg/kg	95% KM (% Bootstrap) UCL	Non-disc dist; 0.5≤σ≤1.0; All n; ND≥40%
	Arsenic	mg/kg	4.92	5.35	13	5.35	mg/kg	95% Student's-t UCL	Normal; All n
	Cadmium	mg/kg	3.38	2.81	18.4	2.81	mg/kg	95% KM (% Bootstrap) UCL	Non-disc dist; 0.5≤σ≤1.0; All n; ND≥40%
	Chromium	mg/kg	20.5	21.4	33.3	21.4	mg/kg	95% Student's-t UCL	Normal; σ < 0.5; All n
	Cobalt	mg/kg	8.50	8.76	12.2	8.76	mg/kg	95% Student's-t UCL	Normal; σ < 0.5; All n
	Iron	mg/kg	20600	21700	55600	21700	mg/kg	95% Approximate Gamma UCL	Approx. Gamma; k ≥ 0.5; All n
	Manganese	mg/kg	633	678	1780	678	mg/kg	95% Approximate Gamma UCL	Approx. Gamma; k ≥ 0.5; All n
	Vanadium	mg/kg	30.0	31.6	45.7	31.6	mg/kg	95% Student's-t UCL	Normal; σ < 0.5; All n
	Dieldrin	ug/kg	84.1	138	620 J	138	ug/kg	95% KM (Chebyshev) UCL	Gamma; k ≤ 1; All n; ND < 30%
	Benz(a)anthracene	ug/kg	1456	5600	44500	5600	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Benzo(a)pyrene	ug/kg	1109	4210	34000	4210	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Benzo(b)fluoranthene	ug/kg	1142	4640	37500	4640	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Benzo(k)fluoranthene	ug/kg	825	3022	24500	3022	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Chrysene	ug/kg	1133	4690	36500	4690	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Dibenz(a,h)anthracene	ug/kg	146	270	2805	270	ug/kg	95% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40-50; ND≥50%
	Indeno(1,2,3-cd)pyrene	ug/kg	636	1900	13800	1900	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Naphthalene	ug/kg	2121	557	8375	557	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%, max>20xDL
	Phenanthrene	ug/kg	3661	17900	151000	17900	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%

TABLE 3.07
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
WITH METALS ELIMINATED THAT ARE WITHIN THE RANGE OF BACKGROUND
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Landfill Area Surface Soil	Total 2,3,7,8-TCDD Equiv.	ug/kg	0.00855	N/A	0.0126	0.0126	ug/kg	Maximum	n<5,use Max
	Aluminum	mg/kg	15700	16400	24250	16400	mg/kg	95% Approximate Gamma UCL	Approx. Gamma; k ≥ 0.5; All n
	Antimony	mg/kg	1.38	1.33	10.4	1.33	mg/kg	95% KM (% Bootstrap) UCL	Non-disc dist; 0.5≤σ≤1.0; All n; ND≥40%
	Cadmium	mg/kg	3.38	2.81	18.4	2.81	mg/kg	95% KM (% Bootstrap) UCL	Non-disc dist; 0.5≤σ≤1.0; All n; ND≥40%
	Chromium	mg/kg	20.5	21.4	33.3	21.4	mg/kg	95% Student's-t UCL	Normal; σ < 0.5; All n
	Cobalt	mg/kg	8.50	8.76	12.2	8.76	mg/kg	95% Student's-t UCL	Normal; σ < 0.5; All n
	Iron	mg/kg	20600	21700	55600	21700	mg/kg	95% Approximate Gamma UCL	Approx. Gamma; k ≥ 0.5; All n
	Vanadium	mg/kg	30.0	31.6	45.7	31.6	mg/kg	95% Student's-t UCL	Normal; σ < 0.5; All n
	Dieldrin	ug/kg	84.1	138	620 J	138	ug/kg	95% KM (Chebyshev) UCL	Gamma; k ≤ 1; All n; ND < 30%
	Benz(a)anthracene	ug/kg	1456	5600	44500	5600	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Benzo(a)pyrene	ug/kg	1109	4210	34000	4210	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Benzo(b)fluoranthene	ug/kg	1142	4640	37500	4640	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Benzo(k)fluoranthene	ug/kg	825	3022	24500	3022	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Chrysene	ug/kg	1133	4690	36500	4690	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Dibenz(a,h)anthracene	ug/kg	146	270	2805	270	ug/kg	95% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40-50; ND≥50%
	Indeno(1,2,3-cd)pyrene	ug/kg	636	1900	13800	1900	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%
	Naphthalene	ug/kg	2121	557	8375	557	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%, max>20xDL
	Phenanthrene	ug/kg	3661	17900	151000	17900	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc dist; 1.5<σ≤2.0; n≥40; ND<50%

TABLE 3.08
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 LANDFILL AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Landfill Area Soil	Total 2,3,7,8-TCDD Equiv.	ug/kg	0.141	NA	0.243	0.243	ug/kg	Maximum	N<5; use Maximum
	Aluminum	mg/kg	18566	19800	74700	19800	mg/kg	95% KM (BCA) UCL	Non-disc Dist; σ ≤ 0.5; All n
	Antimony	mg/kg	21.3	25.0	251	25.0	mg/kg	95% KM (Chebyshev) UCL	Non-disc Dist; 1.5<σ≤2; n≥40-50; ND≥50%
	Arsenic	mg/kg	5.52	6.21	32.4	6.21	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Cadmium	mg/kg	29.3	47.1	300	47.1	mg/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Chromium	mg/kg	32.3	39.4	348 J	39.4	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5≤σ≤1; n>50-70; ND<20%
	Cobalt	mg/kg	10.7	12.3	82.8	12.3	mg/kg	95% KM (BCA) UCL	Non-disc Dist; σ ≤ 0.5; All n
	Copper	mg/kg	311.0	967.0	9230	967.0	mg/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥50
	Iron	mg/kg	28980	33600	193000	33600	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Lead	mg/kg	322	800	4640	322	mg/kg	Mean-N	IEUBK Uses AVG
	Manganese	mg/kg	946	1320	20000	1320	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Mercury	mg/kg	0.682	1.15	7.1	1.15	mg/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Nickel	mg/kg	28.6	37.4	296 K	37.4	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Silver	mg/kg	18.4	16.0	233	16.0	mg/kg	95% KM (Chebyshev) UCL	Lognormal Dist; 1.5<σ≤2; n>40-50; ND≥50%
	Vanadium	mg/kg	34.7	44.5	559	44.5	mg/kg	95% KM (BCA) UCL	Non-disc Dist; σ ≤ 0.5; All n
	Zinc	mg/kg	522	1380	10135	1380	mg/kg	97.5% Chebyshev (Mean, Sd) UCL	Non-disc Dist; 1.0 < σ ≤ 2.0; n≥50
	4,4'-DDD	ug/kg	2410	4630	72000	4630	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	4,4'-DDE	ug/kg	311	603	8700	603	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	4,4'-DDT	ug/kg	7340	17300	270000	17300	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Aroclor-1248	ug/kg	326	N/A	560	560	ug/kg	Maximum	Number detects=2; Max ≤ 2x top 5% DLs
	Aroclor-1254	ug/kg	728	134	4000	134	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Aroclor-1260	ug/kg	173	45.1	600	45.1	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Dieldrin	ug/kg	196	701	10000	701	ug/kg	97.5% KM (Chebyshev) UCL	Lognormal; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Heptachlor Epoxide	ug/kg	21.6	12.8	390 J	12.8	ug/kg	95% KM (BCA) UCL	Non-disc Dist; 1.0 < σ ≤ 1.5; All n; ND≥50%
	Benz(a)anthracene	ug/kg	1575	3920	44500	3920	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Benzo(a)pyrene	ug/kg	1170	2890	34000	2890	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Benzo(b)fluoranthene	ug/kg	1265	3210	37500	3210	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Benzo(k)fluoranthene	ug/kg	958	2140	24500	2140	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Chrysene	ug/kg	1372	3580	36500	3580	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Dibenz(a,h)anthracene	ug/kg	172	280	2810	280	ug/kg	97.5% KM (Chebyshev) UCL	Lognormal; σ > 2-3; n≥50-60; ND>0%
	Indeno(1,2,3-cd)pyrene	ug/kg	647	1300	13800	1300	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Naphthalene	ug/kg	2224	776	14000	776	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Phenanthrene	ug/kg	3899	12500	151000	12500	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Ethylbenzene	ug/kg	2782	655	7000	655	ug/kg	95% KM (t) UCL	Number of detects=3; Detects exceed all DLs

TABLE 3.09
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 LANDFILL AREA SOIL
WITH METALS ELIMINATED THAT ARE WITHIN THE RANGE OF BACKGROUND
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Landfill Area Soil	Total 2,3,7,8-TCDD Equiv.	ug/kg	0.141	NA	0.243	0.243	ug/kg	Maximum	N<5; use Maximum
	Aluminum	mg/kg	18566	19800	74700	19800	mg/kg	95% KM (BCA) UCL	Non-disc Dist; σ ≤ 0.5; All n
	Antimony	mg/kg	21.3	25.0	251	25.0	mg/kg	95% KM (Chebyshev) UCL	Non-disc Dist; 1.5<σ≤2; n≥40-50; ND≥50%
	Cadmium	mg/kg	29.3	47.1	300	47.1	mg/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Chromium	mg/kg	32.3	39.4	348 J	39.4	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5≤σ≤1; n>50-70; ND<20%
	Cobalt	mg/kg	10.7	12.3	82.8	12.3	mg/kg	95% KM (BCA) UCL	Non-disc Dist; σ ≤ 0.5; All n
	Copper	mg/kg	311.0	967.0	9230	967.0	mg/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥50
	Iron	mg/kg	28980	33600	193000	33600	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Lead	mg/kg	322	800	4640	322	mg/kg	Mean-N	IEUBK Uses AVG
	Manganese	mg/kg	946	1320	20000	1320	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Mercury	mg/kg	0.682	1.15	7.1	1.15	mg/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Nickel	mg/kg	28.6	37.4	296 K	37.4	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Silver	mg/kg	18.4	16.0	233	16.0	mg/kg	95% KM (Chebyshev) UCL	Lognormal Dist; 1.5<σ≤2; n>40-50; ND≥50%
	Vanadium	mg/kg	34.7	44.5	559	44.5	mg/kg	95% KM (BCA) UCL	Non-disc Dist; σ ≤ 0.5; All n
	Zinc	mg/kg	522	1380	10135	1380	mg/kg	97.5% Chebyshev (Mean, Sd) UCL	Non-disc Dist; 1.0 < σ ≤ 2.0; n≥50
	4,4'-DDD	ug/kg	2410	4630	72000	4630	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	4,4'-DDE	ug/kg	311	603	8700	603	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	4,4'-DDT	ug/kg	7340	17300	270000	17300	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Aroclor-1248	ug/kg	326	N/A	560	560	ug/kg	Maximum	Number detects=2; Max ≤ 2x top 5% DLs
	Aroclor-1254	ug/kg	728	134	4000	134	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Aroclor-1260	ug/kg	173	45.1	600	45.1	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Dieldrin	ug/kg	196	701	10000	701	ug/kg	97.5% KM (Chebyshev) UCL	Lognormal; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Heptachlor Epoxide	ug/kg	21.6	12.8	390 J	12.8	ug/kg	95% KM (BCA) UCL	Non-disc Dist; 1.0 < σ ≤ 1.5; All n; ND≥50%
	Benz(a)anthracene	ug/kg	1575	3920	44500	3920	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Benzo(a)pyrene	ug/kg	1170	2890	34000	2890	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Benzo(b)fluoranthene	ug/kg	1265	3210	37500	3210	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Benzo(k)fluoranthene	ug/kg	958	2140	24500	2140	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Chrysene	ug/kg	1372	3580	36500	3580	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Dibenz(a,h)anthracene	ug/kg	172	280	2810	280	ug/kg	97.5% KM (Chebyshev) UCL	Lognormal; σ > 2-3; n≥50-60; ND>0%
	Indeno(1,2,3-cd)pyrene	ug/kg	647	1300	13800	1300	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 1.5 < σ ≤ 2.0; n≥40; ND<50%
	Naphthalene	ug/kg	2224	776	14000	776	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Phenanthrene	ug/kg	3899	12500	151000	12500	ug/kg	97.5% KM (Chebyshev) UCL	Non-disc Dist; 2.0<σ≤3.0; n≥50-60; ND≥0%
	Ethylbenzene	ug/kg	2782	655	7000	655	ug/kg	95% KM (t) UCL	Number of detects=3; Detects exceed all DLs

TABLE 3.10
EXPOSURE POINT CONCENTRATION SUMMARY - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Hangar Area Surface Soil Emissions to Ambient Air									

No EPCs were calculcated because no COPCs were selected for the soil to air pathway for exposure to Hangar Area Surface Soil.

TABLE 3.11
EXPOSURE POINT CONCENTRATION SUMMARY - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 HANGAR AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Hangar Area Soil Emissions to Ambient Air									

No EPCs were calculcated because no COPCs were selected for the soil to air pathway for exposure to Hangar Area Soil.

TABLE 3.12
EXPOSURE POINT CONCENTRATION SUMMARY - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Landfill Area Surface Soil	Chromium	mg/kg	20.5	21.4	33.3	21.4	mg/kg	95% Student's-t UCL	Normal; σ < 0.5; All n
Emissions to Ambient Air	Naphthalene	ug/kg	2120.8625	557	8375	557	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%, max>20xDL

TABLE 3.13
EXPOSURE POINT CONCENTRATION SUMMARY - SOIL TO AIR PATHWAY EXPOSURE TO SITE 3 LANDFILL AREA SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Landfill Area Soil	Chromium	mg/kg	32.3	39.4	348 J	39.4	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5≤σ≤1; n>50-70; ND<20%
Emissions to Ambient Air	Manganese	mg/kg	946.0	1320.0	20000	1320	mg/kg	95% KM (BCA) UCL	Non-disc Dist; 0.5 < σ ≤ 1.0; All n
	Naphthalene	ug/kg	2224	776	14000	776	ug/kg	95% KM (t) UCL	Gamma; k ≤ 1; All n; ND≥50%
	Ethylbenzene	ug/kg	2782	655	7000	655	ug/kg	95% KM (t) UCL	Number of detects=3; Detects exceed all DLs

TABLE 3 (RAGS D 3.14)
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 SURFACE WATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Water Contact	Chromium	ug/L	1.3	1.167	1.3	1.17	ug/L	95% KM (t)	Normal Dist.; σ ≤ 0.5; ND > 0%
	Benzo(a)pyrene	ug/L	0.0638	0.0993	0.047 J	0.047	ug/L	Maximum	Number of detects=3; Max = 95% KM % Bootstrap UCL

TABLE 3 (RAGS D 3.15)
EXPOSURE POINT CONCENTRATION SUMMARY - EXPOSURE TO SITE 3 SEDIMENT
REASONABLE MAXIMUM EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site 3 Sediment	Arsenic	mg/kg	6.4	N/A	11.1	11.1	mg/kg	Maximum	n<5,use Max
	Chromium	mg/kg	16.3	26.1	34.8	26.1	mg/kg	95% Approximate Gamma UCL	Approx. Gamma; k ≥ 0.5; All n
	Benzo(a)pyrene	ug/kg	543	976	1400 J	976	ug/kg	95% Student's-t UCL	Normal; All n
	Benzo(b)fluoranthene	ug/kg	918	3070	2500	3070	ug/kg	95% Approximate Gamma UCL	Approx. Gamma; k ≥ 0.5; All n
	Dibenz(a,h)anthracene	ug/kg	166	306	380 J	306	ug/kg	95% Student's-t UCL	Normal; All n

LIST OF TABLES
RAGS PART D TABLE 4
VALUES USED FOR DAILY INTAKE CALCULATIONS

TABLE NO.

REASONABLE MAXIMUM EXPOSURES

4.01.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 GROUNDWATER
4.02.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER
4.03.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 GROUNDWATER
4.04.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 SOIL*
4.05.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 SOIL*
4.06.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 SOIL*
4.07.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SOIL*
4.08.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*
4.09.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*
4.10.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SURFACE WATER
4.11.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
4.12.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
4.13.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SEDIMENT
4.14.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT
4.15.RME	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT

CENTRAL TENDENCY EXPOSURES

4.01.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 GROUNDWATER
4.02.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER
4.03.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 GROUNDWATER
4.04.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 SOIL*
4.05.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 SOIL*
4.06.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 SOIL*
4.07.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SOIL*
4.08.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*
4.09.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*
4.10.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SURFACE WATER
4.11.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
4.12.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
4.13.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SEDIMENT
4.14.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT
4.15.CTE	VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT

TABLE 4.01.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 GROUNDWATER

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Site 3	CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-W	Ingestion Rate of Groundwater	1.29	L/day	USEPA, 1997	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2004	BW x AT
				ED	Exposure Duration	6	years	USEPA, 2004	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	
Dermal	Resident	Child	Site 3	CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	6,600	cm2	USEPA, 2004	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	USEPA, 2004	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	1	hours/event	USEPA, 2004	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	350	events/year	USEPA, 2004	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	6	years	USEPA, 2004	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

TABLE 4.02.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Site 3	CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-W	Ingestion Rate of Groundwater	2	L/day	USEPA, 1997	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2004	BW x AT
				ED	Exposure Duration	24	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
Dermal	Resident	Adult	Site 3	CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	18,000	cm2	USEPA, 2004	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	USEPA, 2004	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	0.5	hours/event	USEPA, 2006	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	350	events/year	USEPA, 2004	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	24	years	USEPA, 2004	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2006: Recommended by Region 3 EPA.

TABLE 4.02a.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Inhalation of Vapors During Showering	EF	Exposure Frequency	350	days/year	USEPA, 2004	EC (mg/m3) = (EC-event x ET x EF x ED) / (AT)
				ED	Exposure Duration	24	years	USEPA, 2004	(Exposure Concentration equivalent to continuous exposure over averaging period)
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	where:
				AT-N	Averaging Time (Non-Cancer)	210240	hours	USEPA, 2009	AT-C = 24 hrs/day x 365 days/yr x 70 years & AT-N = 24 hrs/day x 365 days/yr x ED yrs
				ET	Exposure Time	derived	hours/day	USEPA, 2009	ET (hours/day) = (Dt min/shower / (60 min/hr)) x (1 shower / day)
				EC-event	Exposure Concentration equivalent to steady exposure during 1 shower	Derived	mg/m3	USEPA, 2009	EC-event (mg/m3) = (S x Q) / (Ra x CF1 x Dt)
				CF1	Conversion Factor	1000	ug/mg		(Exposure Concentration equivalent to steady exposure during one shower event)
				Q	Function of Air Exchange Rate & Time in Shower & Shower Room	15.68	min	Calculated	
				Ds	Duration of Shower	30	min	USEPA, 2006	where: Q = Ds + [(exp(-Ra x Dt))/Ra] - [(exp(Ra x (Ds - Dt)))/Ra]
				Dt	Total Time in Shower Room (considered the Micro-Event Time - ET)	60	min	USEPA, 2006	
				Ra	Rate of Air Exchange	0.01667	1/min	Fos&Chr, 1987	
				S	Indoor VOC Generation Rate	Chemical Specific	ug/m3/min	Fos&Chr, 1987	where: S = CWD x FR/SV
				FR	Shower Flow Rate	10	l/min	USEPA, 2006	
				SV	Shower Room Air Volume	12	m3	USEPA, 2006	
				CWD	Chemical Concentration Leaving Water Droplet after time ts	Chemical Specific	ug/l	Fos&Chr, 1987	where: CWD = CW x {1-exp[-KaL x ts x (6/d) x CF2 x CF3]}
				CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002a	
				CF2	Conversion Factor	1/3600	hr/sec		
				CF3	Conversion Factor	10	mm/cm		
				ts	Shower Droplet Time	0.5	sec	USEPA, 2006	
				d	Shower Droplet Diameter	1	mm	Fos&Chr, 1987	
				KaL	Adjusted overall mass transfer coefficient	Chemical Specific	cm/hr	Fos&Chr, 1987	where: KaL = KL/SQRT[(T1 x us)/(Ts x u1)]
				T1	Calibration Water Temperature of KL	293	K	Fos&Chr, 1987	
				Ts	Shower Water Temperature	318	K	Fos&Chr, 1987	
				u1	Water Viscosity at T1	1.002	centipose	Fos&Chr, 1987	
				us	Water Viscosity at Ts	0.596	centipose	Fos&Chr, 1987	

TABLE 4.02a.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Inhalation of Vapors During Showering	KL	Mass Transfer Coefficient	Chemical Specific	cm/hr	Fos&Chr, 1987	where: KL = 1/[(1/KL) + ((R x T)/(H x kg))]
				R	Ideal Gas law Constant	8.21E-05	atm m3/mole/K	Fos&Chr, 1987	
				T	Absolute Temperature	293	K	Fos&Chr, 1987	
				H	Henry's law Constant	Chemical Specific	atm m3/mole	USEPA, 2002b	
				kg	Gas-film Mass Transfer Coefficient	Chemical Specific	cm/hr	Fos&Chr, 1987	where: kg = kH x SQRT[MWH/MW]
				kl	Liquid-film Mass Transfer Coefficient	Chemical Specific	cm/hr	Fos&Chr, 1987	where: kl = kC x SQRT[MWC/MW]
				kH	Gas-film Mass Transfer Coefficient for Water	3000	cm/hr	Fos&Chr, 1987	
				kC	Liquid-film Mass Transfer Coefficient for Carbon Dioxide	20	cm/hr	Fos&Chr, 1987	
				MWH	Molecular Weight of Water	18	g/mole	Fos&Chr, 1987	
				MWC	Molecular Weight of Carbon Dioxide	44	g/mole	Fos&Chr, 1987	
				MW	Molecular Weight of COPC	Chemical Specific	g/mole	Fos&Chr, 1987	

Sources

USEPA, 2001. Fact Sheet. Correcting the Henry's Law Constant for Soil Temperature, from website: http://www.USEPA.gov/superfund/programs/risk/airmodel/factsheet.pdf

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2006: Recommended by Region 3 EPA.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

Foster, S. A. and P.C. Chrostowski. 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. Presented at the 80th Annual Meeting of the Air Pollution Control Association. New York, NY. June.

Default Henry's Law Constants (HLCs) at 25 degrees C obtained from EPA, 1996. See appendix for conversion of HLCs to showering temperature using EPA, 2001.

TABLE 4.03.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 GROUNDWATER

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	Construction Worker	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	2,077	cm2	USEPA, 1997, see (c)	$\frac{CW \times SA \times KP \times Function(ET) \times EV \times EF \times ED \times CF1 \times CF2}{(BW \times AT)}$
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	(a)	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	2	hours/event	(a)	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	130	events/year	(b)	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	1	year	(b)	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Contact with groundwater for 2 hours out of 8 hour workday.

(b). Professional Judgment. 6 months exposure is 26 weeks per year, 5 days per week, for one year exposure duration.

(c). Professional Judgment. Assumes shallow standing water in excavation area allowing contact with hands (904 cm2) and forearms (1173 cm2).

TABLE 4.03a.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 GROUNDWATER

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Worker	Adult	Inhalation of Ambient Air VOCs from Groundwater	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	EC (mg/m3) = (CW x VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Groundwater	Chemical-Specific	l/m3	ASTM, 1995	(Exposure Concentration equivalent to continuous exposure over averaging period)
				ET	Exposure Time	2	hours/day	(a)	Where VF = function of soil properties, Henrys Law &Diffusion Coef.
				EF	Exposure Frequency	130	days/year	(b)	Model Equations From ASTM E 1739 -95, 1995
				ED	Exposure Duration	1	year	(b)	
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	8760	hours	USEPA, 2009	

Sources:

American Society for Testing and Materials (ASTM). 1995. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites. ASTM Designation E 1739 – 95. West Comshohocken, PA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. Inhalation of ambient air VOCs in excavation area containing standing groundwater for 2 hours each workday.

(b). Professional Judgment. 6 months exposure is 26 weeks per year, 5 days per week, for one year exposure duration.

TABLE 4.04.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	200	mg/day	USEPA, 1997	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	6	years	USEPA, 2004	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	
Dermal	Resident	Child	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,800	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	6	years	USEPA, 2004	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Fraction ingested is 100% from source.

TABLE 4.04a.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Child	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	12	hours/day	(a)	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	6	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	52560	hours	USEPA, 2009	
Inhalation	Resident	Child	Inhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	12	hours/day	(a)	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	6	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	52560	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. 12 Hours per day of outdoor exposure based on entire day spent at residence.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.05.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 2002b, 2006	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	24	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
Dermal	Resident	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	5,700	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	24	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA Region 3, 2006: Background Information for Risk-Based Concentration Table.

(a). Professional Judgment. Fraction ingested is 100% from source.

TABLE 4.05a.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	12	hours/day	(a)	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	24	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	210240	hours	USEPA, 2009	
Inhalation	Resident	Adult	Inhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	12	hours/day	(a)	
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	24	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	210240	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. 12 Hours per day of outdoor exposure based on entire day spent at residence.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.06.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Industrial Worker	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 2002b, 2006	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IR-S x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	250	days/year	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	
Dermal	Industrial Worker	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	250	days/year	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA Region 3, 2006:Risk-Based Concentration Table, April.

(a). Professional Judgment. Fraction ingested is 100% from source.

TABLE 4.06a.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Worker	Adult	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	8	hours/day	(a)	
				EF	Exposure Frequency	250	days/year	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	219000	hours	USEPA, 2009	
Inhalation	Industrial Worker	Adult	halation of Ambient air VOCs from Site 3 Soil	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	8	hours/day	(a)	
				EF	Exposure Frequency	250	days/year	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	219000	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. Assumes full time outdoor worker.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.07.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Worker	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	330	mg/day	USEPA, 2002b	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IR-S x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	130	days/year	(b)	
				ED	Exposure Duration	1	years	(b)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
Dermal	Construction Worker	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	130	days/year	(b)	
				ED	Exposure Duration	1	years	(b)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Fraction ingested is 100% from source.

(b). Professional Judgment. 6 months exposure is 26 weeks per year, 5 days per week, for one year exposure duration.

TABLE 4.07a.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Worker	Adult	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	8	hours/day	(a)	
				EF	Exposure Frequency	130	days/year	(b)	
				ED	Exposure Duration	1	years	(b)	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	8760	hours	USEPA, 2009	
Inhalation	Construction Worker	Adult	nhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	8	hours/day	(a)	
				EF	Exposure Frequency	130	days/year	(b)	
				ED	Exposure Duration	1	years	(b)	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	8760	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. Fraction ingested is 100% from source.

(b). Professional Judgment. 6 months exposure is 26 weeks per year, 5 days per week, for one year exposure duration.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.08.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Child	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	200	mg/day	USEPA, 1997	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	104	days/year	(b)	
				ED	Exposure Duration	6	years	USEPA, 2004	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	
Dermal	Recreational Person	Child	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,800	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	104	days/year	(b)	
				ED	Exposure Duration	6	years	USEPA, 2004	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Fraction ingested is 100% from source.

(b). Professional Judgment. Assumes 3 days per week from May through October, one day per week for November through April.

TABLE 4.08a.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Recreational Person	Child	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	3	hours/day	(a)	
				EF	Exposure Frequency	104	days/year	(c)	
				ED	Exposure Duration	6	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	52560	hours	USEPA, 2009	
Inhalation	Recreational Person	Child	Inhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	3	hours/day	(a)	
				EF	Exposure Frequency	104	days/year	(b)	
				ED	Exposure Duration	6	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	52560	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. 3 Hours per day of outdoor exposure based on activities at neighborhood ball park or playground.

(b). Professional Judgment. Assumes 3 days per week from May through October, one day per week for November through April.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.09.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 2002b, 2006	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	104	days/year	(b)	
				ED	Exposure Duration	24	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
Dermal	Recreational Person	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	5,700	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	104	days/year	(b)	
				ED	Exposure Duration	24	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA Region 3, 2006: Background Information for Risk-Based Concentration Table.

(a). Professional Judgment. Fraction ingested is 100% from source.

(b). Professional Judgment. Assumes 3 days per week from May through October, one day per week for November through April.

TABLE 4.09a.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Recreational Person	Adult	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	3	hours/day	(a)	
				EF	Exposure Frequency	104	days/year	(b)	
				ED	Exposure Duration	24	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	210240	hours	USEPA, 2009	
Inhalation	Recreational Person	Adult	halation of Ambient air VOCs from Site 3 Soil	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	3	hours/day	(a)	
				EF	Exposure Frequency	104	days/year	(b)	
				ED	Exposure Duration	24	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	210240	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. 3 Hours per day of outdoor exposure based on activities at neighborhood baseball field or park.

(b). Professional Judgment. Assumes 3 days per week from May through October, one day per week for November through April.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.10.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SURFACE WATER

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Worker	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				IR-W	Ingestion Rate of Surface Water	liters/day	0.005	(a)	
				CF	Conversion factor	0.001	ug/mg	- -	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	130	events/year	(b)	BW x AT
				ED	Exposure Duration	1	year	(b)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
Dermal	Construction Worker	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	2,077	cm2	USEPA, 1997, see (c)	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	(a)	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	2	hours/event	(a)	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	130	events/year	(b)	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	1	year	(b)	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment.

(b). Professional Judgment. 6 months exposure is 26 weeks per year, 5 days per week, for one year exposure duration.

(c). Professional Judgment. Assumes shallow creek with less than 12 inches of water allowing contact with hands (904 cm2) and forearms (1173 cm2).

TABLE 4.11.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Child	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				IR-W	Ingestion Rate of Surface Water	liters/day	0.005	(a)	
				CF	Conversion factor	0.001	ug/mg	- -	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	52	events/year	(b)	BW x AT
				ED	Exposure Duration	6	years	USEPA, 2004	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	
Dermal	Recreational Person	Child	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	2,222	cm2	USEPA, 1997, see (c)	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	(a)	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	2	hours/event	(a)	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	52	days/year	(b)	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	6	years	USEPA, 2004	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment.

(b). Professional Judgment. Assumes 2 days per week from May through October.

(c). Professional Judgment. Assumes shallow creek with less than 12 inches of water allowing contact with hands (430 cm2), forearms (472 cm2), lower legs (779 cm2), and feet (541 cm2).

TABLE 4.12.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				IR-W	Ingestion Rate of Surface Water	liters/day	0.005	(a)	
				CF	Conversion factor	0.001	ug/mg	- -	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	52	events/year	(b)	BW x AT
				ED	Exposure Duration	24	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
Dermal	Recreational Person	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	2,077	cm2	USEPA, 1997, see (c)	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	(a)	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	2	hours/event	(a)	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	52	days/year	(b)	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	24	years	USEPA, 2004	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment.

(b). Professional Judgment. Assumes 2 days per week from May through October.

(c). Professional Judgment. Assumes shallow creek with less than 12 inches of water allowing contact with hands (904 cm2) and forearms (1173 cm2).

TABLE 4.13.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SEDIMENT

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Worker	Adult	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	330	mg/day	USEPA, 2002b	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	$\frac{CS \times IR\text{-}S \times CF3 \times FI \times EF \times ED}{BW \times AT}$
				FI	Fraction Ingested	1	unitless	(a)	
				EF	Exposure Frequency	130	days/year	(b)	
				ED	Exposure Duration	1	years	(b)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
Dermal	Construction Worker	Adult	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	$\frac{CS \times CF3 \times SA \times SSAF \times DABS \times EF \times ED}{BW \times AT}$
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	130	days/year	(b)	
				ED	Exposure Duration	1	years	(b)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Fraction ingested is 100% from source.

(b). Professional Judgment. 6 months exposure is 26 weeks per year, 5 days per week, for one year exposure duration.

Table 4.14.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Child	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	(a)	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(b)	BW x AT
				EF	Exposure Frequency	52	days/year	(c)	
				ED	Exposure Duration	6	years	USEPA, 2004	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	
Dermal	Recreational Person	Child	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,800	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	52	days/year	(c)	
				ED	Exposure Duration	6	years	USEPA, 2004	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Assume sediment incidental ingestion is one-half value for soil incidental ingestion due to anticipated shorter exposure time per day.

(b). Professional Judgment. Fraction ingested is 100% from source.

(c). Professional Judgment. Assumes 2 days per week from May through October.

TABLE 4.15.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT

REASONABLE MAXIMUM EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Adult	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	(a)	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CSs x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(b)	BW x AT
				EF	Exposure Frequency	52	days/year	(c)	
				ED	Exposure Duration	24	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	
Dermal	Recreational Person	Adult	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	5,700	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	52	days/year	(c)	
				ED	Exposure Duration	24	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Assume sediment incidental ingestion is one-half value for soil incidental ingestion due to anticipated shorter exposure time per day.

(b). Professional Judgment. Fraction ingested is 100% from source.

(c). Professional Judgment. Assumes 2 days per week from May through October.

TABLE 4.01.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 GROUNDWATER

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Site 3	CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-W	Ingestion Rate of Groundwater	0.74	L/day	USEPA, 1997	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2004	BW x AT
				ED	Exposure Duration	2	years	USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	
Dermal	Resident	Child	Site 3	CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	6,600	cm2	USEPA, 2004	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	USEPA, 2004	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	0.33	hours/event	USEPA, 2004	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	350	events/year	USEPA, 2004	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	2	years	USEPA, 1993	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

TABLE 4.02.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Site 3	CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-W	Ingestion Rate of Groundwater	1.4	L/day	USEPA, 1997	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2004	BW x AT
				ED	Exposure Duration	7	years	USEPA, 1997	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	
Dermal	Resident	Adult	Site 3	CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	18,000	cm2	USEPA, 2004	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	USEPA, 2004	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	0.167	hours/event	USEPA, 1997	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	350	events/year	USEPA, 2004	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	7	years	USEPA, 1997	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

TABLE 4.02a.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER
CENTRAL TENDENCY EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Inhalation of Vapors During Showering	EF	Exposure Frequency	350	days/year	USEPA, 2004	EC (mg/m3) = (EC-event x ET x EF x ED) / (AT)
				ED	Exposure Duration	7	years	USEPA, 1997	(Exposure Concentration equivalent to continuous exposure over averaging period)
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	where:
				AT-N	Averaging Time (Non-Cancer)	61320	hours	USEPA, 2009	AT-C = 24 hrs/day x 365 days/yr x 70 years & AT-N = 24 hrs/day x 365 days/yr x ED yrs
				ET	Exposure Time	derived	hours/day	USEPA, 2009	ET (hours/day) = (Dt min/shower / (60 min/hr)) x (1 shower / day)
				EC-event	Exposure Concentration equivalent to steady exposure during 1 shower	Derived	mg/m3	USEPA, 2009	EC-event (mg/m3) = (S x Q) / (Ra x CF1 x Dt)
				CF1	Conversion Factor	1000	ug/mg		(Exposure Concentration equivalent to steady exposure during one shower event)
				Q	Function of Air Exchange Rate & Time in Shower & Shower Room	2.7897	min	Fos&Chr, 1987	
				Ds	Duration of Shower	10	min	USEPA, 1997	where: Q = Ds + [(exp(-Ra x Dt))/Ra] - [(exp(Ra x (Ds - Dt)))/Ra]
				Dt	Total Time in Shower Room	20	min	USEPA, 1997	
				Ra	Rate of Air Exchange	0.01667	1/min	Fos&Chr, 1987	
				S	Indoor VOC Generation Rate	Chemical Specific	ug/m3/min	Fos&Chr, 1987	where: S = CWD x FR/SV
				FR	Shower Flow Rate	10	l/min	Prof. Judgment	
				SV	Shower Room Air Volume	12	m3	USEPA, 1997	
				CWD	Chemical Concentration Leaving Water Droplet after time ts	Chemical Specific	ug/l	Fos&Chr, 1987	where: CWD = CW x {1-exp[-KaL x ts x (6/d) x CF2 x CF3]}
				CW	Chemical Concentration in Groundwater	Max or 95% UCL	ug/l	USEPA, 2002a	
				CF2	Conversion Factor	1/3600	hr/sec		
				CF3	Conversion Factor	10	mm/cm		
				ts	Shower Droplet Time	0.5	sec	Fos&Chr, 1987	
				d	Shower Droplet Diameter	1	mm	Fos&Chr, 1987	
				KaL	Adjusted overall mass transfer coefficient	Chemical Specific	cm/hr	Fos&Chr, 1987	where: KaL = KL/SQRT[(T1 x us)/(Ts x u1)]
				T1	Calibration Water Temperature of KL	293	K	Fos&Chr, 1987	
				Ts	Shower Water Temperature	318	K	Fos&Chr, 1987	
				u1	Water Viscosity at T1	1.002	centipose	Fos&Chr, 1987	
				us	Water Viscosity at Ts	0.596	centipose	Fos&Chr, 1987	

TABLE 4.02a.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Inhalation of Vapors During Showering	KL	Mass Transfer Coefficient	Chemical Specific	cm/hr	Fos&Chr, 1987	where: KL = 1/[(1/Kl) + ((R x T)/(H x kg))]
				R	Ideal Gas law Constant	8.21E-05	atm m3/mole/K	Fos&Chr, 1987	
				T	Absolute Temperature	293	K	Fos&Chr, 1987	
				H	Henry's law Constant	Chemical Specific	atm m3/mole	USEPA, 2002b	
				kg	Gas-film Mass Transfer Coefficient	Chemical Specific	cm/hr	Fos&Chr, 1987	where: kg = kH x SQRT[MWH/MW]
				kl	Liquid-film Mass Transfer Coefficient	Chemical Specific	cm/hr	Fos&Chr, 1987	where: kl = kC x SQRT[MWC/MW]
				kH	Gas-film Mass Transfer Coefficient for Water	3000	cm/hr	Fos&Chr, 1987	
				kC	Liquid-film Mass Transfer Coefficient for Carbon Dioxide	20	cm/hr	Fos&Chr, 1987	
				MWH	Molecular Weight of Water	18	g/mole	Fos&Chr, 1987	
				MWC	Molecular Weight of Carbon Dioxide	44	g/mole	Fos&Chr, 1987	
				MW	Molecular Weight of COPC	Chemical Specific	g/mole	Fos&Chr, 1987	

Sources

(a). Professional Judgment. Inhalation rate (IR) during showering corresponds to light acitivity (1.0 m3/hr) based on IR estimates for activity categories presented in EPA, 1997.

USEPA, 2001. Fact Sheet. Correcting the Henry's Law Constant for Soil Temperature, from website: http://www.USEPA.gov/superfund/programs/risk/airmodel/factsheet.pdf

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

Foster, S. A. and P.C. Chrostowski. 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. Presented at the 80th Annual Meeting of the Air Pollution Control Association. New York, NY. June.

Default Henry's Law Constants (HLCs) at 25 degrees C obtained from EPA, 1996. See appendix for conversion of HLCs to showering temperature using EPA, 2001.

TABLE 4.03.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 GROUNDWATER

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	Construction Worker	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	2,077	cm2	USEPA, 1997, see (c)	$\frac{CW \times SA \times KP \times Function(ET) \times EV \times EF \times ED \times CF1 \times CF2}{(BW \times AT)}$
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	(a)	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	2	hours/event	(a)	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	43	events/year	(b)	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	1	year	(b)	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Contact with groundwater for 2 hours out of 8 hour workday.

(b). Professional Judgment. 2 months exposure is 5 days per week, for one year exposure duration.

(c). Professional Judgment. Assumes shallow standing water in excavation area allowing contact with hands (904 cm2) and forearms (1173 cm2).

TABLE 4.03a.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 GROUNDWATER

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Worker	Adult	Inhalation of Ambient Air VOCs from Groundwater	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	EC (mg/m3) = (CW x VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Groundwater	Chemical-Specific	l/m3	ASTM, 1995	(Exposure Concentration equivalent to continuous exposure over averaging period)
				ET	Exposure Time	1	hours/day	(a)	Where VF = function of soil properties, Henrys Law &Diffusion Coef.
				EF	Exposure Frequency	43	days/year	(b)	Model Equations From ASTM E 1739 -95, 1995
				ED	Exposure Duration	1	year	(b)	
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	8760	hours	USEPA, 2009	

Sources:

American Society for Testing and Materials (ASTM). 1995. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites. ASTM Designation E 1739 – 95. West Comshohocken, PA.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. Inhalation of ambient air VOCs in excavation area containing standing groundwater for 2 hours out of 8 hour workday.

(b). Professional Judgment. 2 months exposure is 5 days per week, for one year exposure duration.

TABLE 4.04.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1997	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED	Exposure Duration	2	years	USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	
Dermal	Resident	Child	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,800	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED	Exposure Duration	2	years	USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Fraction ingested is 100% from source.

TABLE 4.04a.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RESIDENT CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Child	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	6	hours/day	(a)	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED	Exposure Duration	2	years	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	17520	hours	USEPA, 2009	
Inhalation	Resident	Child	Inhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	6	hours/day	(a)	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED	Exposure Duration	2	years	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	17520	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. 6 Hours per day of outdoor exposure based on entire day spent at residence. One-half of RME value.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.05.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	USEPA, 1997	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED	Exposure Duration	7	years	USEPA, 1997	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	
Dermal	Resident	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	5,700	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.01	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED	Exposure Duration	7	years	USEPA, 1997	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Fraction ingested is 100% from source.

TABLE 4.05a.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RESIDENT CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	6	hours/day	(a)	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED	Exposure Duration	7	years	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	61320	hours	USEPA, 2009	
Inhalation	Resident	Adult	Inhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	6	hours/day	(a)	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED	Exposure Duration	7	years	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	61320	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. Value is one-half of RME value.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.06.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Industrial Worker	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	(b)	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IR-S x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	219	days/year	USEPA, 2004	
				ED	Exposure Duration	9	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3285	days	USEPA, 1989	
Dermal	Industrial Worker	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.02	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	219	days/year	USEPA, 2004	
				ED	Exposure Duration	9	years	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3285	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Fraction ingested is 100% from source.

(b). Professional Judgment. Assume CTE value is one-half of RME value.

TABLE 4.06a.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Worker	Adult	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	8	hours/day	(a)	
				EF	Exposure Frequency	219	days/year	USEPA, 2004	
				ED	Exposure Duration	9	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	78840	hours	USEPA, 2009	
Inhalation	Industrial Worker	Adult	nhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	8	hours/day	(a)	
				EF	Exposure Frequency	219	days/year	USEPA, 2004	
				ED	Exposure Duration	9	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	78840	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. Assumes full time outdoor worker.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.07.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Worker	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	165	mg/day	(a)	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IR-S x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(b)	BW x AT
				EF	Exposure Frequency	43	days/year	(c)	
				ED	Exposure Duration	1	years	(c)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
Dermal	Construction Worker	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.02	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	43	days/year	(c)	
				ED	Exposure Duration	1	years	(c)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Assume CTE value is one-half of RME value.

(b). Professional Judgment. Fraction ingested is 100% from source.

(c). Professional Judgment. 2 months exposure is 5 days per week, for one year exposure duration.

TABLE 4.07a.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Worker	Adult	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	8	hours/day	(a)	
				EF	Exposure Frequency	43	days/year	(b)	
				ED	Exposure Duration	1	years	(b)	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	8760	hours	USEPA, 2009	
Inhalation	Construction Worker	Adult	Inhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	8	hours/day	(a)	
				EF	Exposure Frequency	43	days/year	(b)	
				ED	Exposure Duration	1	years	(b)	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	8760	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. Fraction ingested is 100% from source.

(b). Professional Judgment. 2 months exposure is 5 days per week, for one year exposure duration.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.08.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Child	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 1997	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IR-S x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	52	days/year	(b)	
				ED	Exposure Duration	2	years	USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	
Dermal	Recreational Person	Child	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,800	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	52	days/year	(b)	
				ED	Exposure Duration	2	years	USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Fraction ingested is 100% from source.

(b). Professional Judgment. CTE value is one-half of RME value.

TABLE 4.08a.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Recreational Person	Child	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	2	hours/day	(a)	
				EF	Exposure Frequency	52	days/year	(c)	
				ED	Exposure Duration	2	years	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	17520	hours	USEPA, 2009	
Inhalation	Recreational Person	Child	Inhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	2	hours/day	(a)	
				EF	Exposure Frequency	52	days/year	(b)	
				ED	Exposure Duration	2	years	USEPA, 1993	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	17520	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. 2 Hours per day of outdoor exposure based on activities at neighborhood ball park or playground.

(b). Professional Judgment. CTE value one-half of RME value.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.09.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	USEPA, 1997	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(a)	BW x AT
				EF	Exposure Frequency	52	days/year	(b)	
				ED	Exposure Duration	7	years	USEPA, 1997	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	
Dermal	Recreational Person	Adult	Site 3	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	5,700	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.01	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	52	days/year	(b)	
				ED	Exposure Duration	7	years	USEPA, 1997	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Fraction ingested is 100% from source.

(b). Professional Judgment. CTE value is one-half of RME value.

TABLE 4.09a.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SOIL*

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Soil*
Exposure Medium: Soil*

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Recreational Person	Adult	Particulate Dust Inhalation from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/PEF x CF1) x ET x EF x ED / AT
				PEF	Particulate Emission Factor from Soil	3.236E+09**	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	2	hours/day	(a)	
				EF	Exposure Frequency	52	days/year	(b)	
				ED	Exposure Duration	7	years	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	61320	hours	USEPA, 2009	
Inhalation	Recreational Person	Adult	Inhalation of Ambient air VOCs from Site 3 Soil*	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	EC (mg/m3) = (CS/VF x CF1) x ET x EF x ED / AT
				VF	Volatilization Factor from Soil	chemical specific	m3/kg	USEPA, 2002b	(Exposure Concentration equivalent to continuous exposure over averaging period)
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				ET	Exposure Time	2	hours/day	(a)	
				EF	Exposure Frequency	52	days/year	(b)	
				ED	Exposure Duration	7	years	USEPA, 1997	
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	
				AT-N	Averaging Time (Non-Cancer)	61320	hours	USEPA, 2009	

"Soil*" Represents surface and subsurface soils that are mixed as a result of construction or landscaping activities.

These exposure parameters are also valid for contact with Surface Soil.

Sources:

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. (Application of guidance to PEF and VF calculation is presented in text.)

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002. (Note RAGS Part F specifies inhalation averaging time should be in hours rather than days.)

(a). Professional Judgment. 2 Hours per day of outdoor exposure based on activities at neighborhood baseball field or park.

(b). Professional Judgment. CTE value one-half of RME value.

**A PEF value of 3.236E+09 is used for the Ninth Street Landfill, based on a source size of 9 acres, A PEF of 5.25E+09 is used for the hangar area, source size 0.5 acre.

TABLE 4.10.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SURFACE WATER

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Worker	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				IR-W	Ingestion Rate of Surface Water	liters/day	0.002	(a)	
				CF	Conversion factor	0.001	ug/mg	- -	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	43	events/year	(b)	BW x AT
				ED	Exposure Duration	1	year	(b)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
Dermal	Construction Worker	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	2,077	cm2	USEPA, 1997, see (c)	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	(a)	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	1	hours/event	(a)	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	43	events/year	(b)	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	1	year	(b)	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. One event per day. CTE ingestion rate and CTE exposure time are one-half of RME values.

(b). Professional Judgment. 2 months exposure is 5 days per week, for one year exposure duration.

(c). Professional Judgment. Assumes shallow creek with less than 12 inches of water allowing contact with hands (904 cm2) and forearms (1173 cm2).

TABLE 4.11.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Child	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				IR-W	Ingestion Rate of Surface Water	liters/day	0.002	(a)	
				CF	Conversion factor	0.001	ug/mg	- -	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	26	events/year	(b)	BW x AT
				ED	Exposure Duration	2	years	USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	
Dermal	Recreational Person	Child	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	971	cm2	USEPA, 1997, see (c)	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	(a)	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	2	hours/event	(a)	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	26	days/year	(b)	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	2	years	USEPA, 1993	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment.

(b). Professional Judgment. Assumes 1 days per week from May through October.

(c). Professional Judgment. Assumes shallow creek with less than 12 inches of water allowing contact with hands (430 cm2) and feet (541 cm2).

TABLE 4.12.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				IR-W	Ingestion Rate of Surface Water	liters/day	0.002	(a)	
				CF	Conversion factor	0.001	ug/mg	- -	CW x CF x IR-W x EF x ED
				EF	Exposure Frequency	26	events/year	(b)	BW x AT
				ED	Exposure Duration	7	years	USEPA, 1997	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	
Dermal	Recreational Person	Adult	Site 3	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Dermal Absorbed Dose (mg/kg-day) =
				SA	Skin Surface Available for Contact	2,077	cm2	USEPA, 1997, see (c)	CW x SA x KP x Function(ET) x EV x EF x ED x CF1 x CF2
				KP	Permeability Constant (Dermal for Liquids)	Chemical-Specific	cm/hr	USEPA, 2004	(BW x AT)
				FA	Fraction Absorbed (Unitless)	Chemical-Specific	cm/hr	USEPA, 2004	
				EV	Event Frequency	1	events/day	(a)	Where: Function(ET) = ET for inorganics, or
				ET	Exposure Time	2	hours/event	(a)	FA x 2 x (6 x Tau x ET / PI)^0.5 for organics where ET < T*
				EF	Exposure Frequency	26	days/year	(b)	FA x [ET/(1+B) + Tau x (2+6B+6B^2)/(1+B)^2] for organics, ET > T*.
				ED	Exposure Duration	7	years	USEPA, 1997	See EPA,2004 for chemical-specific constants Tau, B, T*
				CF1	Conversion Factor 1	0.001	mg/ug	--	
				CF2	Conversion Factor 2	0.001	l/cm3	--	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment.

(b). Professional Judgment. Assumes 1 day per week from May through October.

(c). Professional Judgment. Assumes shallow creek with less than 12 inches of water allowing contact with hands (904 cm2) and forearms (1173 cm2).

TABLE 4.13.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SEDIMENT

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Worker	Adult	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	165	mg/day	(a)	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IR-S x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(b)	BW x AT
				EF	Exposure Frequency	43	days/year	(c)	
				ED	Exposure Duration	1	years	(c)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	
Dermal	Construction Worker	Adult	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3300	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	43	days/year	(c)	
				ED	Exposure Duration	1	years	(c)	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Assume CTE value is one-half of RME value.

(b). Professional Judgment. Fraction ingested is 100% from source.

(c). Professional Judgment. 2 months exposure is 5 days per week, for one year exposure duration.

TABLE 4.14.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Child	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	(a)	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CS x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(b)	BW x AT
				EF	Exposure Frequency	26	days/year	(c)	
				ED	Exposure Duration	2	years	USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	
Dermal	Recreational Person	Child	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	971	cm2	(d)	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(c)	
				ED	Exposure Duration	2	years	USEPA, 1993	
				BW	Body Weight	15	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. CTE value one-half of RME value.

(b). Professional Judgment. Fraction ingested is 100% from source.

(c). Professional Judgment. Assumes 1 day per week from May through October.

(d). Professional Judgment. Assumes sediment contact with feet (541 cm2) and hands (430 cm2)

TABLE 4.15.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT

CENTRAL TENDENCY EXPOSURE

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational Person	Adult	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	25	mg/day	(a)	
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	CSs x IRS x CF3 x FI x EF x ED
				FI	Fraction Ingested	1	unitless	(b)	BW x AT
				EF	Exposure Frequency	26	days/year	(c)	
				ED	Exposure Duration	7	years	USEPA, 1997	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	
Dermal	Recreational Person	Adult	Site 3	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,077	cm2	(d)	CS x CF3 x SA x SSAF x DABS x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.20	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(c)	
				ED	Exposure Duration	7	years	USEPA, 1997	
				BW	Body Weight	70	kg	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1997. Exposure Factors Handbook. Update to Exposure Factors Handbook. EPA/600/8-89/043 - May 1989. Office of Research and Development.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

(a). Professional Judgment. Assume CTE value is one-half of RME value.

(b). Professional Judgment. Fraction ingested is 100% from source.

(c). Professional Judgment. Assumes 1 day per week from May through October.

(d). Professional Judgment. Assumes sediment contact with forearms (1173 cm2) and hands (904 cm2)

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NON-CANCER TOXICITY DATA

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5.02 NON-CANCER TOXICITY DATA -- INHALATION

TABLE 5.01

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

NAS JRB WILLOW GROVE, PENNSYLVANIA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD: Target Organ(s)		Dermal Absorption Factor for Soil (1)
		Value	Units		Value	Units			Source(s) (3)	Date(s)	
Total 2,3,7,8-TCDD Equiv.	Chronic	1.00E-09	mg/kg-day	1.00E+00	1.00E-09	mg/kg-day	CNS (Behavioral)		ATSDR	09/2008	0.03
Aluminum	Chronic	1.00E+00	mg/kg-day	1.00E+00	1.00E+00	mg/kg-day	CNS (Developmental)	100	PPRTV	05/2010	0.01
Antimony	Chronic	4.00E-04	mg/kg-day	1.50E-01	6.00E-05	mg/kg-day	Blood/Liver	1000	HEAST	1997	0.01
Arsenic	Chronic	3.00E-04	mg/kg-day	1.00E+00	3.00E-04	mg/kg-day	Skin/Vascular	3	IRIS	10/20/2010	0.03
Cadmium	Chronic	1.00E-03	mg/kg-day	2.50E-02	2.50E-05	mg/kg-day	Kidney	10	IRIS	10/20/2010	0.001
Chromium	Chronic	3.00E-03	mg/kg-day	2.50E-02	7.50E-05	mg/kg-day	Fetotoxicity/GI Tract/Bone	900	IRIS	10/20/2010	0.01
Cobalt		3.00E-04	mg/kg-day	1.00E+00	3.00E-04	mg/kg-day			PPRTV	05/2010	0.01
Copper	Chronic	4.00E-02	mg/kg-day	1.00E+00	4.00E-02	mg/kg-day	GI Tract	1000	HEAST	1997	0.01
Iron	Chronic	7.00E-01	mg/kg-day	1.00E+00	7.00E-01	mg/kg-day	Liver/Blood/GI Tract	1	PPRTV	05/2010	0.01
Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.01
Manganese	Chronic	2.40E-02	mg/kg-day	4.00E-02	9.60E-04	mg/kg-day	CNS	1	IRIS	10/20/2010	0.01
Mercury	Chronic	1.00E-04	mg/kg-day	1.00E+00	1.00E-04	mg/kg-day	CNS	10	IRIS	10/20/2010	0.01
Nickel	Chronic	2.00E-02	mg/kg-day	4.00E-02	8.00E-04	mg/kg-day	Decr. Org. Wt.	300	IRIS	10/20/2010	0.01
Silver	Chronic	5.00E-03	mg/kg-day	4.00E-02	2.00E-04	mg/kg-day	Skin	3	IRIS	10/20/2010	0.01
Vanadium	Chronic	5.00E-03	mg/kg-day	2.60E-02	1.30E-04	mg/kg-day		100	IRIS	10/20/2010	0.01
Zinc	Chronic	3.00E-01	mg/kg-day	1.00E+00	3.00E-01	mg/kg-day	Blood	3	IRIS	10/20/2010	0.01
4,4'-DDD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03
4,4'-DDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03
4,4'-DDT	Chronic	5.00E-04	mg/kg-day	1.00E+00	5.00E-04	mg/kg-day	Liver	100	IRIS	10/21/2010	0.03
Aroclor-1248	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.14
Aroclor-1254	Chronic	2.00E-05	mg/kg-day	1.00E+00	2.00E-05	mg/kg-day	Skin/Eye	300	IRIS	10/21/2010	0.14
Aroclor-1260	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.14
Dieldrin	Chronic	5.00E-05	mg/kg-day	1.00E+00	5.00E-05	mg/kg-day	Liver	100	IRIS	10/21/2010	0.1
Heptachlor Epoxide	Chronic	1.30E-05	mg/kg-day	1.00E+00	1.30E-05	mg/kg-day	Liver	1000	IRIS	10/21/2010	0.1
Benz(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.13
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.13
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.13
Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.13
Bis(2-ethylhexyl) Phthalate	Chronic	2.00E-02	mg/kg-day	1.00E+00	2.00E-02	mg/kg-day	Liver	1000	IRIS	10/22/2010	0.1
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.13
Dibenz(a,h)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.13
Indeno(1,2,3-cd)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.13
Naphthalene	Chronic	2.00E-02	mg/kg-day	1.00E+00	2.00E-02	mg/kg-day	Decr. Wt. Gain	3000	IRIS	10/22/2010	0.13
Phenanthrene	Chronic	3.00E-02	mg/kg-day	1.00E+00	3.00E-02	mg/kg-day	Kidney	3000	IRIS-surr	10/22/2010	0.13
1,1-Dichloroethane	Chronic	2.00E-01	mg/kg-day	1.00E+00	2.00E-01	mg/kg-day	NOEL	1000	PPRTV	05/2010	0.0005
Bromodichloromethane	Chronic	2.00E-02	mg/kg-day	1.00E+00	2.00E-02	mg/kg-day	Kidney	1000	IRIS	10/22/2010	0.03
Carbon Tetrachloride	Chronic	4.00E-03	mg/kg-day	1.00E+00	4.00E-03	mg/kg-day	Liver	1000	IRIS	10/22/2010	0.0005
Chloroform	Chronic	1.00E-02	mg/kg-day	1.00E+00	1.00E-02	mg/kg-day	Liver	100	IRIS	10/22/2010	0.0005
Dibromochloromethane	Chronic	2.00E-02	mg/kg-day	1.00E+00	2.00E-02	mg/kg-day	Liver	1000	IRIS	10/22/2010	0.03
Ethylbenzene	Chronic	1.00E-01	mg/kg-day	1.00E+00	1.00E-01	mg/kg-day	Liver/Kidney	1000	IRIS	10/22/2010	0.03
Tetrachloroethene	Chronic	1.00E-02	mg/kg-day	1.00E+00	1.00E-02	mg/kg-day	Liver	1000	IRIS	10/27/2010	0.03
Trichloroethene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03

1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.

3 - IRIS - Integrated Risk Information System (EPA, 2010)

ATSDR MRL - Agency for Toxic Substances and Disease Registry Minimal Risk Level

HEAST - EPA Health Effects Assessment Summary Tables

PPRTV - Provisional Peer Reviewed Toxicity Values

IRIS - surr* - Published and peer-reviewed toxicity factors are not available for phenanthrene. Therefore, the toxicity factor for pyrene was used because it is the most conservative among those published for mid-weight to heavier PAHs.

TABLE 5.02
NON-CANCER TOXICITY DATA -- INHALATION
NAS JRB WILLOW GROVE, PENNSYLVANIA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD (1)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC: Target Organ(s)	
		Value	Units	Value	Units			Source(s) (2)	Dates
Total 2,3,7,8-TCDD Equiv.		2.50E-10	mg/m3	N/A	N/A			Cal EPA	10/20/2010
Aluminum	Chronic	5.00E-03	mg/m3	N/A	N/A	CNS	300	PPRTV	05/2010
Antimony	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	Chronic	1.50E-05	mg/m3	N/A	N/A	Developmental/Vascular/CNS		Cal EPA	10/20/2010
Cadmium		0.00001	mg/m3	N/A	N/A			ATSDR	09/2008
Chromium	Chronic	1.00E-04	mg/m3	N/A	N/A	Lung/Nasal	300	IRIS	10/20/2010
Cobalt	Chronic	6.00E-06	mg/m3	N/A	N/A	Respiratory	100	PPRTV	05/2010
Copper	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	Chronic	5.00E-05	mg/m3	N/A	N/A	CNS	1000	IRIS	10/20/2010
Mercury	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nickel	Chronic	9.00E-05	mg/m3	N/A	N/A	Lung	30	ATSDR	08/2005
Silver	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1248	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1254	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1260	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dieldrin		0.0046	mg/m3	N/A	N/A				10/21/2010
Heptachlor Epoxide	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benz(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bis(2-ethylhexyl) Phthalate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic	3.00E-03	mg/m3	N/A	N/A	Respiratory	3000	IRIS	10/22/2010
Phenanthrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bromodichloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carbon Tetrachloride	Chronic	1.00E-01	mg/m3	N/A	N/A	Liver	100	IRIS	10/22/2010
Chloroform	Chronic	9.80E-02	mg/m3	N/A	N/A	Liver		ATSDR	09/1997
Dibromochloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ethylbenzene	Chronic	1.00E+00	mg/m3	N/A	N/A	Developmental	300	IRIS	10/22/2010
Tetrachloroethene	Chronic	2.70E-01	mg/m3	N/A	N/A	CNS/Kidney	100	ATSDR	09/1997
Trichloroethene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

1 - RAGS Part F (EPA, 2009) requires use of the inhalation RfC, so the extrapolated inhalation RfD is obsolete (RFDi = RfC *20m3/day / 70 kg)

2 - IRIS - Integrated Risk Information System (EPA, 2010)

Cal EPA - California Environmental Protection Agency Toxicity Value

PPRTV - Provisional Peer Reviewed Toxicity Values

ATSDR MRL - Agency for Toxic Substances and Disease Registry Minimal Risk Level

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CANCER TOXICITY DATA

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6.02 CANCER TOXICITY DATA -- INHALATION

TABLE 6.01

CANCER TOXICITY DATA -- ORAL/DERMAL

NAS JRB WILLOW GROVE, PENNSYLVANIA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal(1)	Absorbed Cancer Slope Factor for Dermal(2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s) (3)	Date(s)
Total 2,3,7,8-TCDD Equiv.	1.30E+05	1/(mg/kg-day)	1.00E+00	1.30E+05	1/(mg/kg-day)	B2	Cal EPA	10/20/2010
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	1.50E+00	1/(mg/kg-day)	1.00E+00	1.50E+00	1/(mg/kg-day)	A	IRIS	10/20/2010
Cadmium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium	5.00E-01	1/(mg/kg-day)	2.50E-02	2.00E+01	1/(mg/kg-day)		NJDEP	10/16/2009
Cobalt	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Copper	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nickel	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silver	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDD	2.40E-01	1/(mg/kg-day)	1.00E+00	2.40E-01	1/(mg/kg-day)	B2	IRIS	10/21/2010
4,4'-DDE	3.40E-01	1/(mg/kg-day)	1.00E+00	3.40E-01	1/(mg/kg-day)	B2	IRIS	10/21/2010
4,4'-DDT	3.40E-01	1/(mg/kg-day)	1.00E+00	3.40E-01	1/(mg/kg-day)	B2	IRIS	10/21/2010
Aroclor-1248	2.00E+00	1/(mg/kg-day)	1.00E+00	2.00E+00	1/(mg/kg-day)	B2	IRIS	10/21/2010
Aroclor-1254	2.00E+00	1/(mg/kg-day)	1.00E+00	2.00E+00	1/(mg/kg-day)	B2	IRIS	10/21/2010
Aroclor-1260	2.00E+00	1/(mg/kg-day)	1.00E+00	2.00E+00	1/(mg/kg-day)	B2	IRIS	10/21/2010
Dieldrin	1.60E+01	1/(mg/kg-day)	1.00E+00	1.60E+01	1/(mg/kg-day)	B2	IRIS	10/21/2010
Heptachlor Epoxide	9.10E+00	1/(mg/kg-day)	1.00E+00	9.10E+00	1/(mg/kg-day)	B2	IRIS	10/21/2010
Benz(a)anthracene	7.30E-01	1/(mg/kg-day)	1.00E+00	7.30E-01	1/(mg/kg-day)	B2	EPA-NCEA	
Benzo(a)pyrene	7.30E+00	1/(mg/kg-day)	1.00E+00	7.30E+00	1/(mg/kg-day)	B2	IRIS	10/22/2010
Benzo(b)fluoranthene	7.30E-01	1/(mg/kg-day)	1.00E+00	7.30E-01	1/(mg/kg-day)	B2	EPA-NCEA	

TABLE 6.01

CANCER TOXICITY DATA -- ORAL/DERMAL

NAS JRB WILLOW GROVE, PENNSYLVANIA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal(1)	Absorbed Cancer Slope Factor for Dermal(2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s) (3)	Date(s)
Benzo(k)fluoranthene	7.30E-02	1/(mg/kg-day)	1.00E+00	7.30E-02	1/(mg/kg-day)	B2	EPA-NCEA	
Bis(2-ethylhexyl) Phthalate	1.40E-02	1/(mg/kg-day)	1.00E+00	1.40E-02	1/(mg/kg-day)	B2	IRIS	10/22/2010
Chrysene	7.30E-03	1/(mg/kg-day)	1.00E+00	7.30E-03	1/(mg/kg-day)	B2	EPA-NCEA	
Dibenz(a,h)anthracene	7.30E+00	1/(mg/kg-day)	1.00E+00	7.30E+00	1/(mg/kg-day)	B2	EPA-NCEA	
Indeno(1,2,3-cd)pyrene	7.30E-01	1/(mg/kg-day)	1.00E+00	7.30E-01	1/(mg/kg-day)	B2	EPA-NCEA	
Naphthalene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Phenanthrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethane	5.70E-03	1/(mg/kg-day)	1.00E+00	5.70E-03	1/(mg/kg-day)	C	Cal EPA	10/22/2010
Bromodichloromethane	6.20E-02	1/(mg/kg-day)	1.00E+00	6.20E-02	1/(mg/kg-day)	B2	IRIS	10/22/2010
Carbon Tetrachloride	7.00E-02	1/(mg/kg-day)	1.00E+00	7.00E-02	1/(mg/kg-day)	B2	IRIS	10/22/2010
Chloroform	3.10E-02	1/(mg/kg-day)	1.00E+00	3.10E-02	1/(mg/kg-day)	B2	Cal EPA	10/22/2010
Dibromochloromethane	8.40E-02	1/(mg/kg-day)	1.00E+00	8.40E-02	1/(mg/kg-day)	C	IRIS	10/22/2010
Ethylbenzene	1.10E-02	1/(mg/kg-day)	1.00E+00	1.10E-02	1/(mg/kg-day)		Cal EPA	10/22/2010
Tetrachloroethene	5.20E-02	1/(mg/kg-day)	1.00E+00	5.20E-02	1/(mg/kg-day)	B2-C	EPA-NCEA	04/2002
Trichloroethene	1.10E-02	1/(mg/kg-day)	1.00E+00	1.10E-02	1/(mg/kg-day)	B2	EPA-NCEA	08/01/2001

N/A = Not Applicable

1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral Absorption Efficiency for Dermal.

3 - IRIS - Integrated Risk Information System (EPA, 2006)
EPA - NCEA - EPA National Center for Exposure Assessment
Cal EPA - California Environmental Protection Agency Toxicity Value
NJDEP - New Jersey Department of Environmental Protection

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

TABLE 6.02

CANCER TOXICITY DATA -- INHALATION

NAS JRB WILLOW GROVE, PENNSYLVANIA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor (1)		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation CSF	
	Value	Units	Value	Units		Sources(s) (2)	Date(s)
Total 2,3,7,8-TCDD Equiv.	3.80E+01	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/20/2010
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	4.30E-03	1/(ug/m3)	N/A	N/A	A	IRIS	10/20/2010
Cadmium	1.80E-03	1/(ug/m3)	N/A	N/A	B1	IRIS	10/20/2010
Chromium	1.20E-02	1/(ug/m3)	N/A	N/A	A	IRIS	10/20/2010
Cobalt	9.00E-03	1/(ug/m3)	N/A	N/A		PPRTV	05/2010
Copper	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nickel	2.60E-04	1/(ug/m3)	N/A	N/A	A	Cal EPA	10/20/2010
Silver	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDD	6.90E-05	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/21/2010
4,4'-DDE	9.70E-05	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/21/2010
4,4'-DDT	9.70E-05	1/(ug/m3)	N/A	N/A	B2	IRIS	10/21/2010
Aroclor-1248	5.70E-04	1/(ug/m3)	N/A	N/A	B2	IRIS	10/21/2010
Aroclor-1254	5.70E-04	1/(ug/m3)	N/A	N/A	B2	IRIS	10/21/2010
Aroclor-1260	5.70E-04	1/(ug/m3)	N/A	N/A	B2	IRIS	10/21/2010
Dieldrin	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Heptachlor Epoxide	2.60E-03	1/(ug/m3)	N/A	N/A	B2	IRIS	10/21/2010
Benz(a)anthracene	1.10E-04	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/22/2010

TABLE 6.02

CANCER TOXICITY DATA -- INHALATION

NAS JRB WILLOW GROVE, PENNSYLVANIA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor (1)		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation CSF	
	Value	Units	Value	Units		Sources(s) (2)	Date(s)
Benzo(a)pyrene	1.10E-03	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/22/2010
Benzo(b)fluoranthene	1.10E-04	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/22/2010
Benzo(k)fluoranthene	1.10E-04	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/22/2010
Bis(2-ethylhexyl) Phthalate	2.40E-06	1/(ug/m3)	N/A	N/A		Cal EPA	10/22/2010
Chrysene	1.10E-05	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/22/2010
Dibenz(a,h)anthracene	1.20E-03	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/22/2010
Indeno(1,2,3-cd)pyrene	1.10E-04	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/22/2010
Naphthalene	3.40E-05	1/(ug/m3)	N/A	N/A	A	Cal EPA	10/22/2010
Phenanthrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethane	1.60E-06	1/(ug/m3)	N/A	N/A	C	Cal EPA	10/22/2010
Bromodichloromethane	3.70E-05	1/(ug/m3)	N/A	N/A	B2	Cal EPA	10/22/2010
Carbon Tetrachloride	6.00E-06	1/(ug/m3)	N/A	N/A	B2	IRIS	10/22/2010
Chloroform	2.30E-05	1/(ug/m3)	N/A	N/A	B2	IRIS	10/22/2010
Dibromochloromethane	2.70E-05	1/(ug/m3)	N/A	N/A	C	Cal EPA	10/22/2010
Ethylbenzene	2.50E-06	1/(ug/m3)	N/A	N/A		Cal EPA	10/22/2010
Tetrachloroethene	2.90E-06	1/(ug/m3)	N/A	N/A	B2-C	EPA-NCEA	04/2002
Trichloroethene	1.70E-06	1/(ug/m3)	N/A	N/A		EPA-NCEA	04/2002

N/A = Not Applicable

1 - RAGS Part F (EPA, 2009) requires use of the inhalation unit risk (IUR), so the extrapolated Inhalation CSF is obsolete (CSFi = IUR * 70 kg / 20m3/day)

2 - IRIS - Integrated Risk Information System (EPA, 2006)

EPA - NCEA - EPA National Center for Exposure Assessment

Cal EPA - California Environmental Protection Agency Toxicity Value

PPRTV - Provisional Peer Reviewed Toxicity Value

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

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CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

TABLE NO.	REASONABLE MAXIMUM EXPOSURES
7.01.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 GROUNDWATER
7.02.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER
7.03.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 GROUNDWATER
7.04.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER CONTACT WITH SITE 3 GROUNDWATER
7.05.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
7.06.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
7.07.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
7.08.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - INDUSTRIAL WORKER CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
7.09.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
7.10.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
7.11.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
7.12.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.13.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.14.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.15.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.16.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.17.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.18.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.19.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.20.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.20a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.21.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.21a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.22.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.22a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.23.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.23a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.24.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.24a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.25.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.25a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.26.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.26a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.27.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.27a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.28.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.28a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.29.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.29a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.30.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.30a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.31.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.31a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.32.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.32a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.33.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.33a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.34.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.34a.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.35.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SURFACE WATER
7.36.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
7.37.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
7.38.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
7.39.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER CONTACT WITH SITE 3 SEDIMENT
7.40.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT
7.41.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT
7.42.RME	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT

TABLE 7.01.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO GROUNDWATER

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site 3 Tap Water Contact With Groundwater	Ingestion	Arsenic	4.52E+00	ug/l	3.19E-05	mg/kg-day	1.50E+00	mg/kg-day	4.79E-05	3.73E-04	mg/kg-day	3.00E-04	mg/kg-day	1.24E+00
				Cobalt	2.40E+00	ug/l	1.70E-05	mg/kg-day	--	mg/kg-day	--	1.98E-04	mg/kg-day	3.00E-04	mg/kg-day	6.60E-01
				Manganese	4.33E+01	ug/l	3.06E-04	mg/kg-day	--	mg/kg-day	--	3.57E-03	mg/kg-day	2.40E-02	mg/kg-day	1.49E-01
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	7.78E-05	mg/kg-day	1.40E-02	mg/kg-day	1.09E-06	9.07E-04	mg/kg-day	2.00E-02	mg/kg-day	4.54E-02
				1,1-Dichloroethane	8.20E+00	ug/l	5.80E-05	mg/kg-day	5.70E-03	mg/kg-day	3.30E-07	6.76E-04	mg/kg-day	2.00E-01	mg/kg-day	3.38E-03
				Bromodichloromethane	1.10E+00	ug/l	7.78E-06	mg/kg-day	6.20E-02	mg/kg-day	4.82E-07	9.07E-05	mg/kg-day	2.00E-02	mg/kg-day	4.54E-03
				Carbon Tetrachloride	3.80E-01	ug/l	2.69E-06	mg/kg-day	7.00E-02	mg/kg-day	1.88E-07	3.13E-05	mg/kg-day	4.00E-03	mg/kg-day	7.83E-03
				Chloroform	5.23E-01	ug/l	3.70E-06	mg/kg-day	3.10E-02	mg/kg-day	1.15E-07	4.31E-05	mg/kg-day	1.00E-02	mg/kg-day	4.31E-03
				Dibromochloromethane	1.50E+00	ug/l	1.06E-05	mg/kg-day	8.40E-02	mg/kg-day	8.91E-07	1.24E-04	mg/kg-day	2.00E-02	mg/kg-day	6.18E-03
				Tetrachloroethene	5.26E+00	ug/l	3.72E-05	mg/kg-day	5.20E-02	mg/kg-day	1.93E-06	4.34E-04	mg/kg-day	1.00E-02	mg/kg-day	4.34E-02
				Trichloroethene	3.10E+00	ug/l	2.19E-05	mg/kg-day	1.10E-02	mg/kg-day	2.41E-07	2.56E-04	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								5.32E-05					2.17E+00
			Dermal	Arsenic	4.52E+00	ug/l	1.63E-07	mg/kg-day	1.50E+00	mg/kg-day	2.45E-07	1.91E-06	mg/kg-day	3.00E-04	mg/kg-day	6.36E-03
				Cobalt	2.40E+00	ug/l	3.47E-08	mg/kg-day	--	mg/kg-day	--	4.05E-07	mg/kg-day	3.00E-04	mg/kg-day	1.35E-03
				Manganese	4.33E+01	ug/l	1.57E-06	mg/kg-day	--	mg/kg-day	--	1.83E-05	mg/kg-day	9.60E-04	mg/kg-day	1.90E-02
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	8.97E-05	mg/kg-day	1.40E-02	mg/kg-day	1.26E-06	1.05E-03	mg/kg-day	2.00E-02	mg/kg-day	5.23E-02
				1,1-Dichloroethane	8.20E+00	ug/l	3.50E-06	mg/kg-day	5.70E-03	mg/kg-day	1.99E-08	4.08E-05	mg/kg-day	2.00E-01	mg/kg-day	2.04E-04
				Bromodichloromethane	1.10E+00	ug/l	4.74E-07	mg/kg-day	6.20E-02	mg/kg-day	2.94E-08	5.54E-06	mg/kg-day	2.00E-02	mg/kg-day	2.77E-04
				Carbon Tetrachloride	3.80E-01	ug/l	5.37E-07	mg/kg-day	7.00E-02	mg/kg-day	3.76E-08	6.26E-06	mg/kg-day	4.00E-03	mg/kg-day	1.57E-03
				Chloroform	5.23E-01	ug/l	2.51E-07	mg/kg-day	3.10E-02	mg/kg-day	7.79E-09	2.93E-06	mg/kg-day	1.00E-02	mg/kg-day	2.93E-04
				Dibromochloromethane	1.50E+00	ug/l	6.01E-07	mg/kg-day	8.40E-02	mg/kg-day	5.05E-08	7.01E-06	mg/kg-day	2.00E-02	mg/kg-day	3.51E-04
				Tetrachloroethene	5.26E+00	ug/l	1.66E-05	mg/kg-day	5.20E-02	mg/kg-day	8.61E-07	1.93E-04	mg/kg-day	1.00E-02	mg/kg-day	1.93E-02
				Trichloroethene	3.10E+00	ug/l	2.83E-06	mg/kg-day	1.10E-02	mg/kg-day	3.12E-08	3.30E-05	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.54E-06					1.01E-01
		Exposure Point Total									5.57E-05					2.27E+00
	Exposure Medium Total										5.57E-05					2.27E+00
Medium Total											5.57E-05					2.27E+00
										Total of Receptor Risks Across All Media	5.57E-05			Total of Receptor Hazards Across All Media		2.27E+00

TABLE 7.02.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO GROUNDWATER

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site 3 Tap Water Contact With Groundwater	Ingestion	Arsenic	4.52E+00	ug/l	4.25E-05	mg/kg-day	1.50E+00	mg/kg-day	6.37E-05	1.24E-04	mg/kg-day	3.00E-04	mg/kg-day	4.13E-01
				Cobalt	2.40E+00	ug/l	2.25E-05	mg/kg-day	--	mg/kg-day	--	6.58E-05	mg/kg-day	3.00E-04	mg/kg-day	2.19E-01
				Manganese	4.33E+01	ug/l	4.07E-04	mg/kg-day	--	mg/kg-day	--	1.19E-03	mg/kg-day	2.40E-02	mg/kg-day	4.94E-02
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	1.03E-04	mg/kg-day	1.40E-02	mg/kg-day	1.45E-06	3.01E-04	mg/kg-day	2.00E-02	mg/kg-day	1.51E-02
				1,1-Dichloroethane	8.20E+00	ug/l	7.70E-05	mg/kg-day	5.70E-03	mg/kg-day	4.39E-07	2.25E-04	mg/kg-day	2.00E-01	mg/kg-day	1.12E-03
				Bromodichloromethane	1.10E+00	ug/l	1.03E-05	mg/kg-day	6.20E-02	mg/kg-day	6.41E-07	3.01E-05	mg/kg-day	2.00E-02	mg/kg-day	1.51E-03
				Carbon Tetrachloride	3.80E-01	ug/l	3.57E-06	mg/kg-day	7.00E-02	mg/kg-day	2.50E-07	1.04E-05	mg/kg-day	4.00E-03	mg/kg-day	2.60E-03
				Chloroform	5.23E-01	ug/l	4.91E-06	mg/kg-day	3.10E-02	mg/kg-day	1.52E-07	1.43E-05	mg/kg-day	1.00E-02	mg/kg-day	1.43E-03
				Dibromochloromethane	1.50E+00	ug/l	1.41E-05	mg/kg-day	8.40E-02	mg/kg-day	1.18E-06	4.11E-05	mg/kg-day	2.00E-02	mg/kg-day	2.05E-03
				Tetrachloroethene	5.26E+00	ug/l	4.94E-05	mg/kg-day	5.20E-02	mg/kg-day	2.57E-06	1.44E-04	mg/kg-day	1.00E-02	mg/kg-day	1.44E-02
				Trichloroethene	3.10E+00	ug/l	2.91E-05	mg/kg-day	1.10E-02	mg/kg-day	3.20E-07	8.49E-05	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								7.07E-05					7.20E-01
			Dermal	Arsenic	4.52E+00	ug/l	1.91E-07	mg/kg-day	1.50E+00	mg/kg-day	2.87E-07	5.57E-07	mg/kg-day	3.00E-04	mg/kg-day	1.86E-03
				Cobalt	2.40E+00	ug/l	4.06E-08	mg/kg-day	--	mg/kg-day	--	1.18E-07	mg/kg-day	3.00E-04	mg/kg-day	3.95E-04
				Manganese	4.33E+01	ug/l	1.83E-06	mg/kg-day	--	mg/kg-day	--	5.34E-06	mg/kg-day	9.60E-04	mg/kg-day	5.56E-03
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	1.48E-04	mg/kg-day	1.40E-02	mg/kg-day	2.08E-06	4.32E-04	mg/kg-day	2.00E-02	mg/kg-day	2.16E-02
				1,1-Dichloroethane	8.20E+00	ug/l	4.83E-06	mg/kg-day	5.70E-03	mg/kg-day	2.75E-08	1.41E-05	mg/kg-day	2.00E-01	mg/kg-day	7.04E-05
				Bromodichloromethane	1.10E+00	ug/l	7.03E-07	mg/kg-day	6.20E-02	mg/kg-day	4.36E-08	2.05E-06	mg/kg-day	2.00E-02	mg/kg-day	1.03E-04
				Carbon Tetrachloride	3.80E-01	ug/l	7.87E-07	mg/kg-day	7.00E-02	mg/kg-day	5.51E-08	2.30E-06	mg/kg-day	4.00E-03	mg/kg-day	5.74E-04
				Chloroform	5.23E-01	ug/l	3.64E-07	mg/kg-day	3.10E-02	mg/kg-day	1.13E-08	1.06E-06	mg/kg-day	1.00E-02	mg/kg-day	1.06E-04
				Dibromochloromethane	1.50E+00	ug/l	9.06E-07	mg/kg-day	8.40E-02	mg/kg-day	7.61E-08	2.64E-06	mg/kg-day	2.00E-02	mg/kg-day	1.32E-04
				Tetrachloroethene	5.26E+00	ug/l	2.44E-05	mg/kg-day	5.20E-02	mg/kg-day	1.27E-06	7.11E-05	mg/kg-day	1.00E-02	mg/kg-day	7.11E-03
				Trichloroethene	3.10E+00	ug/l	4.11E-06	mg/kg-day	1.10E-02	mg/kg-day	4.53E-08	1.20E-05	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								3.89E-06					3.75E-02
		Exposure Point Total									7.46E-05					7.57E-01
	Exposure Medium Total										7.46E-05					7.57E-01
	Air	Site 3 Groundwater Vapors During Showering	Inhalation	Arsenic	4.52E+00	ug/l	NA	mg/m3	4.30E+00	1/(mg/m3)	NA	NA	mg/m3	1.50E-05	mg/m3	NA
				Cobalt	2.40E+00	ug/l	NA	mg/m3	9.00E+00	1/(mg/m3)	NA	NA	mg/m3	6.00E-06	mg/m3	NA
				Manganese	4.33E+01	ug/l	NA	mg/m3	--	1/(mg/m3)	--	NA	mg/m3	5.00E-05	mg/m3	NA
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	NA	mg/m3	2.40E-03	1/(mg/m3)	NA	NA	mg/m3	--	mg/m3	--
				1,1-Dichloroethane	8.20E+00	ug/l	2.01E-04	mg/m3	1.60E-03	1/(mg/m3)	3.21E-07	5.85E-04	mg/m3	--	mg/m3	--
				Bromodichloromethane	1.10E+00	ug/l	2.04E-05	mg/m3	3.70E-02	1/(mg/m3)	7.56E-07	5.96E-05	mg/m3	--	mg/m3	--
				Carbon Tetrachloride	3.80E-01	ug/l	7.69E-06	mg/m3	6.00E-03	1/(mg/m3)	4.61E-08	2.24E-05	mg/m3	1.00E-01	mg/m3	2.24E-04
				Chloroform	5.23E-01	ug/l	1.16E-05	mg/m3	2.30E-02	1/(mg/m3)	2.67E-07	3.39E-05	mg/m3	9.80E-02	mg/m3	3.46E-04
				Dibromochloromethane	1.50E+00	ug/l	2.37E-05	mg/m3	2.70E-02	1/(mg/m3)	6.39E-07	6.90E-05	mg/m3	--	mg/m3	--
				Tetrachloroethene	5.26E+00	ug/l	1.03E-04	mg/m3	2.90E-03	1/(mg/m3)	2.98E-07	2.99E-04	mg/m3	2.70E-01	mg/m3	1.11E-03
				Trichloroethene	3.10E+00	ug/l	6.71E-05	mg/m3	1.70E-03	1/(mg/m3)	1.14E-07	1.96E-04	mg/m3	--	mg/m3	--
			Exp. Route Total								2.44E-06					1.68E-03
		Exposure Point Total									2.44E-06					1.68E-03
	Exposure Medium Total										2.44E-06					1.68E-03
Medium Total											7.70E-05					7.59E-01
											Total of Receptor Risks Across All Media	7.70E-05				Total of Receptor Hazards Across All Media	7.59E-01

TABLE 7.03.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO GROUNDWATER

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site 3 Tap Water Contact With Groundwater	Ingestion	Arsenic	4.52E+00	ug/l	7.44E-05	mg/kg-day	1.50E+00	mg/kg-day	1.12E-04					N/A
				Cobalt	2.40E+00	ug/l	2.25E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	4.33E+01	ug/l	4.07E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	1.81E-04	mg/kg-day	1.40E-02	mg/kg-day	2.54E-06					N/A
				1,1-Dichloroethane	8.20E+00	ug/l	1.35E-04	mg/kg-day	5.70E-03	mg/kg-day	7.69E-07					N/A
				Bromodichloromethane	1.10E+00	ug/l	1.81E-05	mg/kg-day	6.20E-02	mg/kg-day	1.12E-06					N/A
				Carbon Tetrachloride	3.80E-01	ug/l	6.26E-06	mg/kg-day	7.00E-02	mg/kg-day	4.38E-07					N/A
				Chloroform	5.23E-01	ug/l	8.61E-06	mg/kg-day	3.10E-02	mg/kg-day	2.67E-07					N/A
				Dibromochloromethane	1.50E+00	ug/l	2.47E-05	mg/kg-day	8.40E-02	mg/kg-day	2.07E-06					N/A
				Tetrachloroethene	5.26E+00	ug/l	8.66E-05	mg/kg-day	5.20E-02	mg/kg-day	4.50E-06					N/A
				Trichloroethene	3.10E+00	ug/l	5.10E-05	mg/kg-day	1.10E-02	mg/kg-day	5.61E-07					N/A
			Exp. Route Total								1.24E-04					--
			Dermal	Arsenic	4.52E+00	ug/l	3.55E-07	mg/kg-day	1.50E+00	mg/kg-day	5.32E-07					N/A
				Cobalt	2.40E+00	ug/l	4.06E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	4.33E+01	ug/l	1.83E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	2.38E-04	mg/kg-day	1.40E-02	mg/kg-day	3.33E-06					N/A
				1,1-Dichloroethane	8.20E+00	ug/l	8.33E-06	mg/kg-day	5.70E-03	mg/kg-day	4.75E-08					N/A
				Bromodichloromethane	1.10E+00	ug/l	1.18E-06	mg/kg-day	6.20E-02	mg/kg-day	7.30E-08					N/A
				Carbon Tetrachloride	3.80E-01	ug/l	1.32E-06	mg/kg-day	7.00E-02	mg/kg-day	9.27E-08					N/A
				Chloroform	5.23E-01	ug/l	6.15E-07	mg/kg-day	3.10E-02	mg/kg-day	1.91E-08					N/A
				Dibromochloromethane	1.50E+00	ug/l	1.51E-06	mg/kg-day	8.40E-02	mg/kg-day	1.27E-07					N/A
				Tetrachloroethene	5.26E+00	ug/l	4.09E-05	mg/kg-day	5.20E-02	mg/kg-day	2.13E-06					N/A
				Trichloroethene	3.10E+00	ug/l	6.95E-06	mg/kg-day	1.10E-02	mg/kg-day	7.64E-08					N/A
			Exp. Route Total								6.43E-06					--
		Exposure Point Total									1.30E-04					--
	Exposure Medium Total										1.30E-04					--
	Air	Site 3 Groundwater Vapors During Showering	Inhalation	Arsenic	4.52E+00	ug/l	NA	mg/m3	4.30E+00	1/(mg/m3)	--					N/A
				Cobalt	2.40E+00	ug/l	NA	mg/m3	9.00E+00	1/(mg/m3)	--					N/A
				Manganese	4.33E+01	ug/l	NA	mg/m3	--	1/(mg/m3)	--					N/A
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	NA	mg/m3	2.40E-03	1/(mg/m3)	--					N/A
				1,1-Dichloroethane	8.20E+00	ug/l	2.01E-04	mg/m3	1.60E-03	1/(mg/m3)	3.21E-07					N/A
				Bromodichloromethane	1.10E+00	ug/l	2.04E-05	mg/m3	3.70E-02	1/(mg/m3)	7.56E-07					N/A
				Carbon Tetrachloride	3.80E-01	ug/l	7.69E-06	mg/m3	6.00E-03	1/(mg/m3)	4.61E-08					N/A
				Chloroform	5.23E-01	ug/l	1.16E-05	mg/m3	2.30E-02	1/(mg/m3)	2.67E-07					N/A
				Dibromochloromethane	1.50E+00	ug/l	2.37E-05	mg/m3	2.70E-02	1/(mg/m3)	6.39E-07					N/A
				Tetrachloroethene	5.26E+00	ug/l	1.03E-04	mg/m3	2.90E-03	1/(mg/m3)	2.98E-07					N/A
				Trichloroethene	3.10E+00	ug/l	6.71E-05	mg/m3	1.70E-03	1/(mg/m3)	1.14E-07					N/A
			Exp. Route Total								2.44E-06					--
		Exposure Point Total									2.44E-06					--
	Exposure Medium Total										2.44E-06					--
Medium Total											1.33E-04					--
										Total of Receptor Risks Across All Media	1.33E-04			Total of Receptor Hazards Across All Media		--

TABLE 7.04.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER EXPOSURE TO GROUNDWATER

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site 3 Contact with Groundwater	Dermal	Arsenic	4.52E+00	ug/l	1.36E-09	mg/kg-day	1.50E+00	mg/kg-day	2.05E-09	9.55E-08	mg/kg-day	3.00E-04	mg/kg-day	3.18E-04
				Cobalt	2.40E+00	ug/l	2.90E-10	mg/kg-day	--	mg/kg-day	--	2.03E-08	mg/kg-day	3.00E-04	mg/kg-day	6.76E-05
				Manganese	4.33E+01	ug/l	1.31E-08	mg/kg-day	--	mg/kg-day	--	9.15E-07	mg/kg-day	9.60E-04	mg/kg-day	9.53E-04
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	5.30E-07	mg/kg-day	1.40E-02	mg/kg-day	7.41E-09	3.71E-05	mg/kg-day	2.00E-02	mg/kg-day	1.85E-03
				1,1-Dichloroethane	8.20E+00	ug/l	2.29E-08	mg/kg-day	5.70E-03	mg/kg-day	1.30E-10	1.60E-06	mg/kg-day	2.00E-01	mg/kg-day	8.01E-06
				Bromodichloromethane	1.10E+00	ug/l	2.80E-09	mg/kg-day	6.20E-02	mg/kg-day	1.74E-10	1.96E-07	mg/kg-day	2.00E-02	mg/kg-day	9.80E-06
				Carbon Tetrachloride	3.80E-01	ug/l	3.24E-09	mg/kg-day	7.00E-02	mg/kg-day	2.27E-10	2.27E-07	mg/kg-day	4.00E-03	mg/kg-day	5.67E-05
				Chloroform	5.23E-01	ug/l	1.61E-09	mg/kg-day	3.10E-02	mg/kg-day	4.99E-11	1.13E-07	mg/kg-day	1.00E-02	mg/kg-day	1.13E-05
				Dibromochloromethane	1.50E+00	ug/l	3.55E-09	mg/kg-day	8.40E-02	mg/kg-day	2.98E-10	2.48E-07	mg/kg-day	2.00E-02	mg/kg-day	1.24E-05
				Tetrachloroethene	5.26E+00	ug/l	9.77E-08	mg/kg-day	5.20E-02	mg/kg-day	5.08E-09	6.84E-06	mg/kg-day	1.00E-02	mg/kg-day	6.84E-04
				Trichloroethene	3.10E+00	ug/l	1.74E-08	mg/kg-day	1.10E-02	mg/kg-day	1.91E-10	1.22E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.56E-08					3.98E-03
		Exposure Point Total									1.56E-08					3.98E-03
	Exposure Medium Total										1.56E-08					3.98E-03
	Air	Site 3 Outdoor Air, Volatilization from Groundwater	Inhalation	1,1-Dichloroethane	8.20E+00	ug/l	3.78E-08	mg/m3	1.60E-03	1/(mg/m3)	6.05E-11	2.65E-06	mg/m3	--	mg/m3	--
				Bromodichloromethane	1.10E+00	ug/l	2.77E-09	mg/m3	3.70E-02	1/(mg/m3)	1.03E-10	1.94E-07	mg/m3	--	mg/m3	--
				Carbon Tetrachloride	3.80E-01	ug/l	5.89E-09	mg/m3	6.00E-03	1/(mg/m3)	3.53E-11	4.12E-07	mg/m3	1.00E-01	mg/m3	4.12E-06
				Chloroform	5.23E-01	ug/l	2.25E-09	mg/m3	2.30E-02	1/(mg/m3)	5.18E-11	1.58E-07	mg/m3	9.80E-02	mg/m3	1.61E-06
				Dibromochloromethane	1.50E+00	ug/l	3.50E-09	mg/m3	2.70E-02	1/(mg/m3)	9.46E-11	2.45E-07	mg/m3	--	mg/m3	--
				Tetrachloroethene	5.26E+00	ug/l	4.90E-08	mg/m3	2.90E-03	1/(mg/m3)	1.42E-10	3.43E-06	mg/m3	2.70E-01	mg/m3	1.27E-05
				Trichloroethene	3.10E+00	ug/l	2.04E-08	mg/m3	1.70E-03	1/(mg/m3)	3.47E-11	1.43E-06	mg/m3	--	mg/m3	--
			Exp. Route Total								5.22E-10					1.84E-05
		Exposure Point Total									5.22E-10					1.84E-05
	Exposure Medium Total										5.22E-10					1.84E-05
Medium Total											1.61E-08					3.99E-03
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											1.61E-08					3.99E-03

TABLE 7.05.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Hangar Area Contact with Surface Soil	Ingestion	Benz(a)anthracene	7.80E+02	ug/kg	8.55E-07	mg/kg-day	7.30E-01	mg/kg-day	3.33E-06	9.97E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	9.42E-07	mg/kg-day	7.30E+00	mg/kg-day	3.67E-05	1.10E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	1.21E-06	mg/kg-day	7.30E-01	mg/kg-day	4.69E-06	1.41E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	1.97E-07	mg/kg-day	7.30E+00	mg/kg-day	7.68E-06	2.30E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	7.45E-07	mg/kg-day	7.30E-01	mg/kg-day	2.90E-06	8.69E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								5.53E-05					--
			Dermal	Benz(a)anthracene	7.80E+02	ug/kg	3.11E-07	mg/kg-day	7.30E-01	mg/kg-day	1.21E-06	3.63E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	3.43E-07	mg/kg-day	7.30E+00	mg/kg-day	1.34E-05	4.00E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	4.39E-07	mg/kg-day	7.30E-01	mg/kg-day	1.71E-06	5.12E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	7.18E-08	mg/kg-day	7.30E+00	mg/kg-day	2.80E-06	8.38E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	2.71E-07	mg/kg-day	7.30E-01	mg/kg-day	1.06E-06	3.16E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.01E-05					--
		Exposure Point Total									7.54E-05					--
	Exposure Medium Total										7.54E-05					--
Medium Total											7.54E-05					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											7.54E-05					--

TABLE 7.06.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Hangar Area Contact with Surface Soil	Ingestion	Benz(a)anthracene	7.80E+02	ug/kg	3.66E-07	mg/kg-day	7.30E-01	mg/kg-day	4.90E-07	1.07E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	4.04E-07	mg/kg-day	7.30E+00	mg/kg-day	5.41E-06	1.18E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	5.17E-07	mg/kg-day	7.30E-01	mg/kg-day	6.91E-07	1.51E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	8.45E-08	mg/kg-day	7.30E+00	mg/kg-day	1.13E-06	2.47E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	3.19E-07	mg/kg-day	7.30E-01	mg/kg-day	4.27E-07	9.32E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								8.15E-06					--
			Dermal	Benz(a)anthracene	7.80E+02	ug/kg	1.90E-07	mg/kg-day	7.30E-01	mg/kg-day	2.54E-07	5.54E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	2.10E-07	mg/kg-day	7.30E+00	mg/kg-day	2.80E-06	6.11E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	2.68E-07	mg/kg-day	7.30E-01	mg/kg-day	3.59E-07	7.82E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	4.39E-08	mg/kg-day	7.30E+00	mg/kg-day	5.87E-07	1.28E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	1.66E-07	mg/kg-day	7.30E-01	mg/kg-day	2.22E-07	4.83E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								4.23E-06					--
		Exposure Point Total									1.24E-05					--
	Exposure Medium Total										1.24E-05					--
Medium Total											1.24E-05					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											1.24E-05					--

TABLE 7.07.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Hangar Area Contact with Surface Soil	Ingestion	Benz(a)anthracene	7.80E+02	ug/kg	1.22E-06	mg/kg-day	7.30E-01	mg/kg-day	3.82E-06					N/A
				Benzo(a)pyrene	8.60E+02	ug/kg	1.35E-06	mg/kg-day	7.30E+00	mg/kg-day	4.21E-05					N/A
				Benzo(b)fluoranthene	1.10E+03	ug/kg	1.72E-06	mg/kg-day	7.30E-01	mg/kg-day	5.38E-06					N/A
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	2.82E-07	mg/kg-day	7.30E+00	mg/kg-day	8.81E-06					N/A
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	1.06E-06	mg/kg-day	7.30E-01	mg/kg-day	3.33E-06					N/A
			Exp. Route Total								6.34E-05					--
			Dermal	Benz(a)anthracene	7.80E+02	ug/kg	5.01E-07	mg/kg-day	7.30E-01	mg/kg-day	1.47E-06					N/A
				Benzo(a)pyrene	8.60E+02	ug/kg	5.53E-07	mg/kg-day	7.30E+00	mg/kg-day	1.62E-05					N/A
				Benzo(b)fluoranthene	1.10E+03	ug/kg	7.07E-07	mg/kg-day	7.30E-01	mg/kg-day	2.07E-06					N/A
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	1.16E-07	mg/kg-day	7.30E+00	mg/kg-day	3.38E-06					N/A
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	4.37E-07	mg/kg-day	7.30E-01	mg/kg-day	1.28E-06					N/A
			Exp. Route Total								2.44E-05					--
		Exposure Point Total									8.78E-05					--
	Exposure Medium Total										8.78E-05					--
Medium Total											8.78E-05					--
											Total of Receptor Risks Across All Media	8.78E-05				Total of Receptor Hazards Across All Media	--

TABLE 7.08.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - INDUSTRIAL WORKER EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Industrial
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Hangar Area Contact with Surface Soil	Ingestion	Benz(a)anthracene	7.80E+02	ug/kg	2.73E-07	mg/kg-day	7.30E-01	mg/kg-day	1.99E-07	7.63E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	3.01E-07	mg/kg-day	7.30E+00	mg/kg-day	2.19E-06	8.41E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	3.84E-07	mg/kg-day	7.30E-01	mg/kg-day	2.81E-07	1.08E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	6.29E-08	mg/kg-day	7.30E+00	mg/kg-day	4.59E-07	1.76E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	2.38E-07	mg/kg-day	7.30E-01	mg/kg-day	1.73E-07	6.65E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								3.31E-06					--
			Dermal	Benz(a)anthracene	7.80E+02	ug/kg	2.34E-07	mg/kg-day	7.30E-01	mg/kg-day	1.71E-07	6.55E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	2.58E-07	mg/kg-day	7.30E+00	mg/kg-day	1.88E-06	7.22E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	3.30E-07	mg/kg-day	7.30E-01	mg/kg-day	2.41E-07	9.23E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	5.40E-08	mg/kg-day	7.30E+00	mg/kg-day	3.94E-07	1.51E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	2.04E-07	mg/kg-day	7.30E-01	mg/kg-day	1.49E-07	5.71E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.84E-06					--
		Exposure Point Total									6.14E-06					--
	Exposure Medium Total										6.14E-06					--
Medium Total											6.14E-06					--
											Total of Receptor Risks Across All Media	6.14E-06		Total of Receptor Hazards Across All Media		--

TABLE 7.09.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Hangar Area Contact with Surface Soil	Ingestion	Benz(a)anthracene	7.80E+02	ug/kg	2.54E-07	mg/kg-day	7.30E-01	mg/kg-day	9.89E-07	2.96E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	2.80E-07	mg/kg-day	7.30E+00	mg/kg-day	1.09E-05	3.27E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	3.58E-07	mg/kg-day	7.30E-01	mg/kg-day	1.39E-06	4.18E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	5.86E-08	mg/kg-day	7.30E+00	mg/kg-day	2.28E-06	6.84E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	2.21E-07	mg/kg-day	7.30E-01	mg/kg-day	8.62E-07	2.58E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.64E-05					--
			Dermal	Benz(a)anthracene	7.80E+02	ug/kg	9.25E-08	mg/kg-day	7.30E-01	mg/kg-day	3.60E-07	1.08E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	1.02E-07	mg/kg-day	7.30E+00	mg/kg-day	3.97E-06	1.19E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	1.30E-07	mg/kg-day	7.30E-01	mg/kg-day	5.08E-07	1.52E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	2.13E-08	mg/kg-day	7.30E+00	mg/kg-day	8.31E-07	2.49E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	8.06E-08	mg/kg-day	7.30E-01	mg/kg-day	3.14E-07	9.40E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								5.98E-06					--
		Exposure Point Total									2.24E-05					--
	Exposure Medium Total										2.24E-05					--
Medium Total											2.24E-05					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											2.24E-05					--

TABLE 7.10.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Hangar Area Contact with Surface Soil	Ingestion	Benz(a)anthracene	7.80E+02	ug/kg	1.09E-07	mg/kg-day	7.30E-01	mg/kg-day	1.46E-07	3.17E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	1.20E-07	mg/kg-day	7.30E+00	mg/kg-day	1.61E-06	3.50E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	1.54E-07	mg/kg-day	7.30E-01	mg/kg-day	2.05E-07	4.48E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	2.51E-08	mg/kg-day	7.30E+00	mg/kg-day	3.36E-07	7.33E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	9.49E-08	mg/kg-day	7.30E-01	mg/kg-day	1.27E-07	2.77E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.42E-06					--
			Dermal	Benz(a)anthracene	7.80E+02	ug/kg	5.65E-08	mg/kg-day	7.30E-01	mg/kg-day	7.56E-08	1.65E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	8.60E+02	ug/kg	6.23E-08	mg/kg-day	7.30E+00	mg/kg-day	8.33E-07	1.82E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	1.10E+03	ug/kg	7.96E-08	mg/kg-day	7.30E-01	mg/kg-day	1.07E-07	2.32E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	1.30E-08	mg/kg-day	7.30E+00	mg/kg-day	1.74E-07	3.80E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	4.92E-08	mg/kg-day	7.30E-01	mg/kg-day	6.59E-08	1.44E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.26E-06					--
		Exposure Point Total									3.68E-06					--
	Exposure Medium Total										3.68E-06					--
Medium Total											3.68E-06					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											3.68E-06					--

TABLE 7.11.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Hangar Area Contact with Surface Soil	Ingestion	Benz(a)anthracene	7.80E+02	ug/kg	3.63E-07	mg/kg-day	7.30E-01	mg/kg-day	1.13E-06					N/A
				Benzo(a)pyrene	8.60E+02	ug/kg	4.00E-07	mg/kg-day	7.30E+00	mg/kg-day	1.25E-05					N/A
				Benzo(b)fluoranthene	1.10E+03	ug/kg	5.12E-07	mg/kg-day	7.30E-01	mg/kg-day	1.60E-06					N/A
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	8.37E-08	mg/kg-day	7.30E+00	mg/kg-day	2.62E-06					N/A
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	3.16E-07	mg/kg-day	7.30E-01	mg/kg-day	9.89E-07					N/A
			Exp. Route Total								1.89E-05					--
			Dermal	Benz(a)anthracene	7.80E+02	ug/kg	1.49E-07	mg/kg-day	7.30E-01	mg/kg-day	4.36E-07					N/A
				Benzo(a)pyrene	8.60E+02	ug/kg	1.64E-07	mg/kg-day	7.30E+00	mg/kg-day	4.80E-06					N/A
				Benzo(b)fluoranthene	1.10E+03	ug/kg	2.10E-07	mg/kg-day	7.30E-01	mg/kg-day	6.14E-07					N/A
				Dibenz(a,h)anthracene	1.80E+02	ug/kg	3.44E-08	mg/kg-day	7.30E+00	mg/kg-day	1.01E-06					N/A
				Indeno(1,2,3-cd)pyrene	6.80E+02	ug/kg	1.30E-07	mg/kg-day	7.30E-01	mg/kg-day	3.80E-07					N/A
			Exp. Route Total								7.24E-06					--
		Exposure Point Total									2.61E-05					--
	Exposure Medium Total										2.61E-05					--
Medium Total											2.61E-05					--
											Total of Receptor Risks Across All Media	2.61E-05				Total of Receptor Hazards Across All Media	--

TABLE 7.12.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 HANGAR AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	4.60E-06	mg/kg-day	7.30E-01	mg/kg-day	1.79E-05	5.37E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	3.51E-06	mg/kg-day	7.30E+00	mg/kg-day	1.37E-04	4.09E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	4.60E-06	mg/kg-day	7.30E-01	mg/kg-day	1.79E-05	5.37E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	6.36E-07	mg/kg-day	7.30E+00	mg/kg-day	2.47E-05	7.42E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	2.19E-06	mg/kg-day	7.30E-01	mg/kg-day	8.53E-06	2.56E-05	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.06E-04					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	1.68E-06	mg/kg-day	7.30E-01	mg/kg-day	6.52E-06	1.95E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	1.28E-06	mg/kg-day	7.30E+00	mg/kg-day	4.97E-05	1.49E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.68E-06	mg/kg-day	7.30E-01	mg/kg-day	6.52E-06	1.95E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	2.31E-07	mg/kg-day	7.30E+00	mg/kg-day	9.01E-06	2.70E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	7.98E-07	mg/kg-day	7.30E-01	mg/kg-day	3.11E-06	9.31E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								7.49E-05					--
		Exposure Point Total									2.81E-04					--
	Exposure Medium Total										2.81E-04					--
Medium Total											2.81E-04					--
											Total of Receptor Risks Across All Media					2.81E-04					Total of Receptor Hazards Across All Media	--

TABLE 7.13.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 HANGAR AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	1.97E-06	mg/kg-day	7.30E-01	mg/kg-day	2.64E-06	5.75E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	1.50E-06	mg/kg-day	7.30E+00	mg/kg-day	2.01E-05	4.38E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.97E-06	mg/kg-day	7.30E-01	mg/kg-day	2.64E-06	5.75E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	2.72E-07	mg/kg-day	7.30E+00	mg/kg-day	3.65E-06	7.95E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	9.39E-07	mg/kg-day	7.30E-01	mg/kg-day	1.26E-06	2.74E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								3.03E-05					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	1.02E-06	mg/kg-day	7.30E-01	mg/kg-day	1.37E-06	2.98E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	7.80E-07	mg/kg-day	7.30E+00	mg/kg-day	1.04E-05	2.27E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.02E-06	mg/kg-day	7.30E-01	mg/kg-day	1.37E-06	2.98E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	1.41E-07	mg/kg-day	7.30E+00	mg/kg-day	1.89E-06	4.12E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	4.87E-07	mg/kg-day	7.30E-01	mg/kg-day	6.52E-07	1.42E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.57E-05					--
		Exposure Point Total									4.60E-05					--
	Exposure Medium Total										4.60E-05					--
Medium Total											4.60E-05					--
											Total of Receptor Risks Across All Media					4.60E-05
																Total of Receptor Hazards Across All Media	--

TABLE 7.14.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	6.58E-06	mg/kg-day	7.30E-01	mg/kg-day	2.06E-05					N/A
				Benzo(a)pyrene	3.20E+03	ug/kg	5.01E-06	mg/kg-day	7.30E+00	mg/kg-day	1.57E-04					N/A
				Benzo(b)fluoranthene	4.20E+03	ug/kg	6.58E-06	mg/kg-day	7.30E-01	mg/kg-day	2.06E-05					N/A
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	9.08E-07	mg/kg-day	7.30E+00	mg/kg-day	2.84E-05					N/A
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	3.13E-06	mg/kg-day	7.30E-01	mg/kg-day	9.79E-06					N/A
			Exp. Route Total								2.36E-04					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	2.70E-06	mg/kg-day	7.30E-01	mg/kg-day	7.89E-06					N/A
				Benzo(a)pyrene	3.20E+03	ug/kg	2.06E-06	mg/kg-day	7.30E+00	mg/kg-day	6.01E-05					N/A
				Benzo(b)fluoranthene	4.20E+03	ug/kg	2.70E-06	mg/kg-day	7.30E-01	mg/kg-day	7.89E-06					N/A
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	3.73E-07	mg/kg-day	7.30E+00	mg/kg-day	1.09E-05					N/A
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	1.29E-06	mg/kg-day	7.30E-01	mg/kg-day	3.76E-06					N/A
			Exp. Route Total								9.06E-05					--
		Exposure Point Total									3.27E-04					--
	Exposure Medium Total										3.27E-04					--
Medium Total											3.27E-04					--
										Total of Receptor Risks Across All Media	3.27E-04			Total of Receptor Hazards Across All Media		--

TABLE 7.15.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - INDUSTRIAL WORKER EXPOSURE TO SITE 3 HANGAR AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Industrial
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	1.47E-06	mg/kg-day	7.30E-01	mg/kg-day	1.07E-06	4.11E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	1.12E-06	mg/kg-day	7.30E+00	mg/kg-day	8.16E-06	3.13E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.47E-06	mg/kg-day	7.30E-01	mg/kg-day	1.07E-06	4.11E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	2.03E-07	mg/kg-day	7.30E+00	mg/kg-day	1.48E-06	5.68E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	6.99E-07	mg/kg-day	7.30E-01	mg/kg-day	5.10E-07	1.96E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.23E-05					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	1.26E-06	mg/kg-day	7.30E-01	mg/kg-day	9.19E-07	3.53E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	9.59E-07	mg/kg-day	7.30E+00	mg/kg-day	7.00E-06	2.69E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.26E-06	mg/kg-day	7.30E-01	mg/kg-day	9.19E-07	3.53E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	1.74E-07	mg/kg-day	7.30E+00	mg/kg-day	1.27E-06	4.87E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	6.00E-07	mg/kg-day	7.30E-01	mg/kg-day	4.38E-07	1.68E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.05E-05					--
		Exposure Point Total									2.28E-05					--
	Exposure Medium Total										2.28E-05					--
Medium Total											2.28E-05					--
											Total of Receptor Risks Across All Media	2.28E-05		Total of Receptor Hazards Across All Media		--

TABLE 7.16.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER EXPOSURE TO SITE 3 HANGAR AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	1.01E-07	mg/kg-day	7.30E-01	mg/kg-day	7.35E-08	7.05E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	7.68E-08	mg/kg-day	7.30E+00	mg/kg-day	5.60E-07	5.37E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.01E-07	mg/kg-day	7.30E-01	mg/kg-day	7.35E-08	7.05E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	1.39E-08	mg/kg-day	7.30E+00	mg/kg-day	1.02E-07	9.74E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	4.80E-08	mg/kg-day	7.30E-01	mg/kg-day	3.50E-08	3.36E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								8.44E-07					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	2.62E-08	mg/kg-day	7.30E-01	mg/kg-day	1.91E-08	1.83E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	2.00E-08	mg/kg-day	7.30E+00	mg/kg-day	1.46E-07	1.40E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	2.62E-08	mg/kg-day	7.30E-01	mg/kg-day	1.91E-08	1.83E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	3.62E-09	mg/kg-day	7.30E+00	mg/kg-day	2.64E-08	2.53E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	1.25E-08	mg/kg-day	7.30E-01	mg/kg-day	9.11E-09	8.73E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.19E-07					--
		Exposure Point Total									1.06E-06					--
	Exposure Medium Total										1.06E-06					--
Medium Total											1.06E-06					--
											Total of Receptor Risks Across All Media	1.06E-06		Total of Receptor Hazards Across All Media		--

TABLE 7.17.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	1.37E-06	mg/kg-day	7.30E-01	mg/kg-day	5.32E-06	1.60E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	1.04E-06	mg/kg-day	7.30E+00	mg/kg-day	4.06E-05	1.22E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.37E-06	mg/kg-day	7.30E-01	mg/kg-day	5.32E-06	1.60E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	1.89E-07	mg/kg-day	7.30E+00	mg/kg-day	7.35E-06	2.20E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	6.51E-07	mg/kg-day	7.30E-01	mg/kg-day	2.54E-06	7.60E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								6.11E-05					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	4.98E-07	mg/kg-day	7.30E-01	mg/kg-day	1.94E-06	5.81E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	3.79E-07	mg/kg-day	7.30E+00	mg/kg-day	1.48E-05	4.43E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	4.98E-07	mg/kg-day	7.30E-01	mg/kg-day	1.94E-06	5.81E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	6.87E-08	mg/kg-day	7.30E+00	mg/kg-day	2.68E-06	8.02E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	2.37E-07	mg/kg-day	7.30E-01	mg/kg-day	9.23E-07	2.77E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.22E-05					--
		Exposure Point Total									8.34E-05					--
	Exposure Medium Total										8.34E-05					--
Medium Total											8.34E-05					--
											Total of Receptor Risks Across All Media	8.34E-05		Total of Receptor Hazards Across All Media			--

TABLE 7.18.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	5.86E-07	mg/kg-day	7.30E-01	mg/kg-day	7.84E-07	1.71E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	4.47E-07	mg/kg-day	7.30E+00	mg/kg-day	5.98E-06	1.30E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	5.86E-07	mg/kg-day	7.30E-01	mg/kg-day	7.84E-07	1.71E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	8.09E-08	mg/kg-day	7.30E+00	mg/kg-day	1.08E-06	2.36E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	2.79E-07	mg/kg-day	7.30E-01	mg/kg-day	3.74E-07	8.14E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								9.00E-06					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	3.04E-07	mg/kg-day	7.30E-01	mg/kg-day	4.07E-07	8.87E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	2.32E-07	mg/kg-day	7.30E+00	mg/kg-day	3.10E-06	6.76E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	3.04E-07	mg/kg-day	7.30E-01	mg/kg-day	4.07E-07	8.87E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	4.20E-08	mg/kg-day	7.30E+00	mg/kg-day	5.62E-07	1.22E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	1.45E-07	mg/kg-day	7.30E-01	mg/kg-day	1.94E-07	4.22E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								4.67E-06					--
		Exposure Point Total									1.37E-05					--
	Exposure Medium Total										1.37E-05					--
Medium Total											1.37E-05					--
											Total of Receptor Risks Across All Media	1.37E-05		Total of Receptor Hazards Across All Media		--

TABLE 7.19.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	1.95E-06	mg/kg-day	7.30E-01	mg/kg-day	6.11E-06					N/A
				Benzo(a)pyrene	3.20E+03	ug/kg	1.49E-06	mg/kg-day	7.30E+00	mg/kg-day	4.65E-05					N/A
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.95E-06	mg/kg-day	7.30E-01	mg/kg-day	6.11E-06					N/A
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	2.70E-07	mg/kg-day	7.30E+00	mg/kg-day	8.44E-06					N/A
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	9.30E-07	mg/kg-day	7.30E-01	mg/kg-day	2.91E-06					N/A
			Exp. Route Total								7.01E-05					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	8.02E-07	mg/kg-day	7.30E-01	mg/kg-day	2.35E-06					N/A
				Benzo(a)pyrene	3.20E+03	ug/kg	6.11E-07	mg/kg-day	7.30E+00	mg/kg-day	1.79E-05					N/A
				Benzo(b)fluoranthene	4.20E+03	ug/kg	8.02E-07	mg/kg-day	7.30E-01	mg/kg-day	2.35E-06					N/A
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	1.11E-07	mg/kg-day	7.30E+00	mg/kg-day	3.24E-06					N/A
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	3.82E-07	mg/kg-day	7.30E-01	mg/kg-day	1.12E-06					N/A
			Exp. Route Total								2.69E-05					--
		Exposure Point Total									9.70E-05					--
	Exposure Medium Total										9.70E-05					--
Medium Total											9.70E-05					--
										Total of Receptor Risks Across All Media	9.70E-05			Total of Receptor Hazards Across All Media		--

TABLE 7.20.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.38E-11	mg/kg-day	1.30E+05	mg/kg-day	1.80E-06	1.61E-10	mg/kg-day	1.00E-09	mg/kg-day	1.61E-01
				Aluminum	1.64E+04	mg/kg	1.80E-02	mg/kg-day	--	mg/kg-day	--	2.10E-01	mg/kg-day	1.00E+00	mg/kg-day	2.10E-01
				Antimony	1.33E+00	mg/kg	1.46E-06	mg/kg-day	--	mg/kg-day	--	1.70E-05	mg/kg-day	4.00E-04	mg/kg-day	4.25E-02
				Arsenic	5.35E+00	mg/kg	5.86E-06	mg/kg-day	1.50E+00	mg/kg-day	8.79E-06	6.84E-05	mg/kg-day	3.00E-04	mg/kg-day	2.28E-01
				Cadmium	2.81E+00	mg/kg	3.08E-06	mg/kg-day	--	mg/kg-day	--	3.59E-05	mg/kg-day	1.00E-03	mg/kg-day	3.59E-02
				Chromium	2.14E+01	mg/kg	2.35E-05	mg/kg-day	5.00E-01	mg/kg-day	6.25E-05	2.74E-04	mg/kg-day	3.00E-03	mg/kg-day	9.12E-02
				Cobalt	8.76E+00	mg/kg	9.60E-06	mg/kg-day	--	mg/kg-day	--	1.12E-04	mg/kg-day	3.00E-04	mg/kg-day	3.73E-01
				Iron	2.17E+04	mg/kg	2.38E-02	mg/kg-day	--	mg/kg-day	--	2.77E-01	mg/kg-day	7.00E-01	mg/kg-day	3.96E-01
				Manganese	6.78E+02	mg/kg	7.43E-04	mg/kg-day	--	mg/kg-day	--	8.67E-03	mg/kg-day	2.40E-02	mg/kg-day	3.61E-01
				Vanadium	3.16E+01	mg/kg	3.46E-05	mg/kg-day	--	mg/kg-day	--	4.04E-04	mg/kg-day	5.00E-03	mg/kg-day	8.08E-02
				Dieldrin	1.38E+02	ug/kg	1.51E-07	mg/kg-day	1.60E+01	mg/kg-day	2.42E-06	1.76E-06	mg/kg-day	5.00E-05	mg/kg-day	3.53E-02
				Benz(a)anthracene	5.60E+03	ug/kg	6.14E-06	mg/kg-day	7.30E-01	mg/kg-day	2.39E-05	7.16E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	4.61E-06	mg/kg-day	7.30E+00	mg/kg-day	1.80E-04	5.38E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	5.08E-06	mg/kg-day	7.30E-01	mg/kg-day	1.98E-05	5.93E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	3.31E-06	mg/kg-day	7.30E-02	mg/kg-day	1.29E-06	3.86E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	5.14E-06	mg/kg-day	7.30E-03	mg/kg-day	2.00E-07	6.00E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	2.96E-07	mg/kg-day	7.30E+00	mg/kg-day	1.15E-05	3.45E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.08E-06	mg/kg-day	7.30E-01	mg/kg-day	8.11E-06	2.43E-05	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	6.10E-07	mg/kg-day	--	mg/kg-day	--	7.12E-06	mg/kg-day	2.00E-02	mg/kg-day	3.56E-04
				Phenanthrene	1.79E+04	ug/kg	1.96E-05	mg/kg-day	--	mg/kg-day	--	2.29E-04	mg/kg-day	3.00E-02	mg/kg-day	7.63E-03
			Exp. Route Total								3.20E-04					2.02E+00
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.16E-12	mg/kg-day	1.30E+05	mg/kg-day	1.51E-07	1.35E-11	mg/kg-day	1.00E-09	mg/kg-day	1.35E-02
				Aluminum	1.64E+04	mg/kg	5.03E-04	mg/kg-day	--	mg/kg-day	--	5.87E-03	mg/kg-day	1.00E+00	mg/kg-day	5.87E-03
				Antimony	1.33E+00	mg/kg	4.08E-08	mg/kg-day	--	mg/kg-day	--	4.76E-07	mg/kg-day	6.00E-05	mg/kg-day	7.94E-03
				Arsenic	5.35E+00	mg/kg	4.92E-07	mg/kg-day	1.50E+00	mg/kg-day	7.39E-07	5.75E-06	mg/kg-day	3.00E-04	mg/kg-day	1.92E-02
				Cadmium	2.81E+00	mg/kg	8.62E-09	mg/kg-day	--	mg/kg-day	--	1.01E-07	mg/kg-day	2.50E-05	mg/kg-day	4.02E-03
				Chromium	2.14E+01	mg/kg	6.57E-07	mg/kg-day	2.00E+01	mg/kg-day	7.00E-05	7.66E-06	mg/kg-day	7.50E-05	mg/kg-day	1.02E-01
				Cobalt	8.76E+00	mg/kg	2.69E-07	mg/kg-day	--	mg/kg-day	--	3.14E-06	mg/kg-day	3.00E-04	mg/kg-day	1.05E-02
				Iron	2.17E+04	mg/kg	6.66E-04	mg/kg-day	--	mg/kg-day	--	7.77E-03	mg/kg-day	7.00E-01	mg/kg-day	1.11E-02
				Manganese	6.78E+02	mg/kg	2.08E-05	mg/kg-day	--	mg/kg-day	--	2.43E-04	mg/kg-day	9.60E-04	mg/kg-day	2.53E-01
				Vanadium	3.16E+01	mg/kg	9.70E-07	mg/kg-day	--	mg/kg-day	--	1.13E-05	mg/kg-day	1.30E-04	mg/kg-day	8.70E-02
				Dieldrin	1.38E+02	ug/kg	4.23E-08	mg/kg-day	1.60E+01	mg/kg-day	6.78E-07	4.94E-07	mg/kg-day	5.00E-05	mg/kg-day	9.88E-03
				Benz(a)anthracene	5.60E+03	ug/kg	2.23E-06	mg/kg-day	7.30E-01	mg/kg-day	8.70E-06	2.61E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.68E-06	mg/kg-day	7.30E+00	mg/kg-day	6.54E-05	1.96E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.85E-06	mg/kg-day	7.30E-01	mg/kg-day	7.21E-06	2.16E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.20E-06	mg/kg-day	7.30E-02	mg/kg-day	4.69E-07	1.41E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.87E-06	mg/kg-day	7.30E-03	mg/kg-day	7.28E-08	2.18E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.08E-07	mg/kg-day	7.30E+00	mg/kg-day	4.19E-06	1.26E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	7.58E-07	mg/kg-day	7.30E-01	mg/kg-day	2.95E-06	8.84E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	2.22E-07	mg/kg-day	--	mg/kg-day	--	2.59E-06	mg/kg-day	2.00E-02	mg/kg-day	1.30E-04
				Phenanthrene	1.79E+04	ug/kg	7.14E-06	mg/kg-day	--	mg/kg-day	--	8.33E-05	mg/kg-day	3.00E-02	mg/kg-day	2.78E-03
			Exp. Route Total								1.61E-04					5.27E-01
		Exposure Point Total									4.81E-04					2.55E+00
	Exposure Medium Total										4.81E-04					2.55E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	4.84E-06	mg/m3	3.40E-02	1/(mg/m3)	1.65E-07	5.65E-05	mg/m3	3.00E-03	mg/m3	1.88E-02
			Exp. Route Total								1.65E-07					1.88E-02
		Exposure Point Total									1.65E-07					1.88E-02
	Exposure Medium Total										1.65E-07					1.88E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	2.72E-10	mg/m3	1.20E+01	1/(mg/m3)	1.74E-08	3.17E-09	mg/m3	1.00E-04	mg/m3	3.17E-05
			Exp. Route Total								1.74E-08					3.17E-05
		Exposure Point Total									1.74E-08					3.17E-05
	Exposure Medium Total										1.74E-08					3.17E-05
Medium Total											4.81E-04					2.57E+00
											Total of Receptor Risks Across All Media	4.81E-04				Total of Receptor Hazards Across All Media	2.57E+00

TABLE 7.20a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.38E-11	mg/kg-day	1.30E+05	mg/kg-day	1.80E-06	1.61E-10	mg/kg-day	1.00E-09	mg/kg-day	1.61E-01
				Aluminum	1.64E+04	mg/kg	1.80E-02	mg/kg-day	--	mg/kg-day	--	2.10E-01	mg/kg-day	1.00E+00	mg/kg-day	2.10E-01
				Antimony	1.33E+00	mg/kg	1.46E-06	mg/kg-day	--	mg/kg-day	--	1.70E-05	mg/kg-day	4.00E-04	mg/kg-day	4.25E-02
				Cadmium	2.81E+00	mg/kg	3.08E-06	mg/kg-day	--	mg/kg-day	--	3.59E-05	mg/kg-day	1.00E-03	mg/kg-day	3.59E-02
				Chromium	2.14E+01	mg/kg	2.35E-05	mg/kg-day	5.00E-01	mg/kg-day	6.25E-05	2.74E-04	mg/kg-day	3.00E-03	mg/kg-day	9.12E-02
				Cobalt	8.76E+00	mg/kg	9.60E-06	mg/kg-day	--	mg/kg-day	--	1.12E-04	mg/kg-day	3.00E-04	mg/kg-day	3.73E-01
				Iron	2.17E+04	mg/kg	2.38E-02	mg/kg-day	--	mg/kg-day	--	2.77E-01	mg/kg-day	7.00E-01	mg/kg-day	3.96E-01
				Vanadium	3.16E+01	mg/kg	3.46E-05	mg/kg-day	--	mg/kg-day	--	4.04E-04	mg/kg-day	5.00E-03	mg/kg-day	8.08E-02
				Dieldrin	1.38E+02	ug/kg	1.51E-07	mg/kg-day	1.60E+01	mg/kg-day	2.42E-06	1.76E-06	mg/kg-day	5.00E-05	mg/kg-day	3.53E-02
				Benz(a)anthracene	5.60E+03	ug/kg	6.14E-06	mg/kg-day	7.30E-01	mg/kg-day	2.39E-05	7.16E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	4.61E-06	mg/kg-day	7.30E+00	mg/kg-day	1.80E-04	5.38E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	5.08E-06	mg/kg-day	7.30E-01	mg/kg-day	1.98E-05	5.93E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	3.31E-06	mg/kg-day	7.30E-02	mg/kg-day	1.29E-06	3.86E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	5.14E-06	mg/kg-day	7.30E-03	mg/kg-day	2.00E-07	6.00E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	2.96E-07	mg/kg-day	7.30E+00	mg/kg-day	1.15E-05	3.45E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.08E-06	mg/kg-day	7.30E-01	mg/kg-day	8.11E-06	2.43E-05	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	6.10E-07	mg/kg-day	--	mg/kg-day	--	7.12E-06	mg/kg-day	2.00E-02	mg/kg-day	3.56E-04
				Phenanthrene	1.79E+04	ug/kg	1.96E-05	mg/kg-day	--	mg/kg-day	--	2.29E-04	mg/kg-day	3.00E-02	mg/kg-day	7.63E-03
			Exp. Route Total								3.11E-04					1.43E+00
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.16E-12	mg/kg-day	1.30E+05	mg/kg-day	1.51E-07	1.35E-11	mg/kg-day	1.00E-09	mg/kg-day	1.35E-02
				Aluminum	1.64E+04	mg/kg	5.03E-04	mg/kg-day	--	mg/kg-day	--	5.87E-03	mg/kg-day	1.00E+00	mg/kg-day	5.87E-03
				Antimony	1.33E+00	mg/kg	4.08E-08	mg/kg-day	--	mg/kg-day	--	4.76E-07	mg/kg-day	6.00E-05	mg/kg-day	7.94E-03
				Cadmium	2.81E+00	mg/kg	8.62E-09	mg/kg-day	--	mg/kg-day	--	1.01E-07	mg/kg-day	2.50E-05	mg/kg-day	4.02E-03
				Chromium	2.14E+01	mg/kg	6.57E-07	mg/kg-day	2.00E+01	mg/kg-day	7.00E-05	7.66E-06	mg/kg-day	7.50E-05	mg/kg-day	1.02E-01
				Cobalt	8.76E+00	mg/kg	2.69E-07	mg/kg-day	--	mg/kg-day	--	3.14E-06	mg/kg-day	3.00E-04	mg/kg-day	1.05E-02
				Iron	2.17E+04	mg/kg	6.66E-04	mg/kg-day	--	mg/kg-day	--	7.77E-03	mg/kg-day	7.00E-01	mg/kg-day	1.11E-02
				Vanadium	3.16E+01	mg/kg	9.70E-07	mg/kg-day	--	mg/kg-day	--	1.13E-05	mg/kg-day	1.30E-04	mg/kg-day	8.70E-02
				Dieldrin	1.38E+02	ug/kg	4.23E-08	mg/kg-day	1.60E+01	mg/kg-day	6.78E-07	4.94E-07	mg/kg-day	5.00E-05	mg/kg-day	9.88E-03
				Benz(a)anthracene	5.60E+03	ug/kg	2.23E-06	mg/kg-day	7.30E-01	mg/kg-day	8.70E-06	2.61E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.68E-06	mg/kg-day	7.30E+00	mg/kg-day	6.54E-05	1.96E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.85E-06	mg/kg-day	7.30E-01	mg/kg-day	7.21E-06	2.16E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.20E-06	mg/kg-day	7.30E-02	mg/kg-day	4.69E-07	1.41E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.87E-06	mg/kg-day	7.30E-03	mg/kg-day	7.28E-08	2.18E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.08E-07	mg/kg-day	7.30E+00	mg/kg-day	4.19E-06	1.26E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	7.58E-07	mg/kg-day	7.30E-01	mg/kg-day	2.95E-06	8.84E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	2.22E-07	mg/kg-day	--	mg/kg-day	--	2.59E-06	mg/kg-day	2.00E-02	mg/kg-day	1.30E-04
				Phenanthrene	1.79E+04	ug/kg	7.14E-06	mg/kg-day	--	mg/kg-day	--	8.33E-05	mg/kg-day	3.00E-02	mg/kg-day	2.78E-03
			Exp. Route Total								1.60E-04					2.55E-01
		Exposure Point Total									4.71E-04					1.69E+00
	Exposure Medium Total										4.71E-04					1.69E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	4.84E-06	mg/m3	3.40E-02	1/(mg/m3)	1.65E-07	5.65E-05	mg/m3	3.00E-03	mg/m3	1.88E-02
			Exp. Route Total								1.65E-07					1.88E-02
		Exposure Point Total									1.65E-07					1.88E-02
	Exposure Medium Total										1.65E-07					1.88E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	2.72E-10	mg/m3	1.20E+01	1/(mg/m3)	1.74E-08	3.17E-09	mg/m3	1.00E-04	mg/m3	3.17E-05
			Exp. Route Total								1.74E-08					3.17E-05
		Exposure Point Total									1.74E-08					3.17E-05
	Exposure Medium Total										1.74E-08					3.17E-05
Medium Total											4.71E-04					1.71E+00
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media 1.71E+00

TABLE 7.21.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.92E-12	mg/kg-day	1.30E+05	mg/kg-day	7.69E-07	1.73E-11	mg/kg-day	1.00E-09	mg/kg-day	1.73E-02
				Aluminum	1.64E+04	mg/kg	7.70E-03	mg/kg-day	--	mg/kg-day	--	2.25E-02	mg/kg-day	1.00E+00	mg/kg-day	2.25E-02
				Antimony	1.33E+00	mg/kg	6.25E-07	mg/kg-day	--	mg/kg-day	--	1.82E-06	mg/kg-day	4.00E-04	mg/kg-day	4.55E-03
				Arsenic	5.35E+00	mg/kg	2.51E-06	mg/kg-day	1.50E+00	mg/kg-day	3.77E-06	7.33E-06	mg/kg-day	3.00E-04	mg/kg-day	2.44E-02
				Cadmium	2.81E+00	mg/kg	1.32E-06	mg/kg-day	--	mg/kg-day	--	3.85E-06	mg/kg-day	1.00E-03	mg/kg-day	3.85E-03
				Chromium	2.14E+01	mg/kg	1.01E-05	mg/kg-day	5.00E-01	mg/kg-day	9.21E-06	2.93E-05	mg/kg-day	3.00E-03	mg/kg-day	9.77E-03
				Cobalt	8.76E+00	mg/kg	4.11E-06	mg/kg-day	--	mg/kg-day	--	1.20E-05	mg/kg-day	3.00E-04	mg/kg-day	4.00E-02
				Iron	2.17E+04	mg/kg	1.02E-02	mg/kg-day	--	mg/kg-day	--	2.97E-02	mg/kg-day	7.00E-01	mg/kg-day	4.25E-02
				Manganese	6.78E+02	mg/kg	3.18E-04	mg/kg-day	--	mg/kg-day	--	9.29E-04	mg/kg-day	2.40E-02	mg/kg-day	3.87E-02
				Vanadium	3.16E+01	mg/kg	1.48E-05	mg/kg-day	--	mg/kg-day	--	4.33E-05	mg/kg-day	5.00E-03	mg/kg-day	8.66E-03
				Dieldrin	1.38E+02	ug/kg	6.48E-08	mg/kg-day	1.60E+01	mg/kg-day	1.04E-06	1.89E-07	mg/kg-day	5.00E-05	mg/kg-day	3.78E-03
				Benz(a)anthracene	5.60E+03	ug/kg	2.63E-06	mg/kg-day	7.30E-01	mg/kg-day	3.52E-06	7.67E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.98E-06	mg/kg-day	7.30E+00	mg/kg-day	2.65E-05	5.77E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.18E-06	mg/kg-day	7.30E-01	mg/kg-day	2.92E-06	6.36E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.42E-06	mg/kg-day	7.30E-02	mg/kg-day	1.90E-07	4.14E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	2.20E-06	mg/kg-day	7.30E-03	mg/kg-day	2.95E-08	6.42E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.27E-07	mg/kg-day	7.30E+00	mg/kg-day	1.70E-06	3.70E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	8.92E-07	mg/kg-day	7.30E-01	mg/kg-day	1.19E-06	2.60E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	2.62E-07	mg/kg-day	--	mg/kg-day	--	7.63E-07	mg/kg-day	2.00E-02	mg/kg-day	3.82E-05
				Phenanthrene	1.79E+04	ug/kg	8.41E-06	mg/kg-day	--	mg/kg-day	--	2.45E-05	mg/kg-day	3.00E-02	mg/kg-day	8.17E-04
			Exp. Route Total								5.08E-05					2.17E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	7.08E-13	mg/kg-day	1.30E+05	mg/kg-day	9.21E-08	2.07E-12	mg/kg-day	1.00E-09	mg/kg-day	2.07E-03
				Aluminum	1.64E+04	mg/kg	3.07E-04	mg/kg-day	--	mg/kg-day	--	8.96E-04	mg/kg-day	1.00E+00	mg/kg-day	8.96E-04
				Antimony	1.33E+00	mg/kg	2.49E-08	mg/kg-day	--	mg/kg-day	--	7.27E-08	mg/kg-day	6.00E-05	mg/kg-day	1.21E-03
				Arsenic	5.35E+00	mg/kg	3.01E-07	mg/kg-day	1.50E+00	mg/kg-day	4.51E-07	8.77E-07	mg/kg-day	3.00E-04	mg/kg-day	2.92E-03
				Cadmium	2.81E+00	mg/kg	5.27E-09	mg/kg-day	--	mg/kg-day	--	1.54E-08	mg/kg-day	2.50E-05	mg/kg-day	6.14E-04
				Chromium	2.14E+01	mg/kg	4.01E-07	mg/kg-day	2.00E+01	mg/kg-day	1.47E-05	1.17E-06	mg/kg-day	7.50E-05	mg/kg-day	1.56E-02
				Cobalt	8.76E+00	mg/kg	1.64E-07	mg/kg-day	--	mg/kg-day	--	4.79E-07	mg/kg-day	3.00E-04	mg/kg-day	1.60E-03
				Iron	2.17E+04	mg/kg	4.07E-04	mg/kg-day	--	mg/kg-day	--	1.19E-03	mg/kg-day	7.00E-01	mg/kg-day	1.69E-03
				Manganese	6.78E+02	mg/kg	1.27E-05	mg/kg-day	--	mg/kg-day	--	3.71E-05	mg/kg-day	9.60E-04	mg/kg-day	3.86E-02
				Vanadium	3.16E+01	mg/kg	5.92E-07	mg/kg-day	--	mg/kg-day	--	1.73E-06	mg/kg-day	1.30E-04	mg/kg-day	1.33E-02
				Dieldrin	1.38E+02	ug/kg	2.59E-08	mg/kg-day	1.60E+01	mg/kg-day	4.14E-07	7.54E-08	mg/kg-day	5.00E-05	mg/kg-day	1.51E-03
				Benz(a)anthracene	5.60E+03	ug/kg	1.36E-06	mg/kg-day	7.30E-01	mg/kg-day	1.83E-06	3.98E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.03E-06	mg/kg-day	7.30E+00	mg/kg-day	1.37E-05	2.99E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.13E-06	mg/kg-day	7.30E-01	mg/kg-day	1.51E-06	3.30E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	7.36E-07	mg/kg-day	7.30E-02	mg/kg-day	9.85E-08	2.15E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.14E-06	mg/kg-day	7.30E-03	mg/kg-day	1.53E-08	3.33E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	6.58E-08	mg/kg-day	7.30E+00	mg/kg-day	8.80E-07	1.92E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	4.63E-07	mg/kg-day	7.30E-01	mg/kg-day	6.19E-07	1.35E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.36E-07	mg/kg-day	--	mg/kg-day	--	3.96E-07	mg/kg-day	2.00E-02	mg/kg-day	1.98E-05
				Phenanthrene	1.79E+04	ug/kg	4.36E-06	mg/kg-day	--	mg/kg-day	--	1.27E-05	mg/kg-day	3.00E-02	mg/kg-day	4.24E-04
			Exp. Route Total								3.43E-05					8.04E-02
		Exposure Point Total									8.51E-05					2.97E-01
	Exposure Medium Total										8.51E-05					2.97E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.94E-05	mg/m3	3.40E-02	1/(mg/m3)	6.58E-07	5.65E-05	mg/m3	3.00E-03	mg/m3	1.88E-02
			Exp. Route Total								6.58E-07					1.88E-02
		Exposure Point Total									6.58E-07					1.88E-02
	Exposure Medium Total										6.58E-07					1.88E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.09E-09	mg/m3	1.20E+01	1/(mg/m3)	2.39E-08	3.17E-09	mg/m3	1.00E-04	mg/m3	3.17E-05
			Exp. Route Total								2.39E-08					3.17E-05
		Exposure Point Total									2.39E-08					3.17E-05
	Exposure Medium Total										2.39E-08					3.17E-05
Medium Total											8.58E-05					3.16E-01
										Total of Receptor Risks Across All Media	8.58E-05				Total of Receptor Hazards Across All Media	3.16E-01

TABLE 7.21a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.92E-12	mg/kg-day	1.30E+05	mg/kg-day	7.69E-07	1.73E-11	mg/kg-day	1.00E-09	mg/kg-day	1.73E-02
				Aluminum	1.64E+04	mg/kg	7.70E-03	mg/kg-day	--	mg/kg-day	--	2.25E-02	mg/kg-day	1.00E+00	mg/kg-day	2.25E-02
				Antimony	1.33E+00	mg/kg	6.25E-07	mg/kg-day	--	mg/kg-day	--	1.82E-06	mg/kg-day	4.00E-04	mg/kg-day	4.55E-03
				Cadmium	2.81E+00	mg/kg	1.32E-06	mg/kg-day	--	mg/kg-day	--	3.85E-06	mg/kg-day	1.00E-03	mg/kg-day	3.85E-03
				Chromium	2.14E+01	mg/kg	1.01E-05	mg/kg-day	5.00E-01	mg/kg-day	9.21E-06	2.93E-05	mg/kg-day	3.00E-03	mg/kg-day	9.77E-03
				Cobalt	8.76E+00	mg/kg	4.11E-06	mg/kg-day	--	mg/kg-day	--	1.20E-05	mg/kg-day	3.00E-04	mg/kg-day	4.00E-02
				Iron	2.17E+04	mg/kg	1.02E-02	mg/kg-day	--	mg/kg-day	--	2.97E-02	mg/kg-day	7.00E-01	mg/kg-day	4.25E-02
				Vanadium	3.16E+01	mg/kg	1.48E-05	mg/kg-day	--	mg/kg-day	--	4.33E-05	mg/kg-day	5.00E-03	mg/kg-day	8.66E-03
				Dieldrin	1.38E+02	ug/kg	6.48E-08	mg/kg-day	1.60E+01	mg/kg-day	1.04E-06	1.89E-07	mg/kg-day	5.00E-05	mg/kg-day	3.78E-03
				Benz(a)anthracene	5.60E+03	ug/kg	2.63E-06	mg/kg-day	7.30E-01	mg/kg-day	3.52E-06	7.67E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.98E-06	mg/kg-day	7.30E+00	mg/kg-day	2.65E-05	5.77E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.18E-06	mg/kg-day	7.30E-01	mg/kg-day	2.92E-06	6.36E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.42E-06	mg/kg-day	7.30E-02	mg/kg-day	1.90E-07	4.14E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	2.20E-06	mg/kg-day	7.30E-03	mg/kg-day	2.95E-08	6.42E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.27E-07	mg/kg-day	7.30E+00	mg/kg-day	1.70E-06	3.70E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	8.92E-07	mg/kg-day	7.30E-01	mg/kg-day	1.19E-06	2.60E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	2.62E-07	mg/kg-day	--	mg/kg-day	--	7.63E-07	mg/kg-day	2.00E-02	mg/kg-day	3.82E-05
				Phenanthrene	1.79E+04	ug/kg	8.41E-06	mg/kg-day	--	mg/kg-day	--	2.45E-05	mg/kg-day	3.00E-02	mg/kg-day	8.17E-04
			Exp. Route Total								4.70E-05					1.54E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	7.08E-13	mg/kg-day	1.30E+05	mg/kg-day	9.21E-08	2.07E-12	mg/kg-day	1.00E-09	mg/kg-day	2.07E-03
				Aluminum	1.64E+04	mg/kg	3.07E-04	mg/kg-day	--	mg/kg-day	--	8.96E-04	mg/kg-day	1.00E+00	mg/kg-day	8.96E-04
				Antimony	1.33E+00	mg/kg	2.49E-08	mg/kg-day	--	mg/kg-day	--	7.27E-08	mg/kg-day	6.00E-05	mg/kg-day	1.21E-03
				Cadmium	2.81E+00	mg/kg	5.27E-09	mg/kg-day	--	mg/kg-day	--	1.54E-08	mg/kg-day	2.50E-05	mg/kg-day	6.14E-04
				Chromium	2.14E+01	mg/kg	4.01E-07	mg/kg-day	2.00E+01	mg/kg-day	1.47E-05	1.17E-06	mg/kg-day	7.50E-05	mg/kg-day	1.56E-02
				Cobalt	8.76E+00	mg/kg	1.64E-07	mg/kg-day	--	mg/kg-day	--	4.79E-07	mg/kg-day	3.00E-04	mg/kg-day	1.60E-03
				Iron	2.17E+04	mg/kg	4.07E-04	mg/kg-day	--	mg/kg-day	--	1.19E-03	mg/kg-day	7.00E-01	mg/kg-day	1.69E-03
				Vanadium	3.16E+01	mg/kg	5.92E-07	mg/kg-day	--	mg/kg-day	--	1.73E-06	mg/kg-day	1.30E-04	mg/kg-day	1.33E-02
				Dieldrin	1.38E+02	ug/kg	2.59E-08	mg/kg-day	1.60E+01	mg/kg-day	4.14E-07	7.54E-08	mg/kg-day	5.00E-05	mg/kg-day	1.51E-03
				Benz(a)anthracene	5.60E+03	ug/kg	1.36E-06	mg/kg-day	7.30E-01	mg/kg-day	1.83E-06	3.98E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.03E-06	mg/kg-day	7.30E+00	mg/kg-day	1.37E-05	2.99E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.13E-06	mg/kg-day	7.30E-01	mg/kg-day	1.51E-06	3.30E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	7.36E-07	mg/kg-day	7.30E-02	mg/kg-day	9.85E-08	2.15E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.14E-06	mg/kg-day	7.30E-03	mg/kg-day	1.53E-08	3.33E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	6.58E-08	mg/kg-day	7.30E+00	mg/kg-day	8.80E-07	1.92E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	4.63E-07	mg/kg-day	7.30E-01	mg/kg-day	6.19E-07	1.35E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.36E-07	mg/kg-day	--	mg/kg-day	--	3.96E-07	mg/kg-day	2.00E-02	mg/kg-day	1.98E-05
				Phenanthrene	1.79E+04	ug/kg	4.36E-06	mg/kg-day	--	mg/kg-day	--	1.27E-05	mg/kg-day	3.00E-02	mg/kg-day	4.24E-04
			Exp. Route Total								3.39E-05					3.89E-02
		Exposure Point Total									8.09E-05					1.93E-01
	Exposure Medium Total										8.09E-05					1.93E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.94E-05	mg/m3	3.40E-02	1/(mg/m3)	6.58E-07	5.65E-05	mg/m3	3.00E-03	mg/m3	1.88E-02
			Exp. Route Total								6.58E-07					1.88E-02
		Exposure Point Total									6.58E-07					1.88E-02
	Exposure Medium Total										6.58E-07					1.88E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.09E-09	mg/m3	1.20E+01	1/(mg/m3)	2.39E-08	3.17E-09	mg/m3	1.00E-04	mg/m3	3.17E-05
			Exp. Route Total								2.39E-08					3.17E-05
		Exposure Point Total									2.39E-08					3.17E-05
	Exposure Medium Total										2.39E-08					3.17E-05
Medium Total											8.16E-05					2.11E-01
										Total of Receptor Risks Across All Media	8.16E-05				Total of Receptor Hazards Across All Media	2.11E-01

TABLE 7.22.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.97E-11	mg/kg-day	1.30E+05	mg/kg-day	2.56E-06					N/A
				Aluminum	1.64E+04	mg/kg	7.70E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	6.25E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	5.35E+00	mg/kg	8.38E-06	mg/kg-day	1.50E+00	mg/kg-day	1.26E-05					N/A
				Cadmium	2.81E+00	mg/kg	1.32E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	3.35E-05	mg/kg-day	5.00E-01	mg/kg-day	7.18E-05					N/A
				Cobalt	8.76E+00	mg/kg	4.11E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	1.02E-02	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	6.78E+02	mg/kg	3.18E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	1.48E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	2.16E-07	mg/kg-day	1.60E+01	mg/kg-day	3.46E-06					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	8.77E-06	mg/kg-day	7.30E-01	mg/kg-day	2.74E-05					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	6.59E-06	mg/kg-day	7.30E+00	mg/kg-day	2.06E-04					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	7.26E-06	mg/kg-day	7.30E-01	mg/kg-day	2.27E-05					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	4.73E-06	mg/kg-day	7.30E-02	mg/kg-day	1.48E-06					N/A
				Chrysene	4.69E+03	ug/kg	7.34E-06	mg/kg-day	7.30E-03	mg/kg-day	2.30E-07					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	4.23E-07	mg/kg-day	7.30E+00	mg/kg-day	1.32E-05					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.97E-06	mg/kg-day	7.30E-01	mg/kg-day	9.30E-06					N/A
				Naphthalene	5.57E+02	ug/kg	2.62E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	8.41E-06	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								3.71E-04					--
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.87E-12	mg/kg-day	1.30E+05	mg/kg-day	2.43E-07					N/A
				Aluminum	1.64E+04	mg/kg	3.07E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	2.49E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	5.35E+00	mg/kg	7.93E-07	mg/kg-day	1.50E+00	mg/kg-day	1.19E-06					N/A
				Cadmium	2.81E+00	mg/kg	5.27E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	1.06E-06	mg/kg-day	2.00E+01	mg/kg-day	8.47E-05					N/A
				Cobalt	8.76E+00	mg/kg	1.64E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	4.07E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	6.78E+02	mg/kg	1.27E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	5.92E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	6.82E-08	mg/kg-day	1.60E+01	mg/kg-day	1.09E-06					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	3.60E-06	mg/kg-day	7.30E-01	mg/kg-day	1.05E-05					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	2.71E-06	mg/kg-day	7.30E+00	mg/kg-day	7.91E-05					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.98E-06	mg/kg-day	7.30E-01	mg/kg-day	8.72E-06					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.94E-06	mg/kg-day	7.30E-02	mg/kg-day	5.67E-07					N/A
				Chrysene	4.69E+03	ug/kg	3.01E-06	mg/kg-day	7.30E-03	mg/kg-day	8.81E-08					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.73E-07	mg/kg-day	7.30E+00	mg/kg-day	5.07E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.22E-06	mg/kg-day	7.30E-01	mg/kg-day	3.57E-06					N/A
				Naphthalene	5.57E+02	ug/kg	1.36E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	4.36E-06	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								1.95E-04					--
		Exposure Point Total									5.66E-04					--
	Exposure Medium Total										5.66E-04					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	2.42E-05	mg/m3	3.40E-02	1/(mg/m3)	8.23E-07					N/A
			Exp. Route Total								8.23E-07					--
		Exposure Point Total									8.23E-07					--
	Exposure Medium Total										8.23E-07					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.36E-09	mg/m3	1.20E+01	1/(mg/m3)	4.13E-08					N/A
			Exp. Route Total								4.13E-08					--
		Exposure Point Total									4.13E-08					--
	Exposure Medium Total										4.13E-08					--
Medium Total											5.67E-04					--
										Total of Receptor Risks Across All Media	5.67E-04			Total of Receptor Hazards Across All Media		--

TABLE 7.22a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.97E-11	mg/kg-day	1.30E+05	mg/kg-day	2.56E-06					N/A
				Aluminum	1.64E+04	mg/kg	7.70E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	6.25E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	2.81E+00	mg/kg	1.32E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	3.35E-05	mg/kg-day	5.00E-01	mg/kg-day	7.18E-05					N/A
				Cobalt	8.76E+00	mg/kg	4.11E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	1.02E-02	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	1.48E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	2.16E-07	mg/kg-day	1.60E+01	mg/kg-day	3.46E-06					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	8.77E-06	mg/kg-day	7.30E-01	mg/kg-day	2.74E-05					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	6.59E-06	mg/kg-day	7.30E+00	mg/kg-day	2.06E-04					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	7.26E-06	mg/kg-day	7.30E-01	mg/kg-day	2.27E-05					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	4.73E-06	mg/kg-day	7.30E-02	mg/kg-day	1.48E-06					N/A
				Chrysene	4.69E+03	ug/kg	7.34E-06	mg/kg-day	7.30E-03	mg/kg-day	2.30E-07					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	4.23E-07	mg/kg-day	7.30E+00	mg/kg-day	1.32E-05					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.97E-06	mg/kg-day	7.30E-01	mg/kg-day	9.30E-06					N/A
				Naphthalene	5.57E+02	ug/kg	2.62E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	8.41E-06	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								3.58E-04					--
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.87E-12	mg/kg-day	1.30E+05	mg/kg-day	2.43E-07					N/A
				Aluminum	1.64E+04	mg/kg	3.07E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	2.49E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	2.81E+00	mg/kg	5.27E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	1.06E-06	mg/kg-day	2.00E+01	mg/kg-day	8.47E-05					N/A
				Cobalt	8.76E+00	mg/kg	1.64E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	4.07E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	5.92E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	6.82E-08	mg/kg-day	1.60E+01	mg/kg-day	1.09E-06					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	3.60E-06	mg/kg-day	7.30E-01	mg/kg-day	1.05E-05					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	2.71E-06	mg/kg-day	7.30E+00	mg/kg-day	7.91E-05					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.98E-06	mg/kg-day	7.30E-01	mg/kg-day	8.72E-06					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.94E-06	mg/kg-day	7.30E-02	mg/kg-day	5.67E-07					N/A
				Chrysene	4.69E+03	ug/kg	3.01E-06	mg/kg-day	7.30E-03	mg/kg-day	8.81E-08					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.73E-07	mg/kg-day	7.30E+00	mg/kg-day	5.07E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.22E-06	mg/kg-day	7.30E-01	mg/kg-day	3.57E-06					N/A
				Naphthalene	5.57E+02	ug/kg	1.36E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	4.36E-06	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								1.94E-04					--
		Exposure Point Total									5.52E-04					--
	Exposure Medium Total										5.52E-04					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	2.42E-05	mg/m3	3.40E-02	1/(mg/m3)	8.23E-07					N/A
			Exp. Route Total								8.23E-07					--
		Exposure Point Total									8.23E-07					--
	Exposure Medium Total										8.23E-07					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.36E-09	mg/m3	1.20E+01	1/(mg/m3)	4.13E-08					N/A
			Exp. Route Total								4.13E-08					--
		Exposure Point Total									4.13E-08					--
	Exposure Medium Total										4.13E-08					--
Medium Total											5.53E-04					--
										Total of Receptor Risks Across All Media	5.53E-04				Total of Receptor Hazards Across All Media	--

TABLE 7.23.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Industrial
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	4.40E-12	mg/kg-day	1.30E+05	mg/kg-day	5.72E-07	1.23E-11	mg/kg-day	1.00E-09	mg/kg-day	1.23E-02
				Aluminum	1.64E+04	mg/kg	5.73E-03	mg/kg-day	--	mg/kg-day	--	1.60E-02	mg/kg-day	1.00E+00	mg/kg-day	1.60E-02
				Antimony	1.33E+00	mg/kg	4.65E-07	mg/kg-day	--	mg/kg-day	--	1.30E-06	mg/kg-day	4.00E-04	mg/kg-day	3.25E-03
				Arsenic	5.35E+00	mg/kg	1.87E-06	mg/kg-day	1.50E+00	mg/kg-day	2.80E-06	5.23E-06	mg/kg-day	3.00E-04	mg/kg-day	1.74E-02
				Cadmium	2.81E+00	mg/kg	9.82E-07	mg/kg-day	--	mg/kg-day	--	2.75E-06	mg/kg-day	1.00E-03	mg/kg-day	2.75E-03
				Chromium	2.14E+01	mg/kg	7.48E-06	mg/kg-day	5.00E-01	mg/kg-day	3.74E-06	2.09E-05	mg/kg-day	3.00E-03	mg/kg-day	6.98E-03
				Cobalt	8.76E+00	mg/kg	3.06E-06	mg/kg-day	--	mg/kg-day	--	8.57E-06	mg/kg-day	3.00E-04	mg/kg-day	2.86E-02
				Iron	2.17E+04	mg/kg	7.58E-03	mg/kg-day	--	mg/kg-day	--	2.12E-02	mg/kg-day	7.00E-01	mg/kg-day	3.03E-02
				Manganese	6.78E+02	mg/kg	2.37E-04	mg/kg-day	--	mg/kg-day	--	6.63E-04	mg/kg-day	2.40E-02	mg/kg-day	2.76E-02
				Vanadium	3.16E+01	mg/kg	1.10E-05	mg/kg-day	--	mg/kg-day	--	3.09E-05	mg/kg-day	5.00E-03	mg/kg-day	6.18E-03
				Dieldrin	1.38E+02	ug/kg	4.82E-08	mg/kg-day	1.60E+01	mg/kg-day	7.72E-07	1.35E-07	mg/kg-day	5.00E-05	mg/kg-day	2.70E-03
				Benz(a)anthracene	5.60E+03	ug/kg	1.96E-06	mg/kg-day	7.30E-01	mg/kg-day	1.43E-06	5.48E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.47E-06	mg/kg-day	7.30E+00	mg/kg-day	1.07E-05	4.12E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.62E-06	mg/kg-day	7.30E-01	mg/kg-day	1.18E-06	4.54E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.06E-06	mg/kg-day	7.30E-02	mg/kg-day	7.70E-08	2.95E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.64E-06	mg/kg-day	7.30E-03	mg/kg-day	1.20E-08	4.59E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	9.44E-08	mg/kg-day	7.30E+00	mg/kg-day	6.89E-07	2.64E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	6.64E-07	mg/kg-day	7.30E-01	mg/kg-day	4.85E-07	1.86E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.95E-07	mg/kg-day	--	mg/kg-day	--	5.45E-07	mg/kg-day	2.00E-02	mg/kg-day	2.73E-05
				Phenanthrene	1.79E+04	ug/kg	6.26E-06	mg/kg-day	--	mg/kg-day	--	1.75E-05	mg/kg-day	3.00E-02	mg/kg-day	5.84E-04
			Exp. Route Total								2.25E-05					1.55E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	8.72E-13	mg/kg-day	1.30E+05	mg/kg-day	1.13E-07	2.44E-12	mg/kg-day	1.00E-09	mg/kg-day	2.44E-03
				Aluminum	1.64E+04	mg/kg	3.78E-04	mg/kg-day	--	mg/kg-day	--	1.06E-03	mg/kg-day	1.00E+00	mg/kg-day	1.06E-03
				Antimony	1.33E+00	mg/kg	3.07E-08	mg/kg-day	--	mg/kg-day	--	8.59E-08	mg/kg-day	6.00E-05	mg/kg-day	1.43E-03
				Arsenic	5.35E+00	mg/kg	3.70E-07	mg/kg-day	1.50E+00	mg/kg-day	5.55E-07	1.04E-06	mg/kg-day	3.00E-04	mg/kg-day	3.45E-03
				Cadmium	2.81E+00	mg/kg	6.48E-09	mg/kg-day	--	mg/kg-day	--	1.81E-08	mg/kg-day	2.50E-05	mg/kg-day	7.26E-04
				Chromium	2.14E+01	mg/kg	4.94E-07	mg/kg-day	2.00E+01	mg/kg-day	9.87E-06	1.38E-06	mg/kg-day	7.50E-05	mg/kg-day	1.84E-02
				Cobalt	8.76E+00	mg/kg	2.02E-07	mg/kg-day	--	mg/kg-day	--	5.66E-07	mg/kg-day	3.00E-04	mg/kg-day	1.89E-03
				Iron	2.17E+04	mg/kg	5.00E-04	mg/kg-day	--	mg/kg-day	--	1.40E-03	mg/kg-day	7.00E-01	mg/kg-day	2.00E-03
				Manganese	6.78E+02	mg/kg	1.56E-05	mg/kg-day	--	mg/kg-day	--	4.38E-05	mg/kg-day	9.60E-04	mg/kg-day	4.56E-02
				Vanadium	3.16E+01	mg/kg	7.29E-07	mg/kg-day	--	mg/kg-day	--	2.04E-06	mg/kg-day	1.30E-04	mg/kg-day	1.57E-02
				Dieldrin	1.38E+02	ug/kg	3.18E-08	mg/kg-day	1.60E+01	mg/kg-day	5.09E-07	8.91E-08	mg/kg-day	5.00E-05	mg/kg-day	1.78E-03
				Benz(a)anthracene	5.60E+03	ug/kg	1.68E-06	mg/kg-day	7.30E-01	mg/kg-day	1.23E-06	4.70E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.26E-06	mg/kg-day	7.30E+00	mg/kg-day	9.21E-06	3.53E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.39E-06	mg/kg-day	7.30E-01	mg/kg-day	1.02E-06	3.90E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	9.05E-07	mg/kg-day	7.30E-02	mg/kg-day	6.61E-08	2.54E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.41E-06	mg/kg-day	7.30E-03	mg/kg-day	1.03E-08	3.94E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	8.10E-08	mg/kg-day	7.30E+00	mg/kg-day	5.91E-07	2.27E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	5.70E-07	mg/kg-day	7.30E-01	mg/kg-day	4.16E-07	1.60E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.67E-07	mg/kg-day	--	mg/kg-day	--	4.68E-07	mg/kg-day	2.00E-02	mg/kg-day	2.34E-05
				Phenanthrene	1.79E+04	ug/kg	5.37E-06	mg/kg-day	--	mg/kg-day	--	1.50E-05	mg/kg-day	3.00E-02	mg/kg-day	5.01E-04
			Exp. Route Total								2.36E-05					9.50E-02
		Exposure Point Total									4.61E-05					2.50E-01
	Exposure Medium Total										4.61E-05					2.50E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	9.60E-06	mg/m3	3.40E-02	1/(mg/m3)	3.26E-07	2.69E-05	mg/m3	3.00E-03	mg/m3	8.96E-03
			Exp. Route Total								3.26E-07					8.96E-03
		Exposure Point Total									3.26E-07					8.96E-03
	Exposure Medium Total										3.26E-07					8.96E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	5.39E-10	mg/m3	1.20E+01	1/(mg/m3)	6.47E-09	1.51E-09	mg/m3	1.00E-04	mg/m3	1.51E-05
			Exp. Route Total								6.47E-09					1.51E-05
		Exposure Point Total									6.47E-09					1.51E-05
	Exposure Medium Total										6.47E-09					1.51E-05
Medium Total											4.64E-05					2.59E-01
										Total of Receptor Risks Across All Media	4.64E-05				Total of Receptor Hazards Across All Media	2.59E-01

TABLE 7.23a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Industrial
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	4.40E-12	mg/kg-day	1.30E+05	mg/kg-day	5.72E-07	1.23E-11	mg/kg-day	1.00E-09	mg/kg-day	1.23E-02
				Aluminum	1.64E+04	mg/kg	5.73E-03	mg/kg-day	--	mg/kg-day	--	1.60E-02	mg/kg-day	1.00E+00	mg/kg-day	1.60E-02
				Antimony	1.33E+00	mg/kg	4.65E-07	mg/kg-day	--	mg/kg-day	--	1.30E-06	mg/kg-day	4.00E-04	mg/kg-day	3.25E-03
				Cadmium	2.81E+00	mg/kg	9.82E-07	mg/kg-day	--	mg/kg-day	--	2.75E-06	mg/kg-day	1.00E-03	mg/kg-day	2.75E-03
				Chromium	2.14E+01	mg/kg	7.48E-06	mg/kg-day	5.00E-01	mg/kg-day	3.74E-06	2.09E-05	mg/kg-day	3.00E-03	mg/kg-day	6.98E-03
				Cobalt	8.76E+00	mg/kg	3.06E-06	mg/kg-day	--	mg/kg-day	--	8.57E-06	mg/kg-day	3.00E-04	mg/kg-day	2.86E-02
				Iron	2.17E+04	mg/kg	7.58E-03	mg/kg-day	--	mg/kg-day	--	2.12E-02	mg/kg-day	7.00E-01	mg/kg-day	3.03E-02
				Vanadium	3.16E+01	mg/kg	1.10E-05	mg/kg-day	--	mg/kg-day	--	3.09E-05	mg/kg-day	5.00E-03	mg/kg-day	6.18E-03
				Dieldrin	1.38E+02	ug/kg	4.82E-08	mg/kg-day	1.60E+01	mg/kg-day	7.72E-07	1.35E-07	mg/kg-day	5.00E-05	mg/kg-day	2.70E-03
				Benz(a)anthracene	5.60E+03	ug/kg	1.96E-06	mg/kg-day	7.30E-01	mg/kg-day	1.43E-06	5.48E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.47E-06	mg/kg-day	7.30E+00	mg/kg-day	1.07E-05	4.12E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.62E-06	mg/kg-day	7.30E-01	mg/kg-day	1.18E-06	4.54E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.06E-06	mg/kg-day	7.30E-02	mg/kg-day	7.70E-08	2.95E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.64E-06	mg/kg-day	7.30E-03	mg/kg-day	1.20E-08	4.59E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	9.44E-08	mg/kg-day	7.30E+00	mg/kg-day	6.89E-07	2.64E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	6.64E-07	mg/kg-day	7.30E-01	mg/kg-day	4.85E-07	1.86E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.95E-07	mg/kg-day	--	mg/kg-day	--	5.45E-07	mg/kg-day	2.00E-02	mg/kg-day	2.73E-05
				Phenanthrene	1.79E+04	ug/kg	6.26E-06	mg/kg-day	--	mg/kg-day	--	1.75E-05	mg/kg-day	3.00E-02	mg/kg-day	5.84E-04
			Exp. Route Total								1.97E-05					1.10E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	8.72E-13	mg/kg-day	1.30E+05	mg/kg-day	1.13E-07	2.44E-12	mg/kg-day	1.00E-09	mg/kg-day	2.44E-03
				Aluminum	1.64E+04	mg/kg	3.78E-04	mg/kg-day	--	mg/kg-day	--	1.06E-03	mg/kg-day	1.00E+00	mg/kg-day	1.06E-03
				Antimony	1.33E+00	mg/kg	3.07E-08	mg/kg-day	--	mg/kg-day	--	8.59E-08	mg/kg-day	6.00E-05	mg/kg-day	1.43E-03
				Cadmium	2.81E+00	mg/kg	6.48E-09	mg/kg-day	--	mg/kg-day	--	1.81E-08	mg/kg-day	2.50E-05	mg/kg-day	7.26E-04
				Chromium	2.14E+01	mg/kg	4.94E-07	mg/kg-day	2.00E+01	mg/kg-day	9.87E-06	1.38E-06	mg/kg-day	7.50E-05	mg/kg-day	1.84E-02
				Cobalt	8.76E+00	mg/kg	2.02E-07	mg/kg-day	--	mg/kg-day	--	5.66E-07	mg/kg-day	3.00E-04	mg/kg-day	1.89E-03
				Iron	2.17E+04	mg/kg	5.00E-04	mg/kg-day	--	mg/kg-day	--	1.40E-03	mg/kg-day	7.00E-01	mg/kg-day	2.00E-03
				Vanadium	3.16E+01	mg/kg	7.29E-07	mg/kg-day	--	mg/kg-day	--	2.04E-06	mg/kg-day	1.30E-04	mg/kg-day	1.57E-02
				Dieldrin	1.38E+02	ug/kg	3.18E-08	mg/kg-day	1.60E+01	mg/kg-day	5.09E-07	8.91E-08	mg/kg-day	5.00E-05	mg/kg-day	1.78E-03
				Benz(a)anthracene	5.60E+03	ug/kg	1.68E-06	mg/kg-day	7.30E-01	mg/kg-day	1.23E-06	4.70E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.26E-06	mg/kg-day	7.30E+00	mg/kg-day	9.21E-06	3.53E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.39E-06	mg/kg-day	7.30E-01	mg/kg-day	1.02E-06	3.90E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	9.05E-07	mg/kg-day	7.30E-02	mg/kg-day	6.61E-08	2.54E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.41E-06	mg/kg-day	7.30E-03	mg/kg-day	1.03E-08	3.94E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	8.10E-08	mg/kg-day	7.30E+00	mg/kg-day	5.91E-07	2.27E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	5.70E-07	mg/kg-day	7.30E-01	mg/kg-day	4.16E-07	1.60E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.67E-07	mg/kg-day	--	mg/kg-day	--	4.68E-07	mg/kg-day	2.00E-02	mg/kg-day	2.34E-05
				Phenanthrene	1.79E+04	ug/kg	5.37E-06	mg/kg-day	--	mg/kg-day	--	1.50E-05	mg/kg-day	3.00E-02	mg/kg-day	5.01E-04
			Exp. Route Total								2.30E-05					4.60E-02
		Exposure Point Total									4.27E-05					1.56E-01
	Exposure Medium Total										4.27E-05					1.56E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	9.60E-06	mg/m3	3.40E-02	1/(mg/m3)	3.26E-07	2.69E-05	mg/m3	3.00E-03	mg/m3	8.96E-03
			Exp. Route Total								3.26E-07					8.96E-03
		Exposure Point Total									3.26E-07					8.96E-03
	Exposure Medium Total										3.26E-07					8.96E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	5.39E-10	mg/m3	1.20E+01	1/(mg/m3)	6.47E-09	1.51E-09	mg/m3	1.00E-04	mg/m3	1.51E-05
			Exp. Route Total								6.47E-09					1.51E-05
		Exposure Point Total									6.47E-09					1.51E-05
	Exposure Medium Total										6.47E-09					1.51E-05
Medium Total											4.31E-05					1.65E-01
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											4.31E-05					1.65E-01

TABLE 7.24.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	4.10E-12	mg/kg-day	1.30E+05	mg/kg-day	5.33E-07	4.79E-11	mg/kg-day	1.00E-09	mg/kg-day	4.79E-02
				Aluminum	1.64E+04	mg/kg	5.34E-03	mg/kg-day	--	mg/kg-day	--	6.23E-02	mg/kg-day	1.00E+00	mg/kg-day	6.23E-02
				Antimony	1.33E+00	mg/kg	4.33E-07	mg/kg-day	--	mg/kg-day	--	5.05E-06	mg/kg-day	4.00E-04	mg/kg-day	1.26E-02
				Arsenic	5.35E+00	mg/kg	1.74E-06	mg/kg-day	1.50E+00	mg/kg-day	2.61E-06	2.03E-05	mg/kg-day	3.00E-04	mg/kg-day	6.78E-02
				Cadmium	2.81E+00	mg/kg	9.15E-07	mg/kg-day	--	mg/kg-day	--	1.07E-05	mg/kg-day	1.00E-03	mg/kg-day	1.07E-02
				Chromium	2.14E+01	mg/kg	6.97E-06	mg/kg-day	5.00E-01	mg/kg-day	1.86E-05	8.13E-05	mg/kg-day	3.00E-03	mg/kg-day	2.71E-02
				Cobalt	8.76E+00	mg/kg	2.85E-06	mg/kg-day	--	mg/kg-day	--	3.33E-05	mg/kg-day	3.00E-04	mg/kg-day	1.11E-01
				Iron	2.17E+04	mg/kg	7.07E-03	mg/kg-day	--	mg/kg-day	--	8.24E-02	mg/kg-day	7.00E-01	mg/kg-day	1.18E-01
				Manganese	6.78E+02	mg/kg	2.21E-04	mg/kg-day	--	mg/kg-day	--	2.58E-03	mg/kg-day	2.40E-02	mg/kg-day	1.07E-01
				Vanadium	3.16E+01	mg/kg	1.03E-05	mg/kg-day	--	mg/kg-day	--	1.20E-04	mg/kg-day	5.00E-03	mg/kg-day	2.40E-02
				Dieldrin	1.38E+02	ug/kg	4.49E-08	mg/kg-day	1.60E+01	mg/kg-day	7.19E-07	5.24E-07	mg/kg-day	5.00E-05	mg/kg-day	1.05E-02
				Benz(a)anthracene	5.60E+03	ug/kg	1.82E-06	mg/kg-day	7.30E-01	mg/kg-day	7.10E-06	2.13E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.37E-06	mg/kg-day	7.30E+00	mg/kg-day	5.34E-05	1.60E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.51E-06	mg/kg-day	7.30E-01	mg/kg-day	5.88E-06	1.76E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	9.83E-07	mg/kg-day	7.30E-02	mg/kg-day	3.83E-07	1.15E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.53E-06	mg/kg-day	7.30E-03	mg/kg-day	5.95E-08	1.78E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	8.79E-08	mg/kg-day	7.30E+00	mg/kg-day	3.42E-06	1.03E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	6.19E-07	mg/kg-day	7.30E-01	mg/kg-day	2.41E-06	7.22E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.81E-07	mg/kg-day	--	mg/kg-day	--	2.12E-06	mg/kg-day	2.00E-02	mg/kg-day	1.06E-04
				Phenanthrene	1.79E+04	ug/kg	5.83E-06	mg/kg-day	--	mg/kg-day	--	6.80E-05	mg/kg-day	3.00E-02	mg/kg-day	2.27E-03
			Exp. Route Total								9.51E-05					6.01E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	3.45E-13	mg/kg-day	1.30E+05	mg/kg-day	4.48E-08	4.02E-12	mg/kg-day	1.00E-09	mg/kg-day	4.02E-03
				Aluminum	1.64E+04	mg/kg	1.50E-04	mg/kg-day	--	mg/kg-day	--	1.74E-03	mg/kg-day	1.00E+00	mg/kg-day	1.74E-03
				Antimony	1.33E+00	mg/kg	1.21E-08	mg/kg-day	--	mg/kg-day	--	1.41E-07	mg/kg-day	6.00E-05	mg/kg-day	2.36E-03
				Arsenic	5.35E+00	mg/kg	1.46E-07	mg/kg-day	1.50E+00	mg/kg-day	2.20E-07	1.71E-06	mg/kg-day	3.00E-04	mg/kg-day	5.69E-03
				Cadmium	2.81E+00	mg/kg	2.56E-09	mg/kg-day	--	mg/kg-day	--	2.99E-08	mg/kg-day	2.50E-05	mg/kg-day	1.20E-03
				Chromium	2.14E+01	mg/kg	1.95E-07	mg/kg-day	2.00E+01	mg/kg-day	2.08E-05	2.28E-06	mg/kg-day	7.50E-05	mg/kg-day	3.04E-02
				Cobalt	8.76E+00	mg/kg	7.99E-08	mg/kg-day	--	mg/kg-day	--	9.32E-07	mg/kg-day	3.00E-04	mg/kg-day	3.11E-03
				Iron	2.17E+04	mg/kg	1.98E-04	mg/kg-day	--	mg/kg-day	--	2.31E-03	mg/kg-day	7.00E-01	mg/kg-day	3.30E-03
				Manganese	6.78E+02	mg/kg	6.18E-06	mg/kg-day	--	mg/kg-day	--	7.21E-05	mg/kg-day	9.60E-04	mg/kg-day	7.51E-02
				Vanadium	3.16E+01	mg/kg	2.88E-07	mg/kg-day	--	mg/kg-day	--	3.36E-06	mg/kg-day	1.30E-04	mg/kg-day	2.59E-02
				Dieldrin	1.38E+02	ug/kg	1.26E-08	mg/kg-day	1.60E+01	mg/kg-day	2.01E-07	1.47E-07	mg/kg-day	5.00E-05	mg/kg-day	2.94E-03
				Benz(a)anthracene	5.60E+03	ug/kg	6.64E-07	mg/kg-day	7.30E-01	mg/kg-day	2.58E-06	7.74E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	4.99E-07	mg/kg-day	7.30E+00	mg/kg-day	1.94E-05	5.82E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	5.50E-07	mg/kg-day	7.30E-01	mg/kg-day	2.14E-06	6.42E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	3.58E-07	mg/kg-day	7.30E-02	mg/kg-day	1.39E-07	4.18E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	5.56E-07	mg/kg-day	7.30E-03	mg/kg-day	2.16E-08	6.49E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	3.20E-08	mg/kg-day	7.30E+00	mg/kg-day	1.25E-06	3.73E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.25E-07	mg/kg-day	7.30E-01	mg/kg-day	8.77E-07	2.63E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	6.60E-08	mg/kg-day	--	mg/kg-day	--	7.70E-07	mg/kg-day	2.00E-02	mg/kg-day	3.85E-05
				Phenanthrene	1.79E+04	ug/kg	2.12E-06	mg/kg-day	--	mg/kg-day	--	2.48E-05	mg/kg-day	3.00E-02	mg/kg-day	8.25E-04
			Exp. Route Total								4.77E-05					1.57E-01
		Exposure Point Total									1.43E-04					7.58E-01
	Exposure Medium Total										1.43E-04					7.58E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	3.60E-07	mg/m3	3.40E-02	1/(mg/m3)	1.22E-08	4.19E-06	mg/m3	3.00E-03	mg/m3	1.40E-03
			Exp. Route Total								1.22E-08					1.40E-03
		Exposure Point Total									1.22E-08					1.40E-03
	Exposure Medium Total										1.22E-08					1.40E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	2.02E-11	mg/m3	1.20E+01	1/(mg/m3)	1.29E-09	2.36E-10	mg/m3	1.00E-04	mg/m3	2.36E-06
			Exp. Route Total								1.29E-09					2.36E-06
		Exposure Point Total									1.29E-09					2.36E-06
	Exposure Medium Total										1.29E-09					2.36E-06
Medium Total											1.43E-04					7.59E-01
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											1.43E-04					7.59E-01

TABLE 7.24a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	4.10E-12	mg/kg-day	1.30E+05	mg/kg-day	5.33E-07	4.79E-11	mg/kg-day	1.00E-09	mg/kg-day	4.79E-02
				Aluminum	1.64E+04	mg/kg	5.34E-03	mg/kg-day	--	mg/kg-day	--	6.23E-02	mg/kg-day	1.00E+00	mg/kg-day	6.23E-02
				Antimony	1.33E+00	mg/kg	4.33E-07	mg/kg-day	--	mg/kg-day	--	5.05E-06	mg/kg-day	4.00E-04	mg/kg-day	1.26E-02
				Cadmium	2.81E+00	mg/kg	9.15E-07	mg/kg-day	--	mg/kg-day	--	1.07E-05	mg/kg-day	1.00E-03	mg/kg-day	1.07E-02
				Chromium	2.14E+01	mg/kg	6.97E-06	mg/kg-day	5.00E-01	mg/kg-day	1.86E-05	8.13E-05	mg/kg-day	3.00E-03	mg/kg-day	2.71E-02
				Cobalt	8.76E+00	mg/kg	2.85E-06	mg/kg-day	--	mg/kg-day	--	3.33E-05	mg/kg-day	3.00E-04	mg/kg-day	1.11E-01
				Iron	2.17E+04	mg/kg	7.07E-03	mg/kg-day	--	mg/kg-day	--	8.24E-02	mg/kg-day	7.00E-01	mg/kg-day	1.18E-01
				Vanadium	3.16E+01	mg/kg	1.03E-05	mg/kg-day	--	mg/kg-day	--	1.20E-04	mg/kg-day	5.00E-03	mg/kg-day	2.40E-02
				Dieldrin	1.38E+02	ug/kg	4.49E-08	mg/kg-day	1.60E+01	mg/kg-day	7.19E-07	5.24E-07	mg/kg-day	5.00E-05	mg/kg-day	1.05E-02
				Benz(a)anthracene	5.60E+03	ug/kg	1.82E-06	mg/kg-day	7.30E-01	mg/kg-day	7.10E-06	2.13E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.37E-06	mg/kg-day	7.30E+00	mg/kg-day	5.34E-05	1.60E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.51E-06	mg/kg-day	7.30E-01	mg/kg-day	5.88E-06	1.76E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	9.83E-07	mg/kg-day	7.30E-02	mg/kg-day	3.83E-07	1.15E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.53E-06	mg/kg-day	7.30E-03	mg/kg-day	5.95E-08	1.78E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	8.79E-08	mg/kg-day	7.30E+00	mg/kg-day	3.42E-06	1.03E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	6.19E-07	mg/kg-day	7.30E-01	mg/kg-day	2.41E-06	7.22E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.81E-07	mg/kg-day	--	mg/kg-day	--	2.12E-06	mg/kg-day	2.00E-02	mg/kg-day	1.06E-04
				Phenanthrene	1.79E+04	ug/kg	5.83E-06	mg/kg-day	--	mg/kg-day	--	6.80E-05	mg/kg-day	3.00E-02	mg/kg-day	2.27E-03
			Exp. Route Total								9.25E-05					4.26E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	3.45E-13	mg/kg-day	1.30E+05	mg/kg-day	4.48E-08	4.02E-12	mg/kg-day	1.00E-09	mg/kg-day	4.02E-03
				Aluminum	1.64E+04	mg/kg	1.50E-04	mg/kg-day	--	mg/kg-day	--	1.74E-03	mg/kg-day	1.00E+00	mg/kg-day	1.74E-03
				Antimony	1.33E+00	mg/kg	1.21E-08	mg/kg-day	--	mg/kg-day	--	1.41E-07	mg/kg-day	6.00E-05	mg/kg-day	2.36E-03
				Cadmium	2.81E+00	mg/kg	2.56E-09	mg/kg-day	--	mg/kg-day	--	2.99E-08	mg/kg-day	2.50E-05	mg/kg-day	1.20E-03
				Chromium	2.14E+01	mg/kg	1.95E-07	mg/kg-day	2.00E+01	mg/kg-day	2.08E-05	2.28E-06	mg/kg-day	7.50E-05	mg/kg-day	3.04E-02
				Cobalt	8.76E+00	mg/kg	7.99E-08	mg/kg-day	--	mg/kg-day	--	9.32E-07	mg/kg-day	3.00E-04	mg/kg-day	3.11E-03
				Iron	2.17E+04	mg/kg	1.98E-04	mg/kg-day	--	mg/kg-day	--	2.31E-03	mg/kg-day	7.00E-01	mg/kg-day	3.30E-03
				Vanadium	3.16E+01	mg/kg	2.88E-07	mg/kg-day	--	mg/kg-day	--	3.36E-06	mg/kg-day	1.30E-04	mg/kg-day	2.59E-02
				Dieldrin	1.38E+02	ug/kg	1.26E-08	mg/kg-day	1.60E+01	mg/kg-day	2.01E-07	1.47E-07	mg/kg-day	5.00E-05	mg/kg-day	2.94E-03
				Benz(a)anthracene	5.60E+03	ug/kg	6.64E-07	mg/kg-day	7.30E-01	mg/kg-day	2.58E-06	7.74E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	4.99E-07	mg/kg-day	7.30E+00	mg/kg-day	1.94E-05	5.82E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	5.50E-07	mg/kg-day	7.30E-01	mg/kg-day	2.14E-06	6.42E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	3.58E-07	mg/kg-day	7.30E-02	mg/kg-day	1.39E-07	4.18E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	5.56E-07	mg/kg-day	7.30E-03	mg/kg-day	2.16E-08	6.49E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	3.20E-08	mg/kg-day	7.30E+00	mg/kg-day	1.25E-06	3.73E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.25E-07	mg/kg-day	7.30E-01	mg/kg-day	8.77E-07	2.63E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	6.60E-08	mg/kg-day	--	mg/kg-day	--	7.70E-07	mg/kg-day	2.00E-02	mg/kg-day	3.85E-05
				Phenanthrene	1.79E+04	ug/kg	2.12E-06	mg/kg-day	--	mg/kg-day	--	2.48E-05	mg/kg-day	3.00E-02	mg/kg-day	8.25E-04
			Exp. Route Total								4.75E-05					7.57E-02
		Exposure Point Total									1.40E-04					5.02E-01
	Exposure Medium Total										1.40E-04					5.02E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	3.60E-07	mg/m3	3.40E-02	1/(mg/m3)	1.22E-08	4.19E-06	mg/m3	3.00E-03	mg/m3	1.40E-03
			Exp. Route Total								1.22E-08					1.40E-03
		Exposure Point Total									1.22E-08					1.40E-03
	Exposure Medium Total										1.22E-08					1.40E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	2.02E-11	mg/m3	1.20E+01	1/(mg/m3)	1.29E-09	2.36E-10	mg/m3	1.00E-04	mg/m3	2.36E-06
			Exp. Route Total								1.29E-09					2.36E-06
		Exposure Point Total									1.29E-09					2.36E-06
	Exposure Medium Total										1.29E-09					2.36E-06
Medium Total											1.40E-04					5.03E-01
										Total of Receptor Risks Across All Media	1.40E-04				Total of Receptor Hazards Across All Media	5.03E-01

TABLE 7.25.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.76E-12	mg/kg-day	1.30E+05	mg/kg-day	2.29E-07	5.13E-12	mg/kg-day	1.00E-09	mg/kg-day	5.13E-03
				Aluminum	1.64E+04	mg/kg	2.29E-03	mg/kg-day	--	mg/kg-day	--	6.68E-03	mg/kg-day	1.00E+00	mg/kg-day	6.68E-03
				Antimony	1.33E+00	mg/kg	1.86E-07	mg/kg-day	--	mg/kg-day	--	5.41E-07	mg/kg-day	4.00E-04	mg/kg-day	1.35E-03
				Arsenic	5.35E+00	mg/kg	7.47E-07	mg/kg-day	1.50E+00	mg/kg-day	1.12E-06	2.18E-06	mg/kg-day	3.00E-04	mg/kg-day	7.26E-03
				Cadmium	2.81E+00	mg/kg	3.92E-07	mg/kg-day	--	mg/kg-day	--	1.14E-06	mg/kg-day	1.00E-03	mg/kg-day	1.14E-03
				Chromium	2.14E+01	mg/kg	2.99E-06	mg/kg-day	5.00E-01	mg/kg-day	2.74E-06	8.71E-06	mg/kg-day	3.00E-03	mg/kg-day	2.90E-03
				Cobalt	8.76E+00	mg/kg	1.22E-06	mg/kg-day	--	mg/kg-day	--	3.57E-06	mg/kg-day	3.00E-04	mg/kg-day	1.19E-02
				Iron	2.17E+04	mg/kg	3.03E-03	mg/kg-day	--	mg/kg-day	--	8.83E-03	mg/kg-day	7.00E-01	mg/kg-day	1.26E-02
				Manganese	6.78E+02	mg/kg	9.46E-05	mg/kg-day	--	mg/kg-day	--	2.76E-04	mg/kg-day	2.40E-02	mg/kg-day	1.15E-02
				Vanadium	3.16E+01	mg/kg	4.41E-06	mg/kg-day	--	mg/kg-day	--	1.29E-05	mg/kg-day	5.00E-03	mg/kg-day	2.57E-03
				Dieldrin	1.38E+02	ug/kg	1.93E-08	mg/kg-day	1.60E+01	mg/kg-day	3.08E-07	5.62E-08	mg/kg-day	5.00E-05	mg/kg-day	1.12E-03
				Benz(a)anthracene	5.60E+03	ug/kg	7.82E-07	mg/kg-day	7.30E-01	mg/kg-day	1.05E-06	2.28E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	5.88E-07	mg/kg-day	7.30E+00	mg/kg-day	7.86E-06	1.71E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	6.48E-07	mg/kg-day	7.30E-01	mg/kg-day	8.67E-07	1.89E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	4.21E-07	mg/kg-day	7.30E-02	mg/kg-day	5.64E-08	1.23E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	6.55E-07	mg/kg-day	7.30E-03	mg/kg-day	8.76E-09	1.91E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	3.77E-08	mg/kg-day	7.30E+00	mg/kg-day	5.04E-07	1.10E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.65E-07	mg/kg-day	7.30E-01	mg/kg-day	3.55E-07	7.73E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	7.77E-08	mg/kg-day	--	mg/kg-day	--	2.27E-07	mg/kg-day	2.00E-02	mg/kg-day	1.13E-05
				Phenanthrene	1.79E+04	ug/kg	2.50E-06	mg/kg-day	--	mg/kg-day	--	7.29E-06	mg/kg-day	3.00E-02	mg/kg-day	2.43E-04
			Exp. Route Total								1.51E-05					6.44E-02
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	2.10E-13	mg/kg-day	1.30E+05	mg/kg-day	2.74E-08	6.14E-13	mg/kg-day	1.00E-09	mg/kg-day	6.14E-04
				Aluminum	1.64E+04	mg/kg	9.13E-05	mg/kg-day	--	mg/kg-day	--	2.66E-04	mg/kg-day	1.00E+00	mg/kg-day	2.66E-04
				Antimony	1.33E+00	mg/kg	7.41E-09	mg/kg-day	--	mg/kg-day	--	2.16E-08	mg/kg-day	6.00E-05	mg/kg-day	3.60E-04
				Arsenic	5.35E+00	mg/kg	8.94E-08	mg/kg-day	1.50E+00	mg/kg-day	1.34E-07	2.61E-07	mg/kg-day	3.00E-04	mg/kg-day	8.69E-04
				Cadmium	2.81E+00	mg/kg	1.56E-09	mg/kg-day	--	mg/kg-day	--	4.56E-09	mg/kg-day	2.50E-05	mg/kg-day	1.83E-04
				Chromium	2.14E+01	mg/kg	1.19E-07	mg/kg-day	2.00E+01	mg/kg-day	4.37E-06	3.48E-07	mg/kg-day	7.50E-05	mg/kg-day	4.63E-03
				Cobalt	8.76E+00	mg/kg	4.88E-08	mg/kg-day	--	mg/kg-day	--	1.42E-07	mg/kg-day	3.00E-04	mg/kg-day	4.74E-04
				Iron	2.17E+04	mg/kg	1.21E-04	mg/kg-day	--	mg/kg-day	--	3.52E-04	mg/kg-day	7.00E-01	mg/kg-day	5.03E-04
				Manganese	6.78E+02	mg/kg	3.78E-06	mg/kg-day	--	mg/kg-day	--	1.10E-05	mg/kg-day	9.60E-04	mg/kg-day	1.15E-02
				Vanadium	3.16E+01	mg/kg	1.76E-07	mg/kg-day	--	mg/kg-day	--	5.13E-07	mg/kg-day	1.30E-04	mg/kg-day	3.95E-03
				Dieldrin	1.38E+02	ug/kg	7.68E-09	mg/kg-day	1.60E+01	mg/kg-day	1.23E-07	2.24E-08	mg/kg-day	5.00E-05	mg/kg-day	4.48E-04
				Benz(a)anthracene	5.60E+03	ug/kg	4.05E-07	mg/kg-day	7.30E-01	mg/kg-day	5.43E-07	1.18E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	3.05E-07	mg/kg-day	7.30E+00	mg/kg-day	4.08E-06	8.89E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	3.36E-07	mg/kg-day	7.30E-01	mg/kg-day	4.50E-07	9.80E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	2.19E-07	mg/kg-day	7.30E-02	mg/kg-day	2.93E-08	6.38E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	3.40E-07	mg/kg-day	7.30E-03	mg/kg-day	4.54E-09	9.90E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.95E-08	mg/kg-day	7.30E+00	mg/kg-day	2.62E-07	5.70E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.38E-07	mg/kg-day	7.30E-01	mg/kg-day	1.84E-07	4.01E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	4.03E-08	mg/kg-day	--	mg/kg-day	--	1.18E-07	mg/kg-day	2.00E-02	mg/kg-day	5.88E-06
				Phenanthrene	1.79E+04	ug/kg	1.30E-06	mg/kg-day	--	mg/kg-day	--	3.78E-06	mg/kg-day	3.00E-02	mg/kg-day	1.26E-04
			Exp. Route Total								1.02E-05					2.39E-02
		Exposure Point Total									2.53E-05					8.83E-02
	Exposure Medium Total										2.53E-05					8.83E-02
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.44E-06	mg/m3	3.40E-02	1/(mg/m3)	4.89E-08	4.19E-06	mg/m3	3.00E-03	mg/m3	1.40E-03
			Exp. Route Total								4.89E-08					1.40E-03
		Exposure Point Total									4.89E-08					1.40E-03
	Exposure Medium Total										4.89E-08					1.40E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	8.08E-11	mg/m3	1.20E+01	1/(mg/m3)	1.78E-09	2.36E-10	mg/m3	1.00E-04	mg/m3	2.36E-06
			Exp. Route Total								1.78E-09					2.36E-06
		Exposure Point Total									1.78E-09					2.36E-06
	Exposure Medium Total										1.78E-09					2.36E-06
Medium Total											2.53E-05					8.97E-02
											Total of Receptor Risks Across All Media	2.53E-05				Total of Receptor Hazards Across All Media	8.97E-02

TABLE 7.25a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.76E-12	mg/kg-day	1.30E+05	mg/kg-day	2.29E-07	5.13E-12	mg/kg-day	1.00E-09	mg/kg-day	5.13E-03
				Aluminum	1.64E+04	mg/kg	2.29E-03	mg/kg-day	--	mg/kg-day	--	6.68E-03	mg/kg-day	1.00E+00	mg/kg-day	6.68E-03
				Antimony	1.33E+00	mg/kg	1.86E-07	mg/kg-day	--	mg/kg-day	--	5.41E-07	mg/kg-day	4.00E-04	mg/kg-day	1.35E-03
				Cadmium	2.81E+00	mg/kg	3.92E-07	mg/kg-day	--	mg/kg-day	--	1.14E-06	mg/kg-day	1.00E-03	mg/kg-day	1.14E-03
				Chromium	2.14E+01	mg/kg	2.99E-06	mg/kg-day	5.00E-01	mg/kg-day	2.74E-06	8.71E-06	mg/kg-day	3.00E-03	mg/kg-day	2.90E-03
				Cobalt	8.76E+00	mg/kg	1.22E-06	mg/kg-day	--	mg/kg-day	--	3.57E-06	mg/kg-day	3.00E-04	mg/kg-day	1.19E-02
				Iron	2.17E+04	mg/kg	3.03E-03	mg/kg-day	--	mg/kg-day	--	8.83E-03	mg/kg-day	7.00E-01	mg/kg-day	1.26E-02
				Vanadium	3.16E+01	mg/kg	4.41E-06	mg/kg-day	--	mg/kg-day	--	1.29E-05	mg/kg-day	5.00E-03	mg/kg-day	2.57E-03
				Dieldrin	1.38E+02	ug/kg	1.93E-08	mg/kg-day	1.60E+01	mg/kg-day	3.08E-07	5.62E-08	mg/kg-day	5.00E-05	mg/kg-day	1.12E-03
				Benz(a)anthracene	5.60E+03	ug/kg	7.82E-07	mg/kg-day	7.30E-01	mg/kg-day	1.05E-06	2.28E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	5.88E-07	mg/kg-day	7.30E+00	mg/kg-day	7.86E-06	1.71E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	6.48E-07	mg/kg-day	7.30E-01	mg/kg-day	8.67E-07	1.89E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	4.21E-07	mg/kg-day	7.30E-02	mg/kg-day	5.64E-08	1.23E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	6.55E-07	mg/kg-day	7.30E-03	mg/kg-day	8.76E-09	1.91E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	3.77E-08	mg/kg-day	7.30E+00	mg/kg-day	5.04E-07	1.10E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.65E-07	mg/kg-day	7.30E-01	mg/kg-day	3.55E-07	7.73E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	7.77E-08	mg/kg-day	--	mg/kg-day	--	2.27E-07	mg/kg-day	2.00E-02	mg/kg-day	1.13E-05
				Phenanthrene	1.79E+04	ug/kg	2.50E-06	mg/kg-day	--	mg/kg-day	--	7.29E-06	mg/kg-day	3.00E-02	mg/kg-day	2.43E-04
			Exp. Route Total								1.40E-05					4.57E-02
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	2.10E-13	mg/kg-day	1.30E+05	mg/kg-day	2.74E-08	6.14E-13	mg/kg-day	1.00E-09	mg/kg-day	6.14E-04
				Aluminum	1.64E+04	mg/kg	9.13E-05	mg/kg-day	--	mg/kg-day	--	2.66E-04	mg/kg-day	1.00E+00	mg/kg-day	2.66E-04
				Antimony	1.33E+00	mg/kg	7.41E-09	mg/kg-day	--	mg/kg-day	--	2.16E-08	mg/kg-day	6.00E-05	mg/kg-day	3.60E-04
				Cadmium	2.81E+00	mg/kg	1.56E-09	mg/kg-day	--	mg/kg-day	--	4.56E-09	mg/kg-day	2.50E-05	mg/kg-day	1.83E-04
				Chromium	2.14E+01	mg/kg	1.19E-07	mg/kg-day	2.00E+01	mg/kg-day	4.37E-06	3.48E-07	mg/kg-day	7.50E-05	mg/kg-day	4.63E-03
				Cobalt	8.76E+00	mg/kg	4.88E-08	mg/kg-day	--	mg/kg-day	--	1.42E-07	mg/kg-day	3.00E-04	mg/kg-day	4.74E-04
				Iron	2.17E+04	mg/kg	1.21E-04	mg/kg-day	--	mg/kg-day	--	3.52E-04	mg/kg-day	7.00E-01	mg/kg-day	5.03E-04
				Vanadium	3.16E+01	mg/kg	1.76E-07	mg/kg-day	--	mg/kg-day	--	5.13E-07	mg/kg-day	1.30E-04	mg/kg-day	3.95E-03
				Dieldrin	1.38E+02	ug/kg	7.68E-09	mg/kg-day	1.60E+01	mg/kg-day	1.23E-07	2.24E-08	mg/kg-day	5.00E-05	mg/kg-day	4.48E-04
				Benz(a)anthracene	5.60E+03	ug/kg	4.05E-07	mg/kg-day	7.30E-01	mg/kg-day	5.43E-07	1.18E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	3.05E-07	mg/kg-day	7.30E+00	mg/kg-day	4.08E-06	8.89E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	3.36E-07	mg/kg-day	7.30E-01	mg/kg-day	4.50E-07	9.80E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	2.19E-07	mg/kg-day	7.30E-02	mg/kg-day	2.93E-08	6.38E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	3.40E-07	mg/kg-day	7.30E-03	mg/kg-day	4.54E-09	9.90E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.95E-08	mg/kg-day	7.30E+00	mg/kg-day	2.62E-07	5.70E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.38E-07	mg/kg-day	7.30E-01	mg/kg-day	1.84E-07	4.01E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	4.03E-08	mg/kg-day	--	mg/kg-day	--	1.18E-07	mg/kg-day	2.00E-02	mg/kg-day	5.88E-06
				Phenanthrene	1.79E+04	ug/kg	1.30E-06	mg/kg-day	--	mg/kg-day	--	3.78E-06	mg/kg-day	3.00E-02	mg/kg-day	1.26E-04
			Exp. Route Total								1.01E-05					1.16E-02
		Exposure Point Total									2.40E-05					5.72E-02
	Exposure Medium Total										2.40E-05					5.72E-02
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.44E-06	mg/m3	3.40E-02	1/(mg/m3)	4.89E-08	4.19E-06	mg/m3	3.00E-03	mg/m3	1.40E-03
			Exp. Route Total								4.89E-08					1.40E-03
		Exposure Point Total									4.89E-08					1.40E-03
	Exposure Medium Total										4.89E-08					1.40E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	8.08E-11	mg/m3	1.20E+01	1/(mg/m3)	1.78E-09	2.36E-10	mg/m3	1.00E-04	mg/m3	2.36E-06
			Exp. Route Total								1.78E-09					2.36E-06
		Exposure Point Total									1.78E-09					2.36E-06
	Exposure Medium Total										1.78E-09					2.36E-06
Medium Total											2.41E-05					5.86E-02
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											2.41E-05					5.86E-02

TABLE 7.26.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.86E-12	mg/kg-day	1.30E+05	mg/kg-day	7.62E-07					N/A
				Aluminum	1.64E+04	mg/kg	2.29E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	1.86E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	5.35E+00	mg/kg	2.49E-06	mg/kg-day	1.50E+00	mg/kg-day	3.73E-06					N/A
				Cadmium	2.81E+00	mg/kg	3.92E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	9.96E-06	mg/kg-day	5.00E-01	mg/kg-day	2.13E-05					N/A
				Cobalt	8.76E+00	mg/kg	1.22E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	3.03E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	6.78E+02	mg/kg	9.46E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	4.41E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	6.42E-08	mg/kg-day	1.60E+01	mg/kg-day	1.03E-06					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	2.61E-06	mg/kg-day	7.30E-01	mg/kg-day	8.15E-06					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	1.96E-06	mg/kg-day	7.30E+00	mg/kg-day	6.12E-05					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.16E-06	mg/kg-day	7.30E-01	mg/kg-day	6.75E-06					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.40E-06	mg/kg-day	7.30E-02	mg/kg-day	4.39E-07					N/A
				Chrysene	4.69E+03	ug/kg	2.18E-06	mg/kg-day	7.30E-03	mg/kg-day	6.82E-08					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.26E-07	mg/kg-day	7.30E+00	mg/kg-day	3.93E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	8.84E-07	mg/kg-day	7.30E-01	mg/kg-day	2.76E-06					N/A
				Naphthalene	5.57E+02	ug/kg	7.77E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	2.50E-06	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								1.10E-04					--
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.55E-13	mg/kg-day	1.30E+05	mg/kg-day	7.22E-08					N/A
				Aluminum	1.64E+04	mg/kg	9.13E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	7.41E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	5.35E+00	mg/kg	2.36E-07	mg/kg-day	1.50E+00	mg/kg-day	3.54E-07					N/A
				Cadmium	2.81E+00	mg/kg	1.56E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	3.14E-07	mg/kg-day	2.00E+01	mg/kg-day	2.52E-05					N/A
				Cobalt	8.76E+00	mg/kg	4.88E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	1.21E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	6.78E+02	mg/kg	3.78E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	1.76E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	2.03E-08	mg/kg-day	1.60E+01	mg/kg-day	3.24E-07					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	1.07E-06	mg/kg-day	7.30E-01	mg/kg-day	3.13E-06					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	8.04E-07	mg/kg-day	7.30E+00	mg/kg-day	2.35E-05					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	8.86E-07	mg/kg-day	7.30E-01	mg/kg-day	2.59E-06					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	5.77E-07	mg/kg-day	7.30E-02	mg/kg-day	1.69E-07					N/A
				Chrysene	4.69E+03	ug/kg	8.95E-07	mg/kg-day	7.30E-03	mg/kg-day	2.62E-08					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	5.15E-08	mg/kg-day	7.30E+00	mg/kg-day	1.51E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	3.63E-07	mg/kg-day	7.30E-01	mg/kg-day	1.06E-06					N/A
				Naphthalene	5.57E+02	ug/kg	4.03E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	1.30E-06	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								5.79E-05					--
		Exposure Point Total									1.68E-04					--
	Exposure Medium Total										1.68E-04					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.80E-06	mg/m3	3.40E-02	1/(mg/m3)	6.11E-08					N/A
			Exp. Route Total								6.11E-08					--
		Exposure Point Total									6.11E-08					--
	Exposure Medium Total										6.11E-08					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.01E-10	mg/m3	1.20E+01	1/(mg/m3)	3.07E-09					N/A
			Exp. Route Total								3.07E-09					--
		Exposure Point Total									3.07E-09					--
	Exposure Medium Total										3.07E-09					--
Medium Total											1.68E-04					--
										Total of Receptor Risks Across All Media	1.68E-04			Total of Receptor Hazards Across All Media		--

TABLE 7.26a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.86E-12	mg/kg-day	1.30E+05	mg/kg-day	7.62E-07					N/A
				Aluminum	1.64E+04	mg/kg	2.29E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	1.86E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	2.81E+00	mg/kg	3.92E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	9.96E-06	mg/kg-day	5.00E-01	mg/kg-day	2.13E-05					N/A
				Cobalt	8.76E+00	mg/kg	1.22E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	3.03E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	4.41E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	6.42E-08	mg/kg-day	1.60E+01	mg/kg-day	1.03E-06					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	2.61E-06	mg/kg-day	7.30E-01	mg/kg-day	8.15E-06					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	1.96E-06	mg/kg-day	7.30E+00	mg/kg-day	6.12E-05					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.16E-06	mg/kg-day	7.30E-01	mg/kg-day	6.75E-06					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.40E-06	mg/kg-day	7.30E-02	mg/kg-day	4.39E-07					N/A
				Chrysene	4.69E+03	ug/kg	2.18E-06	mg/kg-day	7.30E-03	mg/kg-day	6.82E-08					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.26E-07	mg/kg-day	7.30E+00	mg/kg-day	3.93E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	8.84E-07	mg/kg-day	7.30E-01	mg/kg-day	2.76E-06					N/A
				Naphthalene	5.57E+02	ug/kg	7.77E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	2.50E-06	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								1.06E-04					--
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.55E-13	mg/kg-day	1.30E+05	mg/kg-day	7.22E-08					N/A
				Aluminum	1.64E+04	mg/kg	9.13E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	7.41E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	2.81E+00	mg/kg	1.56E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	3.14E-07	mg/kg-day	2.00E+01	mg/kg-day	2.52E-05					N/A
				Cobalt	8.76E+00	mg/kg	4.88E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	1.21E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	1.76E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	2.03E-08	mg/kg-day	1.60E+01	mg/kg-day	3.24E-07					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	1.07E-06	mg/kg-day	7.30E-01	mg/kg-day	3.13E-06					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	8.04E-07	mg/kg-day	7.30E+00	mg/kg-day	2.35E-05					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	8.86E-07	mg/kg-day	7.30E-01	mg/kg-day	2.59E-06					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	5.77E-07	mg/kg-day	7.30E-02	mg/kg-day	1.69E-07					N/A
				Chrysene	4.69E+03	ug/kg	8.95E-07	mg/kg-day	7.30E-03	mg/kg-day	2.62E-08					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	5.15E-08	mg/kg-day	7.30E+00	mg/kg-day	1.51E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	3.63E-07	mg/kg-day	7.30E-01	mg/kg-day	1.06E-06					N/A
				Naphthalene	5.57E+02	ug/kg	4.03E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	1.30E-06	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								5.76E-05					--
		Exposure Point Total									1.64E-04					--
	Exposure Medium Total										1.64E-04					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.80E-06	mg/m3	3.40E-02	1/(mg/m3)	6.11E-08					N/A
			Exp. Route Total								6.11E-08					--
		Exposure Point Total									6.11E-08					--
	Exposure Medium Total										6.11E-08					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.01E-10	mg/m3	1.20E+01	1/(mg/m3)	3.07E-09					N/A
			Exp. Route Total								3.07E-09					--
		Exposure Point Total									3.07E-09					--
	Exposure Medium Total										3.07E-09					--
Medium Total											1.64E-04					--
											Total of Receptor Risks Across All Media	1.64E-04				Total of Receptor Hazards Across All Media	--

TABLE 7.27.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.66E-10	mg/kg-day	1.30E+05	mg/kg-day	3.46E-05	3.11E-09	mg/kg-day	1.00E-09	mg/kg-day	3.11E+00
				Aluminum	1.98E+04	mg/kg	2.17E-02	mg/kg-day	--	mg/kg-day	--	2.53E-01	mg/kg-day	1.00E+00	mg/kg-day	2.53E-01
				Antimony	2.50E+01	mg/kg	2.74E-05	mg/kg-day	--	mg/kg-day	--	3.20E-04	mg/kg-day	4.00E-04	mg/kg-day	7.99E-01
				Arsenic	6.21E+00	mg/kg	6.81E-06	mg/kg-day	1.50E+00	mg/kg-day	1.02E-05	7.94E-05	mg/kg-day	3.00E-04	mg/kg-day	2.65E-01
				Cadmium	4.71E+01	mg/kg	5.16E-05	mg/kg-day	--	mg/kg-day	--	6.02E-04	mg/kg-day	1.00E-03	mg/kg-day	6.02E-01
				Chromium	3.94E+01	mg/kg	4.32E-05	mg/kg-day	5.00E-01	mg/kg-day	1.15E-04	5.04E-04	mg/kg-day	3.00E-03	mg/kg-day	1.68E-01
				Cobalt	1.23E+01	mg/kg	1.35E-05	mg/kg-day	--	mg/kg-day	--	1.57E-04	mg/kg-day	3.00E-04	mg/kg-day	5.24E-01
				Copper	9.67E+02	mg/kg	1.06E-03	mg/kg-day	--	mg/kg-day	--	1.24E-02	mg/kg-day	4.00E-02	mg/kg-day	3.09E-01
				Iron	3.36E+04	mg/kg	3.68E-02	mg/kg-day	--	mg/kg-day	--	4.30E-01	mg/kg-day	7.00E-01	mg/kg-day	6.14E-01
				Lead	3.22E+02	mg/kg	3.53E-04	mg/kg-day	--	mg/kg-day	--	4.12E-03	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.45E-03	mg/kg-day	--	mg/kg-day	--	1.69E-02	mg/kg-day	2.40E-02	mg/kg-day	7.03E-01
				Mercury	1.15E+00	mg/kg	1.26E-06	mg/kg-day	--	mg/kg-day	--	1.47E-05	mg/kg-day	1.00E-04	mg/kg-day	1.47E-01
				Nickel	3.74E+01	mg/kg	4.10E-05	mg/kg-day	--	mg/kg-day	--	4.78E-04	mg/kg-day	2.00E-02	mg/kg-day	2.39E-02
				Silver	1.60E+01	mg/kg	1.75E-05	mg/kg-day	--	mg/kg-day	--	2.05E-04	mg/kg-day	5.00E-03	mg/kg-day	4.09E-02
				Vanadium	4.45E+01	mg/kg	4.88E-05	mg/kg-day	--	mg/kg-day	--	5.69E-04	mg/kg-day	5.00E-03	mg/kg-day	1.14E-01
				Zinc	1.38E+03	mg/kg	1.51E-03	mg/kg-day	--	mg/kg-day	--	1.76E-02	mg/kg-day	3.00E-01	mg/kg-day	5.88E-02
				4,4'-DDD	4.63E+03	ug/kg	5.07E-06	mg/kg-day	2.40E-01	mg/kg-day	1.22E-06	5.92E-05	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	6.61E-07	mg/kg-day	3.40E-01	mg/kg-day	2.25E-07	7.71E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.90E-05	mg/kg-day	3.40E-01	mg/kg-day	6.45E-06	2.21E-04	mg/kg-day	5.00E-04	mg/kg-day	4.42E-01
				Aroclor-1248	5.60E+02	ug/kg	6.14E-07	mg/kg-day	2.00E+00	mg/kg-day	1.23E-06	7.16E-06	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.47E-07	mg/kg-day	2.00E+00	mg/kg-day	2.94E-07	1.71E-06	mg/kg-day	2.00E-05	mg/kg-day	8.57E-02
				Aroclor-1260	4.51E+01	ug/kg	4.94E-08	mg/kg-day	2.00E+00	mg/kg-day	9.88E-08	5.77E-07	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	7.68E-07	mg/kg-day	1.60E+01	mg/kg-day	1.23E-05	8.96E-06	mg/kg-day	5.00E-05	mg/kg-day	1.79E-01
				Heptachlor Epoxide	1.28E+01	ug/kg	1.40E-08	mg/kg-day	9.10E+00	mg/kg-day	1.28E-07	1.64E-07	mg/kg-day	1.30E-05	mg/kg-day	1.26E-02
				Benz(a)anthracene	3.92E+03	ug/kg	4.30E-06	mg/kg-day	7.30E-01	mg/kg-day	1.67E-05	5.01E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	3.17E-06	mg/kg-day	7.30E+00	mg/kg-day	1.23E-04	3.69E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	3.52E-06	mg/kg-day	7.30E-01	mg/kg-day	1.37E-05	4.10E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.35E-06	mg/kg-day	7.30E-02	mg/kg-day	9.13E-07	2.74E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	3.92E-06	mg/kg-day	7.30E-03	mg/kg-day	1.53E-07	4.58E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	3.07E-07	mg/kg-day	7.30E+00	mg/kg-day	1.19E-05	3.58E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.42E-06	mg/kg-day	7.30E-01	mg/kg-day	5.55E-06	1.66E-05	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	8.50E-07	mg/kg-day	--	mg/kg-day	--	9.92E-06	mg/kg-day	2.00E-02	mg/kg-day	4.96E-04
				Phenanthrene	1.25E+04	ug/kg	1.37E-05	mg/kg-day	--	mg/kg-day	--	1.60E-04	mg/kg-day	3.00E-02	mg/kg-day	5.33E-03
				Ethylbenzene	6.55E+02	ug/kg	7.18E-07	mg/kg-day	1.10E-02	mg/kg-day	7.90E-09	8.37E-06	mg/kg-day	1.00E-01	mg/kg-day	8.37E-05
			Exp. Route Total								3.54E-04					8.45E+00

TABLE 7.27.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.24E-11	mg/kg-day	1.30E+05	mg/kg-day	2.91E-06	2.61E-10	mg/kg-day	1.00E-09	mg/kg-day	2.61E-01
				Aluminum	1.98E+04	mg/kg	6.08E-04	mg/kg-day	--	mg/kg-day	--	7.09E-03	mg/kg-day	1.00E+00	mg/kg-day	7.09E-03
				Antimony	2.50E+01	mg/kg	7.67E-07	mg/kg-day	--	mg/kg-day	--	8.95E-06	mg/kg-day	6.00E-05	mg/kg-day	1.49E-01
				Arsenic	6.21E+00	mg/kg	5.72E-07	mg/kg-day	1.50E+00	mg/kg-day	8.57E-07	6.67E-06	mg/kg-day	3.00E-04	mg/kg-day	2.22E-02
				Cadmium	4.71E+01	mg/kg	1.45E-07	mg/kg-day	--	mg/kg-day	--	1.69E-06	mg/kg-day	2.50E-05	mg/kg-day	6.74E-02
				Chromium	3.94E+01	mg/kg	1.21E-06	mg/kg-day	2.00E+01	mg/kg-day	1.29E-04	1.41E-05	mg/kg-day	7.50E-05	mg/kg-day	1.88E-01
				Cobalt	1.23E+01	mg/kg	3.77E-07	mg/kg-day	--	mg/kg-day	--	4.40E-06	mg/kg-day	3.00E-04	mg/kg-day	1.47E-02
				Copper	9.67E+02	mg/kg	2.97E-05	mg/kg-day	--	mg/kg-day	--	3.46E-04	mg/kg-day	4.00E-02	mg/kg-day	8.65E-03
				Iron	3.36E+04	mg/kg	1.03E-03	mg/kg-day	--	mg/kg-day	--	1.20E-02	mg/kg-day	7.00E-01	mg/kg-day	1.72E-02
				Lead	3.22E+02	mg/kg	9.88E-06	mg/kg-day	--	mg/kg-day	--	1.15E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	4.05E-05	mg/kg-day	--	mg/kg-day	--	4.73E-04	mg/kg-day	9.60E-04	mg/kg-day	4.92E-01
				Mercury	1.15E+00	mg/kg	3.53E-08	mg/kg-day	--	mg/kg-day	--	4.12E-07	mg/kg-day	1.00E-04	mg/kg-day	4.12E-03
				Nickel	3.74E+01	mg/kg	1.15E-06	mg/kg-day	--	mg/kg-day	--	1.34E-05	mg/kg-day	8.00E-04	mg/kg-day	1.67E-02
				Silver	1.60E+01	mg/kg	4.91E-07	mg/kg-day	--	mg/kg-day	--	5.73E-06	mg/kg-day	2.00E-04	mg/kg-day	2.86E-02
				Vanadium	4.45E+01	mg/kg	1.37E-06	mg/kg-day	--	mg/kg-day	--	1.59E-05	mg/kg-day	1.30E-04	mg/kg-day	1.23E-01
				Zinc	1.38E+03	mg/kg	4.23E-05	mg/kg-day	--	mg/kg-day	--	4.94E-04	mg/kg-day	3.00E-01	mg/kg-day	1.65E-03
				4,4'-DDD	4.63E+03	ug/kg	4.26E-07	mg/kg-day	2.40E-01	mg/kg-day	1.02E-07	4.97E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	5.55E-08	mg/kg-day	3.40E-01	mg/kg-day	1.89E-08	6.48E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.59E-06	mg/kg-day	3.40E-01	mg/kg-day	5.41E-07	1.86E-05	mg/kg-day	5.00E-04	mg/kg-day	3.72E-02
				Aroclor-1248	5.60E+02	ug/kg	2.41E-07	mg/kg-day	2.00E+00	mg/kg-day	4.81E-07	2.81E-06	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	5.76E-08	mg/kg-day	2.00E+00	mg/kg-day	1.15E-07	6.72E-07	mg/kg-day	2.00E-05	mg/kg-day	3.36E-02
				Aroclor-1260	4.51E+01	ug/kg	1.94E-08	mg/kg-day	2.00E+00	mg/kg-day	3.87E-08	2.26E-07	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	2.15E-07	mg/kg-day	1.60E+01	mg/kg-day	3.44E-06	2.51E-06	mg/kg-day	5.00E-05	mg/kg-day	5.02E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	3.93E-09	mg/kg-day	9.10E+00	mg/kg-day	3.57E-08	4.58E-08	mg/kg-day	1.30E-05	mg/kg-day	3.52E-03
				Benz(a)anthracene	3.92E+03	ug/kg	1.56E-06	mg/kg-day	7.30E-01	mg/kg-day	6.09E-06	1.82E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.15E-06	mg/kg-day	7.30E+00	mg/kg-day	4.49E-05	1.34E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.28E-06	mg/kg-day	7.30E-01	mg/kg-day	4.99E-06	1.49E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	8.54E-07	mg/kg-day	7.30E-02	mg/kg-day	3.32E-07	9.96E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.43E-06	mg/kg-day	7.30E-03	mg/kg-day	5.56E-08	1.67E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.12E-07	mg/kg-day	7.30E+00	mg/kg-day	4.35E-06	1.30E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	5.19E-07	mg/kg-day	7.30E-01	mg/kg-day	2.02E-06	6.05E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	3.10E-07	mg/kg-day	--	mg/kg-day	--	3.61E-06	mg/kg-day	2.00E-02	mg/kg-day	1.81E-04
				Phenanthrene	1.25E+04	ug/kg	4.99E-06	mg/kg-day	--	mg/kg-day	--	5.82E-05	mg/kg-day	3.00E-02	mg/kg-day	1.94E-03
				Ethylbenzene	6.55E+02	ug/kg	6.03E-08	mg/kg-day	1.10E-02	mg/kg-day	6.63E-10	7.03E-07	mg/kg-day	1.00E-01	mg/kg-day	7.03E-06
			Exp. Route Total								2.00E-04					1.53E+00
		Exposure Point Total									5.54E-04					9.98E+00
	Exposure Medium Total										5.54E-04					9.98E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	6.74E-06	mg/m3	3.40E-02	1/(mg/m3)	2.29E-07	7.87E-05	mg/m3	3.00E-03	mg/m3	2.62E-02
				Ethylbenzene	7.00E+03	ug/kg	2.38E-04	mg/m3	2.50E-03	1/(mg/m3)	5.94E-07	2.77E-03	mg/m3	1.00E+00	mg/m3	2.77E-03
			Exp. Route Total								8.24E-07					2.90E-02
		Exposure Point Total									8.24E-07					2.90E-02
	Exposure Medium Total										8.24E-07					2.90E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	5.00E-10	mg/m3	1.20E+01	1/(mg/m3)	3.20E-08	5.84E-09	mg/m3	1.00E-04	mg/m3	5.84E-05
				Manganese	1.32E+03	mg/kg	1.68E-08	mg/m3	--	1/(mg/m3)	--	1.96E-07	mg/m3	5.00E-05	mg/m3	3.91E-03
			Exp. Route Total								3.20E-08					3.97E-03
		Exposure Point Total									3.20E-08					3.97E-03
	Exposure Medium Total										3.20E-08					3.97E-03
Medium Total											5.55E-04					1.00E+01
										Total of Receptor Risks Across All Media	5.55E-04			Total of Receptor Hazards Across All Media		1.00E+01

TABLE 7.27a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.66E-10	mg/kg-day	1.30E+05	mg/kg-day	3.46E-05	3.11E-09	mg/kg-day	1.00E-09	mg/kg-day	3.11E+00
				Aluminum	1.98E+04	mg/kg	2.17E-02	mg/kg-day	--	mg/kg-day	--	2.53E-01	mg/kg-day	1.00E+00	mg/kg-day	2.53E-01
				Antimony	2.50E+01	mg/kg	2.74E-05	mg/kg-day	--	mg/kg-day	--	3.20E-04	mg/kg-day	4.00E-04	mg/kg-day	7.99E-01
				Cadmium	4.71E+01	mg/kg	5.16E-05	mg/kg-day	--	mg/kg-day	--	6.02E-04	mg/kg-day	1.00E-03	mg/kg-day	6.02E-01
				Chromium	3.94E+01	mg/kg	4.32E-05	mg/kg-day	5.00E-01	mg/kg-day	1.15E-04	5.04E-04	mg/kg-day	3.00E-03	mg/kg-day	1.68E-01
				Cobalt	1.23E+01	mg/kg	1.35E-05	mg/kg-day	--	mg/kg-day	--	1.57E-04	mg/kg-day	3.00E-04	mg/kg-day	5.24E-01
				Copper	9.67E+02	mg/kg	1.06E-03	mg/kg-day	--	mg/kg-day	--	1.24E-02	mg/kg-day	4.00E-02	mg/kg-day	3.09E-01
				Iron	3.36E+04	mg/kg	3.68E-02	mg/kg-day	--	mg/kg-day	--	4.30E-01	mg/kg-day	7.00E-01	mg/kg-day	6.14E-01
				Lead	3.22E+02	mg/kg	3.53E-04	mg/kg-day	--	mg/kg-day	--	4.12E-03	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.45E-03	mg/kg-day	--	mg/kg-day	--	1.69E-02	mg/kg-day	2.40E-02	mg/kg-day	7.03E-01
				Mercury	1.15E+00	mg/kg	1.26E-06	mg/kg-day	--	mg/kg-day	--	1.47E-05	mg/kg-day	1.00E-04	mg/kg-day	1.47E-01
				Nickel	3.74E+01	mg/kg	4.10E-05	mg/kg-day	--	mg/kg-day	--	4.78E-04	mg/kg-day	2.00E-02	mg/kg-day	2.39E-02
				Silver	1.60E+01	mg/kg	1.75E-05	mg/kg-day	--	mg/kg-day	--	2.05E-04	mg/kg-day	5.00E-03	mg/kg-day	4.09E-02
				Vanadium	4.45E+01	mg/kg	4.88E-05	mg/kg-day	--	mg/kg-day	--	5.69E-04	mg/kg-day	5.00E-03	mg/kg-day	1.14E-01
				Zinc	1.38E+03	mg/kg	1.51E-03	mg/kg-day	--	mg/kg-day	--	1.76E-02	mg/kg-day	3.00E-01	mg/kg-day	5.88E-02
				4,4'-DDD	4.63E+03	ug/kg	5.07E-06	mg/kg-day	2.40E-01	mg/kg-day	1.22E-06	5.92E-05	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	6.61E-07	mg/kg-day	3.40E-01	mg/kg-day	2.25E-07	7.71E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.90E-05	mg/kg-day	3.40E-01	mg/kg-day	6.45E-06	2.21E-04	mg/kg-day	5.00E-04	mg/kg-day	4.42E-01
				Aroclor-1248	5.60E+02	ug/kg	6.14E-07	mg/kg-day	2.00E+00	mg/kg-day	1.23E-06	7.16E-06	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.47E-07	mg/kg-day	2.00E+00	mg/kg-day	2.94E-07	1.71E-06	mg/kg-day	2.00E-05	mg/kg-day	8.57E-02
				Aroclor-1260	4.51E+01	ug/kg	4.94E-08	mg/kg-day	2.00E+00	mg/kg-day	9.88E-08	5.77E-07	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	7.68E-07	mg/kg-day	1.60E+01	mg/kg-day	1.23E-05	8.96E-06	mg/kg-day	5.00E-05	mg/kg-day	1.79E-01
				Heptachlor Epoxide	1.28E+01	ug/kg	1.40E-08	mg/kg-day	9.10E+00	mg/kg-day	1.28E-07	1.64E-07	mg/kg-day	1.30E-05	mg/kg-day	1.26E-02
				Benz(a)anthracene	3.92E+03	ug/kg	4.30E-06	mg/kg-day	7.30E-01	mg/kg-day	1.67E-05	5.01E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	3.17E-06	mg/kg-day	7.30E+00	mg/kg-day	1.23E-04	3.69E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	3.52E-06	mg/kg-day	7.30E-01	mg/kg-day	1.37E-05	4.10E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.35E-06	mg/kg-day	7.30E-02	mg/kg-day	9.13E-07	2.74E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	3.92E-06	mg/kg-day	7.30E-03	mg/kg-day	1.53E-07	4.58E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	3.07E-07	mg/kg-day	7.30E+00	mg/kg-day	1.19E-05	3.58E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.42E-06	mg/kg-day	7.30E-01	mg/kg-day	5.55E-06	1.66E-05	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	8.50E-07	mg/kg-day	--	mg/kg-day	--	9.92E-06	mg/kg-day	2.00E-02	mg/kg-day	4.96E-04
				Phenanthrene	1.25E+04	ug/kg	1.37E-05	mg/kg-day	--	mg/kg-day	--	1.60E-04	mg/kg-day	3.00E-02	mg/kg-day	5.33E-03
				Ethylbenzene	6.55E+02	ug/kg	7.18E-07	mg/kg-day	1.10E-02	mg/kg-day	7.90E-09	8.37E-06	mg/kg-day	1.00E-01	mg/kg-day	8.37E-05
			Exp. Route Total								3.44E-04					8.19E+00

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Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.24E-11	mg/kg-day	1.30E+05	mg/kg-day	2.91E-06	2.61E-10	mg/kg-day	1.00E-09	mg/kg-day	2.61E-01
				Aluminum	1.98E+04	mg/kg	6.08E-04	mg/kg-day	--	mg/kg-day	--	7.09E-03	mg/kg-day	1.00E+00	mg/kg-day	7.09E-03
				Antimony	2.50E+01	mg/kg	7.67E-07	mg/kg-day	--	mg/kg-day	--	8.95E-06	mg/kg-day	6.00E-05	mg/kg-day	1.49E-01
				Cadmium	4.71E+01	mg/kg	1.45E-07	mg/kg-day	--	mg/kg-day	--	1.69E-06	mg/kg-day	2.50E-05	mg/kg-day	6.74E-02
				Chromium	3.94E+01	mg/kg	1.21E-06	mg/kg-day	2.00E+01	mg/kg-day	1.29E-04	1.41E-05	mg/kg-day	7.50E-05	mg/kg-day	1.88E-01
				Cobalt	1.23E+01	mg/kg	3.77E-07	mg/kg-day	--	mg/kg-day	--	4.40E-06	mg/kg-day	3.00E-04	mg/kg-day	1.47E-02
				Copper	9.67E+02	mg/kg	2.97E-05	mg/kg-day	--	mg/kg-day	--	3.46E-04	mg/kg-day	4.00E-02	mg/kg-day	8.65E-03
				Iron	3.36E+04	mg/kg	1.03E-03	mg/kg-day	--	mg/kg-day	--	1.20E-02	mg/kg-day	7.00E-01	mg/kg-day	1.72E-02
				Lead	3.22E+02	mg/kg	9.88E-06	mg/kg-day	--	mg/kg-day	--	1.15E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	4.05E-05	mg/kg-day	--	mg/kg-day	--	4.73E-04	mg/kg-day	9.60E-04	mg/kg-day	4.92E-01
				Mercury	1.15E+00	mg/kg	3.53E-08	mg/kg-day	--	mg/kg-day	--	4.12E-07	mg/kg-day	1.00E-04	mg/kg-day	4.12E-03
				Nickel	3.74E+01	mg/kg	1.15E-06	mg/kg-day	--	mg/kg-day	--	1.34E-05	mg/kg-day	8.00E-04	mg/kg-day	1.67E-02
				Silver	1.60E+01	mg/kg	4.91E-07	mg/kg-day	--	mg/kg-day	--	5.73E-06	mg/kg-day	2.00E-04	mg/kg-day	2.86E-02
				Vanadium	4.45E+01	mg/kg	1.37E-06	mg/kg-day	--	mg/kg-day	--	1.59E-05	mg/kg-day	1.30E-04	mg/kg-day	1.23E-01
				Zinc	1.38E+03	mg/kg	4.23E-05	mg/kg-day	--	mg/kg-day	--	4.94E-04	mg/kg-day	3.00E-01	mg/kg-day	1.65E-03
				4,4'-DDD	4.63E+03	ug/kg	4.26E-07	mg/kg-day	2.40E-01	mg/kg-day	1.02E-07	4.97E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	5.55E-08	mg/kg-day	3.40E-01	mg/kg-day	1.89E-08	6.48E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.59E-06	mg/kg-day	3.40E-01	mg/kg-day	5.41E-07	1.86E-05	mg/kg-day	5.00E-04	mg/kg-day	3.72E-02
				Aroclor-1248	5.60E+02	ug/kg	2.41E-07	mg/kg-day	2.00E+00	mg/kg-day	4.81E-07	2.81E-06	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	5.76E-08	mg/kg-day	2.00E+00	mg/kg-day	1.15E-07	6.72E-07	mg/kg-day	2.00E-05	mg/kg-day	3.36E-02
				Aroclor-1260	4.51E+01	ug/kg	1.94E-08	mg/kg-day	2.00E+00	mg/kg-day	3.87E-08	2.26E-07	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	2.15E-07	mg/kg-day	1.60E+01	mg/kg-day	3.44E-06	2.51E-06	mg/kg-day	5.00E-05	mg/kg-day	5.02E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	3.93E-09	mg/kg-day	9.10E+00	mg/kg-day	3.57E-08	4.58E-08	mg/kg-day	1.30E-05	mg/kg-day	3.52E-03
				Benz(a)anthracene	3.92E+03	ug/kg	1.56E-06	mg/kg-day	7.30E-01	mg/kg-day	6.09E-06	1.82E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.15E-06	mg/kg-day	7.30E+00	mg/kg-day	4.49E-05	1.34E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.28E-06	mg/kg-day	7.30E-01	mg/kg-day	4.99E-06	1.49E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	8.54E-07	mg/kg-day	7.30E-02	mg/kg-day	3.32E-07	9.96E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.43E-06	mg/kg-day	7.30E-03	mg/kg-day	5.56E-08	1.67E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.12E-07	mg/kg-day	7.30E+00	mg/kg-day	4.35E-06	1.30E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	5.19E-07	mg/kg-day	7.30E-01	mg/kg-day	2.02E-06	6.05E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	3.10E-07	mg/kg-day	--	mg/kg-day	--	3.61E-06	mg/kg-day	2.00E-02	mg/kg-day	1.81E-04
				Phenanthrene	1.25E+04	ug/kg	4.99E-06	mg/kg-day	--	mg/kg-day	--	5.82E-05	mg/kg-day	3.00E-02	mg/kg-day	1.94E-03
				Ethylbenzene	6.55E+02	ug/kg	6.03E-08	mg/kg-day	1.10E-02	mg/kg-day	6.63E-10	7.03E-07	mg/kg-day	1.00E-01	mg/kg-day	7.03E-06
			Exp. Route Total								1.99E-04					1.51E+00
		Exposure Point Total									5.43E-04					9.70E+00
	Exposure Medium Total										5.43E-04					9.70E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	6.74E-06	mg/m3	3.40E-02	1/(mg/m3)	2.29E-07	7.87E-05	mg/m3	3.00E-03	mg/m3	2.62E-02
				Ethylbenzene	7.00E+03	ug/kg	2.38E-04	mg/m3	2.50E-03	1/(mg/m3)	5.94E-07	2.77E-03	mg/m3	1.00E+00	mg/m3	2.77E-03
			Exp. Route Total								8.24E-07					2.90E-02
		Exposure Point Total									8.24E-07					2.90E-02
	Exposure Medium Total										8.24E-07					2.90E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	5.00E-10	mg/m3	1.20E+01	1/(mg/m3)	3.20E-08	5.84E-09	mg/m3	1.00E-04	mg/m3	5.84E-05
				Manganese	1.32E+03	mg/kg	1.68E-08	mg/m3	--	1/(mg/m3)	--	1.96E-07	mg/m3	5.00E-05	mg/m3	3.91E-03
			Exp. Route Total								3.20E-08					3.97E-03
		Exposure Point Total									3.20E-08					3.97E-03
	Exposure Medium Total										3.20E-08					3.97E-03
Medium Total											5.44E-04					9.73E+00
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											5.44E-04					9.73E+00

TABLE 7.28.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.14E-10	mg/kg-day	1.30E+05	mg/kg-day	1.48E-05	3.33E-10	mg/kg-day	1.00E-09	mg/kg-day	3.33E-01
				Aluminum	1.98E+04	mg/kg	9.30E-03	mg/kg-day	--	mg/kg-day	--	2.71E-02	mg/kg-day	1.00E+00	mg/kg-day	2.71E-02
				Antimony	2.50E+01	mg/kg	1.17E-05	mg/kg-day	--	mg/kg-day	--	3.42E-05	mg/kg-day	4.00E-04	mg/kg-day	8.56E-02
				Arsenic	6.21E+00	mg/kg	2.92E-06	mg/kg-day	1.50E+00	mg/kg-day	4.37E-06	8.51E-06	mg/kg-day	3.00E-04	mg/kg-day	2.84E-02
				Cadmium	4.71E+01	mg/kg	2.21E-05	mg/kg-day	--	mg/kg-day	--	6.45E-05	mg/kg-day	1.00E-03	mg/kg-day	6.45E-02
				Chromium	3.94E+01	mg/kg	1.85E-05	mg/kg-day	5.00E-01	mg/kg-day	1.70E-05	5.40E-05	mg/kg-day	3.00E-03	mg/kg-day	1.80E-02
				Cobalt	1.23E+01	mg/kg	5.78E-06	mg/kg-day	--	mg/kg-day	--	1.68E-05	mg/kg-day	3.00E-04	mg/kg-day	5.62E-02
				Copper	9.67E+02	mg/kg	4.54E-04	mg/kg-day	--	mg/kg-day	--	1.32E-03	mg/kg-day	4.00E-02	mg/kg-day	3.31E-02
				Iron	3.36E+04	mg/kg	1.58E-02	mg/kg-day	--	mg/kg-day	--	4.60E-02	mg/kg-day	7.00E-01	mg/kg-day	6.58E-02
				Lead	3.22E+02	mg/kg	1.51E-04	mg/kg-day	--	mg/kg-day	--	4.41E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	6.20E-04	mg/kg-day	--	mg/kg-day	--	1.81E-03	mg/kg-day	2.40E-02	mg/kg-day	7.53E-02
				Mercury	1.15E+00	mg/kg	5.40E-07	mg/kg-day	--	mg/kg-day	--	1.58E-06	mg/kg-day	1.00E-04	mg/kg-day	1.58E-02
				Nickel	3.74E+01	mg/kg	1.76E-05	mg/kg-day	--	mg/kg-day	--	5.12E-05	mg/kg-day	2.00E-02	mg/kg-day	2.56E-03
				Silver	1.60E+01	mg/kg	7.51E-06	mg/kg-day	--	mg/kg-day	--	2.19E-05	mg/kg-day	5.00E-03	mg/kg-day	4.38E-03
				Vanadium	4.45E+01	mg/kg	2.09E-05	mg/kg-day	--	mg/kg-day	--	6.10E-05	mg/kg-day	5.00E-03	mg/kg-day	1.22E-02
				Zinc	1.38E+03	mg/kg	6.48E-04	mg/kg-day	--	mg/kg-day	--	1.89E-03	mg/kg-day	3.00E-01	mg/kg-day	6.30E-03
				4,4'-DDD	4.63E+03	ug/kg	2.17E-06	mg/kg-day	2.40E-01	mg/kg-day	5.22E-07	6.34E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.83E-07	mg/kg-day	3.40E-01	mg/kg-day	9.63E-08	8.26E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	8.13E-06	mg/kg-day	3.40E-01	mg/kg-day	2.76E-06	2.37E-05	mg/kg-day	5.00E-04	mg/kg-day	4.74E-02
				Aroclor-1248	5.60E+02	ug/kg	2.63E-07	mg/kg-day	2.00E+00	mg/kg-day	5.26E-07	7.67E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	6.29E-08	mg/kg-day	2.00E+00	mg/kg-day	1.26E-07	1.84E-07	mg/kg-day	2.00E-05	mg/kg-day	9.18E-03
				Aroclor-1260	4.51E+01	ug/kg	2.12E-08	mg/kg-day	2.00E+00	mg/kg-day	4.24E-08	6.18E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.29E-07	mg/kg-day	1.60E+01	mg/kg-day	5.27E-06	9.60E-07	mg/kg-day	5.00E-05	mg/kg-day	1.92E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	6.01E-09	mg/kg-day	9.10E+00	mg/kg-day	5.47E-08	1.75E-08	mg/kg-day	1.30E-05	mg/kg-day	1.35E-03
				Benz(a)anthracene	3.92E+03	ug/kg	1.84E-06	mg/kg-day	7.30E-01	mg/kg-day	2.46E-06	5.37E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.36E-06	mg/kg-day	7.30E+00	mg/kg-day	1.82E-05	3.96E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.51E-06	mg/kg-day	7.30E-01	mg/kg-day	2.02E-06	4.40E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.01E-06	mg/kg-day	7.30E-02	mg/kg-day	1.35E-07	2.93E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.68E-06	mg/kg-day	7.30E-03	mg/kg-day	2.25E-08	4.90E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.32E-07	mg/kg-day	7.30E+00	mg/kg-day	1.76E-06	3.84E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	6.11E-07	mg/kg-day	7.30E-01	mg/kg-day	8.17E-07	1.78E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	3.64E-07	mg/kg-day	--	mg/kg-day	--	1.06E-06	mg/kg-day	2.00E-02	mg/kg-day	5.32E-05
				Phenanthrene	1.25E+04	ug/kg	5.87E-06	mg/kg-day	--	mg/kg-day	--	1.71E-05	mg/kg-day	3.00E-02	mg/kg-day	5.71E-04
				Ethylbenzene	6.55E+02	ug/kg	3.08E-07	mg/kg-day	1.10E-02	mg/kg-day	3.38E-09	8.97E-07	mg/kg-day	1.00E-01	mg/kg-day	8.97E-06
			Exp. Route Total								7.10E-05					9.06E-01

TABLE 7.28.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.37E-11	mg/kg-day	1.30E+05	mg/kg-day	1.78E-06	3.98E-11	mg/kg-day	1.00E-09	mg/kg-day	3.98E-02
				Aluminum	1.98E+04	mg/kg	3.71E-04	mg/kg-day	--	mg/kg-day	--	1.08E-03	mg/kg-day	1.00E+00	mg/kg-day	1.08E-03
				Antimony	2.50E+01	mg/kg	4.68E-07	mg/kg-day	--	mg/kg-day	--	1.37E-06	mg/kg-day	6.00E-05	mg/kg-day	2.28E-02
				Arsenic	6.21E+00	mg/kg	3.49E-07	mg/kg-day	1.50E+00	mg/kg-day	5.24E-07	1.02E-06	mg/kg-day	3.00E-04	mg/kg-day	3.39E-03
				Cadmium	4.71E+01	mg/kg	8.83E-08	mg/kg-day	--	mg/kg-day	--	2.57E-07	mg/kg-day	2.50E-05	mg/kg-day	1.03E-02
				Chromium	3.94E+01	mg/kg	7.38E-07	mg/kg-day	2.00E+01	mg/kg-day	2.71E-05	2.15E-06	mg/kg-day	7.50E-05	mg/kg-day	2.87E-02
				Cobalt	1.23E+01	mg/kg	2.30E-07	mg/kg-day	--	mg/kg-day	--	6.72E-07	mg/kg-day	3.00E-04	mg/kg-day	2.24E-03
				Copper	9.67E+02	mg/kg	1.81E-05	mg/kg-day	--	mg/kg-day	--	5.29E-05	mg/kg-day	4.00E-02	mg/kg-day	1.32E-03
				Iron	3.36E+04	mg/kg	6.30E-04	mg/kg-day	--	mg/kg-day	--	1.84E-03	mg/kg-day	7.00E-01	mg/kg-day	2.62E-03
				Lead	3.22E+02	mg/kg	6.03E-06	mg/kg-day	--	mg/kg-day	--	1.76E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	2.47E-05	mg/kg-day	--	mg/kg-day	--	7.21E-05	mg/kg-day	9.60E-04	mg/kg-day	7.52E-02
				Mercury	1.15E+00	mg/kg	2.16E-08	mg/kg-day	--	mg/kg-day	--	6.29E-08	mg/kg-day	1.00E-04	mg/kg-day	6.29E-04
				Nickel	3.74E+01	mg/kg	7.01E-07	mg/kg-day	--	mg/kg-day	--	2.04E-06	mg/kg-day	8.00E-04	mg/kg-day	2.56E-03
				Silver	1.60E+01	mg/kg	3.00E-07	mg/kg-day	--	mg/kg-day	--	8.75E-07	mg/kg-day	2.00E-04	mg/kg-day	4.37E-03
				Vanadium	4.45E+01	mg/kg	8.34E-07	mg/kg-day	--	mg/kg-day	--	2.43E-06	mg/kg-day	1.30E-04	mg/kg-day	1.87E-02
				Zinc	1.38E+03	mg/kg	2.59E-05	mg/kg-day	--	mg/kg-day	--	7.54E-05	mg/kg-day	3.00E-01	mg/kg-day	2.51E-04
				4,4'-DDD	4.63E+03	ug/kg	2.60E-07	mg/kg-day	2.40E-01	mg/kg-day	6.25E-08	7.59E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	3.39E-08	mg/kg-day	3.40E-01	mg/kg-day	1.15E-08	9.89E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	9.73E-07	mg/kg-day	3.40E-01	mg/kg-day	3.31E-07	2.84E-06	mg/kg-day	5.00E-04	mg/kg-day	5.67E-03
				Aroclor-1248	5.60E+02	ug/kg	1.47E-07	mg/kg-day	2.00E+00	mg/kg-day	2.94E-07	4.29E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	3.52E-08	mg/kg-day	2.00E+00	mg/kg-day	7.03E-08	1.03E-07	mg/kg-day	2.00E-05	mg/kg-day	5.13E-03
				Aroclor-1260	4.51E+01	ug/kg	1.18E-08	mg/kg-day	2.00E+00	mg/kg-day	2.37E-08	3.45E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	1.31E-07	mg/kg-day	1.60E+01	mg/kg-day	2.10E-06	3.83E-07	mg/kg-day	5.00E-05	mg/kg-day	7.66E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	2.40E-09	mg/kg-day	9.10E+00	mg/kg-day	2.18E-08	7.00E-09	mg/kg-day	1.30E-05	mg/kg-day	5.38E-04
				Benz(a)anthracene	3.92E+03	ug/kg	9.55E-07	mg/kg-day	7.30E-01	mg/kg-day	1.28E-06	2.79E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	7.04E-07	mg/kg-day	7.30E+00	mg/kg-day	9.42E-06	2.05E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	7.82E-07	mg/kg-day	7.30E-01	mg/kg-day	1.05E-06	2.28E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	5.21E-07	mg/kg-day	7.30E-02	mg/kg-day	6.98E-08	1.52E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	8.72E-07	mg/kg-day	7.30E-03	mg/kg-day	1.17E-08	2.54E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	6.82E-08	mg/kg-day	7.30E+00	mg/kg-day	9.13E-07	1.99E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.17E-07	mg/kg-day	7.30E-01	mg/kg-day	4.24E-07	9.24E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.89E-07	mg/kg-day	--	mg/kg-day	--	5.51E-07	mg/kg-day	2.00E-02	mg/kg-day	2.76E-05
				Phenanthrene	1.25E+04	ug/kg	3.05E-06	mg/kg-day	--	mg/kg-day	--	8.88E-06	mg/kg-day	3.00E-02	mg/kg-day	2.96E-04
				Ethylbenzene	6.55E+02	ug/kg	3.68E-08	mg/kg-day	1.10E-02	mg/kg-day	4.05E-10	1.07E-07	mg/kg-day	1.00E-01	mg/kg-day	1.07E-06
			Exp. Route Total								4.55E-05					2.33E-01
		Exposure Point Total									1.16E-04					1.14E+00
	Exposure Medium Total										1.16E-04					1.14E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.70E-05	mg/m3	3.40E-02	1/(mg/m3)	9.17E-07	7.87E-05	mg/m3	3.00E-03	mg/m3	2.62E-02
				Ethylbenzene	7.00E+03	ug/kg	9.51E-04	mg/m3	2.50E-03	1/(mg/m3)	2.38E-06	2.77E-03	mg/m3	1.00E+00	mg/m3	2.77E-03
			Exp. Route Total								3.29E-06					2.90E-02
		Exposure Point Total									3.29E-06					2.90E-02
	Exposure Medium Total										3.29E-06					2.90E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	2.00E-09	mg/m3	1.20E+01	1/(mg/m3)	4.40E-08	5.84E-09	mg/m3	1.00E-04	mg/m3	5.84E-05
				Manganese	1.32E+03	mg/kg	6.71E-08	mg/m3	--	1/(mg/m3)	--	1.96E-07	mg/m3	5.00E-05	mg/m3	3.91E-03
			Exp. Route Total								4.40E-08					3.97E-03
		Exposure Point Total									4.40E-08					3.97E-03
	Exposure Medium Total										4.40E-08					3.97E-03
Medium Total											1.20E-04					1.17E+00
										Total of Receptor Risks Across All Media	1.20E-04			Total of Receptor Hazards Across All Media		1.17E+00

TABLE 7.28a.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION
NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.14E-10	mg/kg-day	1.30E+05	mg/kg-day	1.48E-05	3.33E-10	mg/kg-day	1.00E-09	mg/kg-day	3.33E-01
				Aluminum	1.98E+04	mg/kg	9.30E-03	mg/kg-day	--	mg/kg-day	--	2.71E-02	mg/kg-day	1.00E+00	mg/kg-day	2.71E-02
				Antimony	2.50E+01	mg/kg	1.17E-05	mg/kg-day	--	mg/kg-day	--	3.42E-05	mg/kg-day	4.00E-04	mg/kg-day	8.56E-02
				Cadmium	4.71E+01	mg/kg	2.21E-05	mg/kg-day	--	mg/kg-day	--	6.45E-05	mg/kg-day	1.00E-03	mg/kg-day	6.45E-02
				Chromium	3.94E+01	mg/kg	1.85E-05	mg/kg-day	5.00E-01	mg/kg-day	1.70E-05	5.40E-05	mg/kg-day	3.00E-03	mg/kg-day	1.80E-02
				Cobalt	1.23E+01	mg/kg	5.78E-06	mg/kg-day	--	mg/kg-day	--	1.68E-05	mg/kg-day	3.00E-04	mg/kg-day	5.62E-02
				Copper	9.67E+02	mg/kg	4.54E-04	mg/kg-day	--	mg/kg-day	--	1.32E-03	mg/kg-day	4.00E-02	mg/kg-day	3.31E-02
				Iron	3.36E+04	mg/kg	1.58E-02	mg/kg-day	--	mg/kg-day	--	4.60E-02	mg/kg-day	7.00E-01	mg/kg-day	6.58E-02
				Lead	3.22E+02	mg/kg	1.51E-04	mg/kg-day	--	mg/kg-day	--	4.41E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	6.20E-04	mg/kg-day	--	mg/kg-day	--	1.81E-03	mg/kg-day	2.40E-02	mg/kg-day	7.53E-02
				Mercury	1.15E+00	mg/kg	5.40E-07	mg/kg-day	--	mg/kg-day	--	1.58E-06	mg/kg-day	1.00E-04	mg/kg-day	1.58E-02
				Nickel	3.74E+01	mg/kg	1.76E-05	mg/kg-day	--	mg/kg-day	--	5.12E-05	mg/kg-day	2.00E-02	mg/kg-day	2.56E-03
				Silver	1.60E+01	mg/kg	7.51E-06	mg/kg-day	--	mg/kg-day	--	2.19E-05	mg/kg-day	5.00E-03	mg/kg-day	4.38E-03
				Vanadium	4.45E+01	mg/kg	2.09E-05	mg/kg-day	--	mg/kg-day	--	6.10E-05	mg/kg-day	5.00E-03	mg/kg-day	1.22E-02
				Zinc	1.38E+03	mg/kg	6.48E-04	mg/kg-day	--	mg/kg-day	--	1.89E-03	mg/kg-day	3.00E-01	mg/kg-day	6.30E-03
				4,4'-DDD	4.63E+03	ug/kg	2.17E-06	mg/kg-day	2.40E-01	mg/kg-day	5.22E-07	6.34E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.83E-07	mg/kg-day	3.40E-01	mg/kg-day	9.63E-08	8.26E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	8.13E-06	mg/kg-day	3.40E-01	mg/kg-day	2.76E-06	2.37E-05	mg/kg-day	5.00E-04	mg/kg-day	4.74E-02
				Aroclor-1248	5.60E+02	ug/kg	2.63E-07	mg/kg-day	2.00E+00	mg/kg-day	5.26E-07	7.67E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	6.29E-08	mg/kg-day	2.00E+00	mg/kg-day	1.26E-07	1.84E-07	mg/kg-day	2.00E-05	mg/kg-day	9.18E-03
				Aroclor-1260	4.51E+01	ug/kg	2.12E-08	mg/kg-day	2.00E+00	mg/kg-day	4.24E-08	6.18E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.29E-07	mg/kg-day	1.60E+01	mg/kg-day	5.27E-06	9.60E-07	mg/kg-day	5.00E-05	mg/kg-day	1.92E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	6.01E-09	mg/kg-day	9.10E+00	mg/kg-day	5.47E-08	1.75E-08	mg/kg-day	1.30E-05	mg/kg-day	1.35E-03
				Benz(a)anthracene	3.92E+03	ug/kg	1.84E-06	mg/kg-day	7.30E-01	mg/kg-day	2.46E-06	5.37E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.36E-06	mg/kg-day	7.30E+00	mg/kg-day	1.82E-05	3.96E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.51E-06	mg/kg-day	7.30E-01	mg/kg-day	2.02E-06	4.40E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.01E-06	mg/kg-day	7.30E-02	mg/kg-day	1.35E-07	2.93E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.68E-06	mg/kg-day	7.30E-03	mg/kg-day	2.25E-08	4.90E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.32E-07	mg/kg-day	7.30E+00	mg/kg-day	1.76E-06	3.84E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	6.11E-07	mg/kg-day	7.30E-01	mg/kg-day	8.17E-07	1.78E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	3.64E-07	mg/kg-day	--	mg/kg-day	--	1.06E-06	mg/kg-day	2.00E-02	mg/kg-day	5.32E-05
				Phenanthrene	1.25E+04	ug/kg	5.87E-06	mg/kg-day	--	mg/kg-day	--	1.71E-05	mg/kg-day	3.00E-02	mg/kg-day	5.71E-04
				Ethylbenzene	6.55E+02	ug/kg	3.08E-07	mg/kg-day	1.10E-02	mg/kg-day	3.38E-09	8.97E-07	mg/kg-day	1.00E-01	mg/kg-day	8.97E-06
			Exp. Route Total								6.66E-05					8.77E-01

TABLE 7.28a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.37E-11	mg/kg-day	1.30E+05	mg/kg-day	1.78E-06	3.98E-11	mg/kg-day	1.00E-09	mg/kg-day	3.98E-02
				Aluminum	1.98E+04	mg/kg	3.71E-04	mg/kg-day	--	mg/kg-day	--	1.08E-03	mg/kg-day	1.00E+00	mg/kg-day	1.08E-03
				Antimony	2.50E+01	mg/kg	4.68E-07	mg/kg-day	--	mg/kg-day	--	1.37E-06	mg/kg-day	6.00E-05	mg/kg-day	2.28E-02
				Cadmium	4.71E+01	mg/kg	8.83E-08	mg/kg-day	--	mg/kg-day	--	2.57E-07	mg/kg-day	2.50E-05	mg/kg-day	1.03E-02
				Chromium	3.94E+01	mg/kg	7.38E-07	mg/kg-day	2.00E+01	mg/kg-day	2.71E-05	2.15E-06	mg/kg-day	7.50E-05	mg/kg-day	2.87E-02
				Cobalt	1.23E+01	mg/kg	2.30E-07	mg/kg-day	--	mg/kg-day	--	6.72E-07	mg/kg-day	3.00E-04	mg/kg-day	2.24E-03
				Copper	9.67E+02	mg/kg	1.81E-05	mg/kg-day	--	mg/kg-day	--	5.29E-05	mg/kg-day	4.00E-02	mg/kg-day	1.32E-03
				Iron	3.36E+04	mg/kg	6.30E-04	mg/kg-day	--	mg/kg-day	--	1.84E-03	mg/kg-day	7.00E-01	mg/kg-day	2.62E-03
				Lead	3.22E+02	mg/kg	6.03E-06	mg/kg-day	--	mg/kg-day	--	1.76E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	2.47E-05	mg/kg-day	--	mg/kg-day	--	7.21E-05	mg/kg-day	9.60E-04	mg/kg-day	7.52E-02
				Mercury	1.15E+00	mg/kg	2.16E-08	mg/kg-day	--	mg/kg-day	--	6.29E-08	mg/kg-day	1.00E-04	mg/kg-day	6.29E-04
				Nickel	3.74E+01	mg/kg	7.01E-07	mg/kg-day	--	mg/kg-day	--	2.04E-06	mg/kg-day	8.00E-04	mg/kg-day	2.56E-03
				Silver	1.60E+01	mg/kg	3.00E-07	mg/kg-day	--	mg/kg-day	--	8.75E-07	mg/kg-day	2.00E-04	mg/kg-day	4.37E-03
				Vanadium	4.45E+01	mg/kg	8.34E-07	mg/kg-day	--	mg/kg-day	--	2.43E-06	mg/kg-day	1.30E-04	mg/kg-day	1.87E-02
				Zinc	1.38E+03	mg/kg	2.59E-05	mg/kg-day	--	mg/kg-day	--	7.54E-05	mg/kg-day	3.00E-01	mg/kg-day	2.51E-04
				4,4'-DDD	4.63E+03	ug/kg	2.60E-07	mg/kg-day	2.40E-01	mg/kg-day	6.25E-08	7.59E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	3.39E-08	mg/kg-day	3.40E-01	mg/kg-day	1.15E-08	9.89E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	9.73E-07	mg/kg-day	3.40E-01	mg/kg-day	3.31E-07	2.84E-06	mg/kg-day	5.00E-04	mg/kg-day	5.67E-03
				Aroclor-1248	5.60E+02	ug/kg	1.47E-07	mg/kg-day	2.00E+00	mg/kg-day	2.94E-07	4.29E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	3.52E-08	mg/kg-day	2.00E+00	mg/kg-day	7.03E-08	1.03E-07	mg/kg-day	2.00E-05	mg/kg-day	5.13E-03
				Aroclor-1260	4.51E+01	ug/kg	1.18E-08	mg/kg-day	2.00E+00	mg/kg-day	2.37E-08	3.45E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	1.31E-07	mg/kg-day	1.60E+01	mg/kg-day	2.10E-06	3.83E-07	mg/kg-day	5.00E-05	mg/kg-day	7.66E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	2.40E-09	mg/kg-day	9.10E+00	mg/kg-day	2.18E-08	7.00E-09	mg/kg-day	1.30E-05	mg/kg-day	5.38E-04
				Benz(a)anthracene	3.92E+03	ug/kg	9.55E-07	mg/kg-day	7.30E-01	mg/kg-day	1.28E-06	2.79E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	7.04E-07	mg/kg-day	7.30E+00	mg/kg-day	9.42E-06	2.05E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	7.82E-07	mg/kg-day	7.30E-01	mg/kg-day	1.05E-06	2.28E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	5.21E-07	mg/kg-day	7.30E-02	mg/kg-day	6.98E-08	1.52E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	8.72E-07	mg/kg-day	7.30E-03	mg/kg-day	1.17E-08	2.54E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	6.82E-08	mg/kg-day	7.30E+00	mg/kg-day	9.13E-07	1.99E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.17E-07	mg/kg-day	7.30E-01	mg/kg-day	4.24E-07	9.24E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.89E-07	mg/kg-day	--	mg/kg-day	--	5.51E-07	mg/kg-day	2.00E-02	mg/kg-day	2.76E-05
				Phenanthrene	1.25E+04	ug/kg	3.05E-06	mg/kg-day	--	mg/kg-day	--	8.88E-06	mg/kg-day	3.00E-02	mg/kg-day	2.96E-04
				Ethylbenzene	6.55E+02	ug/kg	3.68E-08	mg/kg-day	1.10E-02	mg/kg-day	4.05E-10	1.07E-07	mg/kg-day	1.00E-01	mg/kg-day	1.07E-06
			Exp. Route Total								4.49E-05					2.30E-01
		Exposure Point Total									1.12E-04					1.11E+00
	Exposure Medium Total										1.12E-04					1.11E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.70E-05	mg/m3	3.40E-02	1/(mg/m3)	9.17E-07	7.87E-05	mg/m3	3.00E-03	mg/m3	2.62E-02
				Ethylbenzene	7.00E+03	ug/kg	9.51E-04	mg/m3	2.50E-03	1/(mg/m3)	2.38E-06	2.77E-03	mg/m3	1.00E+00	mg/m3	2.77E-03
			Exp. Route Total								3.29E-06					2.90E-02
		Exposure Point Total									3.29E-06					2.90E-02
	Exposure Medium Total										3.29E-06					2.90E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	2.00E-09	mg/m3	1.20E+01	1/(mg/m3)	4.40E-08	5.84E-09	mg/m3	1.00E-04	mg/m3	5.84E-05
				Manganese	1.32E+03	mg/kg	6.71E-08	mg/m3	--	1/(mg/m3)	--	1.96E-07	mg/m3	5.00E-05	mg/m3	3.91E-03
			Exp. Route Total								4.40E-08					3.97E-03
		Exposure Point Total									4.40E-08					3.97E-03
	Exposure Medium Total										4.40E-08					3.97E-03
Medium Total											1.15E-04					1.14E+00
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											1.15E-04					1.14E+00

TABLE 7.29.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.80E-10	mg/kg-day	1.30E+05	mg/kg-day	4.95E-05					N/A
				Aluminum	1.98E+04	mg/kg	9.30E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	1.17E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	6.21E+00	mg/kg	9.72E-06	mg/kg-day	1.50E+00	mg/kg-day	1.46E-05					N/A
				Cadmium	4.71E+01	mg/kg	2.21E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	6.17E-05	mg/kg-day	5.00E-01	mg/kg-day	1.32E-04					N/A
				Cobalt	1.23E+01	mg/kg	5.78E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	4.54E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	1.58E-02	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	1.51E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	6.20E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	5.40E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	1.76E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	7.51E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	2.09E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	6.48E-04	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	7.25E-06	mg/kg-day	2.40E-01	mg/kg-day	1.74E-06					N/A
				4,4'-DDE	6.03E+02	ug/kg	9.44E-07	mg/kg-day	3.40E-01	mg/kg-day	3.21E-07					N/A
				4,4'-DDT	1.73E+04	ug/kg	2.71E-05	mg/kg-day	3.40E-01	mg/kg-day	9.21E-06					N/A
				Aroclor-1248	5.60E+02	ug/kg	8.77E-07	mg/kg-day	2.00E+00	mg/kg-day	1.75E-06					N/A
				Aroclor-1254	1.34E+02	ug/kg	2.10E-07	mg/kg-day	2.00E+00	mg/kg-day	4.20E-07					N/A
				Aroclor-1260	4.51E+01	ug/kg	7.06E-08	mg/kg-day	2.00E+00	mg/kg-day	1.41E-07					N/A
				Dieldrin	7.01E+02	ug/kg	1.10E-06	mg/kg-day	1.60E+01	mg/kg-day	1.76E-05					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	2.00E-08	mg/kg-day	9.10E+00	mg/kg-day	1.82E-07					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	6.14E-06	mg/kg-day	7.30E-01	mg/kg-day	1.92E-05					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	4.52E-06	mg/kg-day	7.30E+00	mg/kg-day	1.41E-04					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	5.03E-06	mg/kg-day	7.30E-01	mg/kg-day	1.57E-05					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	3.35E-06	mg/kg-day	7.30E-02	mg/kg-day	1.05E-06					N/A
				Chrysene	3.58E+03	ug/kg	5.60E-06	mg/kg-day	7.30E-03	mg/kg-day	1.75E-07					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	4.38E-07	mg/kg-day	7.30E+00	mg/kg-day	1.37E-05					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	2.04E-06	mg/kg-day	7.30E-01	mg/kg-day	6.36E-06					N/A
				Naphthalene	7.76E+02	ug/kg	3.64E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	5.87E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	1.03E-06	mg/kg-day	1.10E-02	mg/kg-day	1.13E-08					N/A
			Exp. Route Total								4.25E-04					--

TABLE 7.29.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURES
NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.60E-11	mg/kg-day	1.30E+05	mg/kg-day	4.68E-06					N/A
				Aluminum	1.98E+04	mg/kg	3.71E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	4.68E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	6.21E+00	mg/kg	9.21E-07	mg/kg-day	1.50E+00	mg/kg-day	1.38E-06					N/A
				Cadmium	4.71E+01	mg/kg	8.83E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	1.95E-06	mg/kg-day	2.00E+01	mg/kg-day	1.56E-04					N/A
				Cobalt	1.23E+01	mg/kg	2.30E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	1.81E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	6.30E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	6.03E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	2.47E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	2.16E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	7.01E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	3.00E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	8.34E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	2.59E-05	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	6.87E-07	mg/kg-day	2.40E-01	mg/kg-day	1.65E-07					N/A
				4,4'-DDE	6.03E+02	ug/kg	8.94E-08	mg/kg-day	3.40E-01	mg/kg-day	3.04E-08					N/A
				4,4'-DDT	1.73E+04	ug/kg	2.57E-06	mg/kg-day	3.40E-01	mg/kg-day	8.72E-07					N/A
				Aroclor-1248	5.60E+02	ug/kg	3.87E-07	mg/kg-day	2.00E+00	mg/kg-day	7.75E-07					N/A
				Aroclor-1254	1.34E+02	ug/kg	9.27E-08	mg/kg-day	2.00E+00	mg/kg-day	1.85E-07					N/A
				Aroclor-1260	4.51E+01	ug/kg	3.12E-08	mg/kg-day	2.00E+00	mg/kg-day	6.24E-08					N/A
				Dieldrin	7.01E+02	ug/kg	3.46E-07	mg/kg-day	1.60E+01	mg/kg-day	5.54E-06					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	6.33E-09	mg/kg-day	9.10E+00	mg/kg-day	5.76E-08					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	2.52E-06	mg/kg-day	7.30E-01	mg/kg-day	7.37E-06					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	1.86E-06	mg/kg-day	7.30E+00	mg/kg-day	5.43E-05					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	2.06E-06	mg/kg-day	7.30E-01	mg/kg-day	6.03E-06					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.37E-06	mg/kg-day	7.30E-02	mg/kg-day	4.02E-07					N/A
				Chrysene	3.58E+03	ug/kg	2.30E-06	mg/kg-day	7.30E-03	mg/kg-day	6.73E-08					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.80E-07	mg/kg-day	7.30E+00	mg/kg-day	5.26E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	8.35E-07	mg/kg-day	7.30E-01	mg/kg-day	2.44E-06					N/A
				Naphthalene	7.76E+02	ug/kg	1.89E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	3.05E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	9.71E-08	mg/kg-day	1.10E-02	mg/kg-day	1.07E-09					N/A
			Exp. Route Total								2.46E-04					--
		Exposure Point Total									6.71E-04					--
	Exposure Medium Total										6.71E-04					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	3.37E-05	mg/m3	3.40E-02	1/(mg/m3)	1.15E-06					N/A
				Ethylbenzene	7.00E+03	ug/kg	1.19E-03	mg/m3	2.50E-03	1/(mg/m3)	2.97E-06					N/A
			Exp. Route Total								4.12E-06					--
		Exposure Point Total									4.12E-06					--
	Exposure Medium Total										4.12E-06					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	2.50E-09	mg/m3	1.20E+01	1/(mg/m3)	7.61E-08					N/A
				Manganese	1.32E+03	mg/kg	6.71E-08	mg/m3	--	1/(mg/m3)	--					N/A
			Exp. Route Total								7.61E-08					--
		Exposure Point Total									7.61E-08					--
	Exposure Medium Total										7.61E-08					--
Medium Total											6.75E-04					--
										Total of Receptor Risks Across All Media	6.75E-04				Total of Receptor Hazards Across All Media	--

TABLE 7.29a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.80E-10	mg/kg-day	1.30E+05	mg/kg-day	4.95E-05					N/A
				Aluminum	1.98E+04	mg/kg	9.30E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	1.17E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	4.71E+01	mg/kg	2.21E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	6.17E-05	mg/kg-day	5.00E-01	mg/kg-day	1.32E-04					N/A
				Cobalt	1.23E+01	mg/kg	5.78E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	4.54E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	1.58E-02	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	1.51E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	6.20E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	5.40E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	1.76E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	7.51E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	2.09E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	6.48E-04	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	7.25E-06	mg/kg-day	2.40E-01	mg/kg-day	1.74E-06					N/A
				4,4'-DDE	6.03E+02	ug/kg	9.44E-07	mg/kg-day	3.40E-01	mg/kg-day	3.21E-07					N/A
				4,4'-DDT	1.73E+04	ug/kg	2.71E-05	mg/kg-day	3.40E-01	mg/kg-day	9.21E-06					N/A
				Aroclor-1248	5.60E+02	ug/kg	8.77E-07	mg/kg-day	2.00E+00	mg/kg-day	1.75E-06					N/A
				Aroclor-1254	1.34E+02	ug/kg	2.10E-07	mg/kg-day	2.00E+00	mg/kg-day	4.20E-07					N/A
				Aroclor-1260	4.51E+01	ug/kg	7.06E-08	mg/kg-day	2.00E+00	mg/kg-day	1.41E-07					N/A
				Dieldrin	7.01E+02	ug/kg	1.10E-06	mg/kg-day	1.60E+01	mg/kg-day	1.76E-05					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	2.00E-08	mg/kg-day	9.10E+00	mg/kg-day	1.82E-07					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	6.14E-06	mg/kg-day	7.30E-01	mg/kg-day	1.92E-05					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	4.52E-06	mg/kg-day	7.30E+00	mg/kg-day	1.41E-04					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	5.03E-06	mg/kg-day	7.30E-01	mg/kg-day	1.57E-05					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	3.35E-06	mg/kg-day	7.30E-02	mg/kg-day	1.05E-06					N/A
				Chrysene	3.58E+03	ug/kg	5.60E-06	mg/kg-day	7.30E-03	mg/kg-day	1.75E-07					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	4.38E-07	mg/kg-day	7.30E+00	mg/kg-day	1.37E-05					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	2.04E-06	mg/kg-day	7.30E-01	mg/kg-day	6.36E-06					N/A
				Naphthalene	7.76E+02	ug/kg	3.64E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	5.87E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	1.03E-06	mg/kg-day	1.10E-02	mg/kg-day	1.13E-08					N/A
			Exp. Route Total								4.11E-04					--

TABLE 7.29a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.60E-11	mg/kg-day	1.30E+05	mg/kg-day	4.68E-06					N/A
				Aluminum	1.98E+04	mg/kg	3.71E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	4.68E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	4.71E+01	mg/kg	8.83E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	1.95E-06	mg/kg-day	2.00E+01	mg/kg-day	1.56E-04					N/A
				Cobalt	1.23E+01	mg/kg	2.30E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	1.81E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	6.30E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	6.03E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	2.47E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	2.16E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	7.01E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	3.00E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	8.34E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	2.59E-05	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	6.87E-07	mg/kg-day	2.40E-01	mg/kg-day	1.65E-07					N/A
				4,4'-DDE	6.03E+02	ug/kg	8.94E-08	mg/kg-day	3.40E-01	mg/kg-day	3.04E-08					N/A
				4,4'-DDT	1.73E+04	ug/kg	2.57E-06	mg/kg-day	3.40E-01	mg/kg-day	8.72E-07					N/A
				Aroclor-1248	5.60E+02	ug/kg	3.87E-07	mg/kg-day	2.00E+00	mg/kg-day	7.75E-07					N/A
				Aroclor-1254	1.34E+02	ug/kg	9.27E-08	mg/kg-day	2.00E+00	mg/kg-day	1.85E-07					N/A
				Aroclor-1260	4.51E+01	ug/kg	3.12E-08	mg/kg-day	2.00E+00	mg/kg-day	6.24E-08					N/A
				Dieldrin	7.01E+02	ug/kg	3.46E-07	mg/kg-day	1.60E+01	mg/kg-day	5.54E-06					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	6.33E-09	mg/kg-day	9.10E+00	mg/kg-day	5.76E-08					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	2.52E-06	mg/kg-day	7.30E-01	mg/kg-day	7.37E-06					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	1.86E-06	mg/kg-day	7.30E+00	mg/kg-day	5.43E-05					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	2.06E-06	mg/kg-day	7.30E-01	mg/kg-day	6.03E-06					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.37E-06	mg/kg-day	7.30E-02	mg/kg-day	4.02E-07					N/A
				Chrysene	3.58E+03	ug/kg	2.30E-06	mg/kg-day	7.30E-03	mg/kg-day	6.73E-08					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.80E-07	mg/kg-day	7.30E+00	mg/kg-day	5.26E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	8.35E-07	mg/kg-day	7.30E-01	mg/kg-day	2.44E-06					N/A
				Naphthalene	7.76E+02	ug/kg	1.89E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	3.05E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	9.71E-08	mg/kg-day	1.10E-02	mg/kg-day	1.07E-09					N/A
			Exp. Route Total								2.44E-04					--
		Exposure Point Total									6.55E-04					--
	Exposure Medium Total										6.55E-04					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	3.37E-05	mg/m3	3.40E-02	1/(mg/m3)	1.15E-06					N/A
				Ethylbenzene	7.00E+03	ug/kg	1.19E-03	mg/m3	2.50E-03	1/(mg/m3)	2.97E-06					N/A
			Exp. Route Total								4.12E-06					--
		Exposure Point Total									4.12E-06					--
	Exposure Medium Total										4.12E-06					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	2.50E-09	mg/m3	1.20E+01	1/(mg/m3)	7.61E-08					N/A
				Manganese	1.32E+03	mg/kg	6.71E-08	mg/m3	--	1/(mg/m3)	--					N/A
			Exp. Route Total								7.61E-08					--
		Exposure Point Total									7.61E-08					--
	Exposure Medium Total										7.61E-08					--
Medium Total											6.59E-04					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

TABLE 7.30.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURES
NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Industrial
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	8.49E-11	mg/kg-day	1.30E+05	mg/kg-day	1.10E-05	2.38E-10	mg/kg-day	1.00E-09	mg/kg-day	2.38E-01
				Aluminum	1.98E+04	mg/kg	6.92E-03	mg/kg-day	--	mg/kg-day	--	1.94E-02	mg/kg-day	1.00E+00	mg/kg-day	1.94E-02
				Antimony	2.50E+01	mg/kg	8.74E-06	mg/kg-day	--	mg/kg-day	--	2.45E-05	mg/kg-day	4.00E-04	mg/kg-day	6.12E-02
				Arsenic	6.21E+00	mg/kg	2.17E-06	mg/kg-day	1.50E+00	mg/kg-day	3.26E-06	6.08E-06	mg/kg-day	3.00E-04	mg/kg-day	2.03E-02
				Cadmium	4.71E+01	mg/kg	1.65E-05	mg/kg-day	--	mg/kg-day	--	4.61E-05	mg/kg-day	1.00E-03	mg/kg-day	4.61E-02
				Chromium	3.94E+01	mg/kg	1.38E-05	mg/kg-day	5.00E-01	mg/kg-day	6.88E-06	3.86E-05	mg/kg-day	3.00E-03	mg/kg-day	1.29E-02
				Cobalt	1.23E+01	mg/kg	4.30E-06	mg/kg-day	--	mg/kg-day	--	1.20E-05	mg/kg-day	3.00E-04	mg/kg-day	4.01E-02
				Copper	9.67E+02	mg/kg	3.38E-04	mg/kg-day	--	mg/kg-day	--	9.46E-04	mg/kg-day	4.00E-02	mg/kg-day	2.37E-02
				Iron	3.36E+04	mg/kg	1.17E-02	mg/kg-day	--	mg/kg-day	--	3.29E-02	mg/kg-day	7.00E-01	mg/kg-day	4.70E-02
				Lead	3.22E+02	mg/kg	1.13E-04	mg/kg-day	--	mg/kg-day	--	3.15E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	4.61E-04	mg/kg-day	--	mg/kg-day	--	1.29E-03	mg/kg-day	2.40E-02	mg/kg-day	5.38E-02
				Mercury	1.15E+00	mg/kg	4.02E-07	mg/kg-day	--	mg/kg-day	--	1.13E-06	mg/kg-day	1.00E-04	mg/kg-day	1.13E-02
				Nickel	3.74E+01	mg/kg	1.31E-05	mg/kg-day	--	mg/kg-day	--	3.66E-05	mg/kg-day	2.00E-02	mg/kg-day	1.83E-03
				Silver	1.60E+01	mg/kg	5.59E-06	mg/kg-day	--	mg/kg-day	--	1.57E-05	mg/kg-day	5.00E-03	mg/kg-day	3.13E-03
				Vanadium	4.45E+01	mg/kg	1.56E-05	mg/kg-day	--	mg/kg-day	--	4.35E-05	mg/kg-day	5.00E-03	mg/kg-day	8.71E-03
				Zinc	1.38E+03	mg/kg	4.82E-04	mg/kg-day	--	mg/kg-day	--	1.35E-03	mg/kg-day	3.00E-01	mg/kg-day	4.50E-03
				4,4'-DDD	4.63E+03	ug/kg	1.62E-06	mg/kg-day	2.40E-01	mg/kg-day	3.88E-07	4.53E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.11E-07	mg/kg-day	3.40E-01	mg/kg-day	7.16E-08	5.90E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	6.05E-06	mg/kg-day	3.40E-01	mg/kg-day	2.06E-06	1.69E-05	mg/kg-day	5.00E-04	mg/kg-day	3.39E-02
				Aroclor-1248	5.60E+02	ug/kg	1.96E-07	mg/kg-day	2.00E+00	mg/kg-day	3.91E-07	5.48E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	4.68E-08	mg/kg-day	2.00E+00	mg/kg-day	9.37E-08	1.31E-07	mg/kg-day	2.00E-05	mg/kg-day	6.56E-03
				Aroclor-1260	4.51E+01	ug/kg	1.58E-08	mg/kg-day	2.00E+00	mg/kg-day	3.15E-08	4.41E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	2.45E-07	mg/kg-day	1.60E+01	mg/kg-day	3.92E-06	6.86E-07	mg/kg-day	5.00E-05	mg/kg-day	1.37E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	4.47E-09	mg/kg-day	9.10E+00	mg/kg-day	4.07E-08	1.25E-08	mg/kg-day	1.30E-05	mg/kg-day	9.63E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.37E-06	mg/kg-day	7.30E-01	mg/kg-day	1.00E-06	3.84E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.01E-06	mg/kg-day	7.30E+00	mg/kg-day	7.37E-06	2.83E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.12E-06	mg/kg-day	7.30E-01	mg/kg-day	8.19E-07	3.14E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	7.48E-07	mg/kg-day	7.30E-02	mg/kg-day	5.46E-08	2.09E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.25E-06	mg/kg-day	7.30E-03	mg/kg-day	9.13E-09	3.50E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	9.78E-08	mg/kg-day	7.30E+00	mg/kg-day	7.14E-07	2.74E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	4.54E-07	mg/kg-day	7.30E-01	mg/kg-day	3.32E-07	1.27E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	2.71E-07	mg/kg-day	--	mg/kg-day	--	7.59E-07	mg/kg-day	2.00E-02	mg/kg-day	3.80E-05
				Phenanthrene	1.25E+04	ug/kg	4.37E-06	mg/kg-day	--	mg/kg-day	--	1.22E-05	mg/kg-day	3.00E-02	mg/kg-day	4.08E-04
				Ethylbenzene	6.55E+02	ug/kg	2.29E-07	mg/kg-day	1.10E-02	mg/kg-day	2.52E-09	6.41E-07	mg/kg-day	1.00E-01	mg/kg-day	6.41E-06
			Exp. Route Total								3.85E-05					6.47E-01

TABLE 7.30.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Industrial
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.68E-11	mg/kg-day	1.30E+05	mg/kg-day	2.19E-06	4.71E-11	mg/kg-day	1.00E-09	mg/kg-day	4.71E-02
				Aluminum	1.98E+04	mg/kg	4.57E-04	mg/kg-day	--	mg/kg-day	--	1.28E-03	mg/kg-day	1.00E+00	mg/kg-day	1.28E-03
				Antimony	2.50E+01	mg/kg	5.77E-07	mg/kg-day	--	mg/kg-day	--	1.61E-06	mg/kg-day	6.00E-05	mg/kg-day	2.69E-02
				Arsenic	6.21E+00	mg/kg	4.30E-07	mg/kg-day	1.50E+00	mg/kg-day	6.45E-07	1.20E-06	mg/kg-day	3.00E-04	mg/kg-day	4.01E-03
				Cadmium	4.71E+01	mg/kg	1.09E-07	mg/kg-day	--	mg/kg-day	--	3.04E-07	mg/kg-day	2.50E-05	mg/kg-day	1.22E-02
				Chromium	3.94E+01	mg/kg	9.09E-07	mg/kg-day	2.00E+01	mg/kg-day	1.82E-05	2.54E-06	mg/kg-day	7.50E-05	mg/kg-day	3.39E-02
				Cobalt	1.23E+01	mg/kg	2.84E-07	mg/kg-day	--	mg/kg-day	--	7.94E-07	mg/kg-day	3.00E-04	mg/kg-day	2.65E-03
				Copper	9.67E+02	mg/kg	2.23E-05	mg/kg-day	--	mg/kg-day	--	6.24E-05	mg/kg-day	4.00E-02	mg/kg-day	1.56E-03
				Iron	3.36E+04	mg/kg	7.75E-04	mg/kg-day	--	mg/kg-day	--	2.17E-03	mg/kg-day	7.00E-01	mg/kg-day	3.10E-03
				Lead	3.22E+02	mg/kg	7.43E-06	mg/kg-day	--	mg/kg-day	--	2.08E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	3.04E-05	mg/kg-day	--	mg/kg-day	--	8.52E-05	mg/kg-day	9.60E-04	mg/kg-day	8.88E-02
				Mercury	1.15E+00	mg/kg	2.65E-08	mg/kg-day	--	mg/kg-day	--	7.43E-08	mg/kg-day	1.00E-04	mg/kg-day	7.43E-04
				Nickel	3.74E+01	mg/kg	8.63E-07	mg/kg-day	--	mg/kg-day	--	2.42E-06	mg/kg-day	8.00E-04	mg/kg-day	3.02E-03
				Silver	1.60E+01	mg/kg	3.69E-07	mg/kg-day	--	mg/kg-day	--	1.03E-06	mg/kg-day	2.00E-04	mg/kg-day	5.17E-03
				Vanadium	4.45E+01	mg/kg	1.03E-06	mg/kg-day	--	mg/kg-day	--	2.87E-06	mg/kg-day	1.30E-04	mg/kg-day	2.21E-02
				Zinc	1.38E+03	mg/kg	3.18E-05	mg/kg-day	--	mg/kg-day	--	8.91E-05	mg/kg-day	3.00E-01	mg/kg-day	2.97E-04
				4,4'-DDD	4.63E+03	ug/kg	3.20E-07	mg/kg-day	2.40E-01	mg/kg-day	7.69E-08	8.97E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	4.17E-08	mg/kg-day	3.40E-01	mg/kg-day	1.42E-08	1.17E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.20E-06	mg/kg-day	3.40E-01	mg/kg-day	4.07E-07	3.35E-06	mg/kg-day	5.00E-04	mg/kg-day	6.70E-03
				Aroclor-1248	5.60E+02	ug/kg	1.81E-07	mg/kg-day	2.00E+00	mg/kg-day	3.62E-07	5.06E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	4.33E-08	mg/kg-day	2.00E+00	mg/kg-day	8.65E-08	1.21E-07	mg/kg-day	2.00E-05	mg/kg-day	6.06E-03
				Aroclor-1260	4.51E+01	ug/kg	1.46E-08	mg/kg-day	2.00E+00	mg/kg-day	2.91E-08	4.08E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	1.62E-07	mg/kg-day	1.60E+01	mg/kg-day	2.59E-06	4.53E-07	mg/kg-day	5.00E-05	mg/kg-day	9.05E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	2.95E-09	mg/kg-day	9.10E+00	mg/kg-day	2.69E-08	8.27E-09	mg/kg-day	1.30E-05	mg/kg-day	6.36E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.18E-06	mg/kg-day	7.30E-01	mg/kg-day	8.58E-07	3.29E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	8.67E-07	mg/kg-day	7.30E+00	mg/kg-day	6.33E-06	2.43E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	9.62E-07	mg/kg-day	7.30E-01	mg/kg-day	7.03E-07	2.69E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	6.42E-07	mg/kg-day	7.30E-02	mg/kg-day	4.68E-08	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.07E-06	mg/kg-day	7.30E-03	mg/kg-day	7.84E-09	3.01E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	8.40E-08	mg/kg-day	7.30E+00	mg/kg-day	6.13E-07	2.35E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.90E-07	mg/kg-day	7.30E-01	mg/kg-day	2.85E-07	1.09E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	2.33E-07	mg/kg-day	--	mg/kg-day	--	6.51E-07	mg/kg-day	2.00E-02	mg/kg-day	3.26E-05
				Phenanthrene	1.25E+04	ug/kg	3.75E-06	mg/kg-day	--	mg/kg-day	--	1.05E-05	mg/kg-day	3.00E-02	mg/kg-day	3.50E-04
				Ethylbenzene	6.55E+02	ug/kg	4.53E-08	mg/kg-day	1.10E-02	mg/kg-day	4.99E-10	1.27E-07	mg/kg-day	1.00E-01	mg/kg-day	1.27E-06
			Exp. Route Total								3.34E-05					2.76E-01
		Exposure Point Total									7.19E-05					9.23E-01
	Exposure Medium Total										7.19E-05					9.23E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	1.34E-05	mg/m3	3.40E-02	1/(mg/m3)	4.55E-07	3.75E-05	mg/m3	3.00E-03	mg/m3	1.25E-02
				Ethylbenzene	7.00E+03	ug/kg	4.72E-04	mg/m3	2.50E-03	1/(mg/m3)	1.18E-06	1.32E-03	mg/m3	1.00E+00	mg/m3	1.32E-03
			Exp. Route Total								1.63E-06					1.38E-02
		Exposure Point Total									1.63E-06					1.38E-02
	Exposure Medium Total										1.63E-06					1.38E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	9.93E-10	mg/m3	1.20E+01	1/(mg/m3)	1.19E-08	2.78E-09	mg/m3	1.00E-04	mg/m3	2.78E-05
				Manganese	1.32E+03	mg/kg	3.33E-08	mg/m3	--	1/(mg/m3)	--	9.31E-08	mg/m3	5.00E-05	mg/m3	1.86E-03
			Exp. Route Total								1.19E-08					1.89E-03
		Exposure Point Total									1.19E-08					1.89E-03
	Exposure Medium Total										1.19E-08					1.89E-03
Medium Total											7.36E-05					9.38E-01
										Total of Receptor Risks Across All Media	7.36E-05			Total of Receptor Hazards Across All Media		9.38E-01

TABLE 7.30a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Industrial
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	8.49E-11	mg/kg-day	1.30E+05	mg/kg-day	1.10E-05	2.38E-10	mg/kg-day	1.00E-09	mg/kg-day	2.38E-01
				Aluminum	1.98E+04	mg/kg	6.92E-03	mg/kg-day	--	mg/kg-day	--	1.94E-02	mg/kg-day	1.00E+00	mg/kg-day	1.94E-02
				Antimony	2.50E+01	mg/kg	8.74E-06	mg/kg-day	--	mg/kg-day	--	2.45E-05	mg/kg-day	4.00E-04	mg/kg-day	6.12E-02
				Cadmium	4.71E+01	mg/kg	1.65E-05	mg/kg-day	--	mg/kg-day	--	4.61E-05	mg/kg-day	1.00E-03	mg/kg-day	4.61E-02
				Chromium	3.94E+01	mg/kg	1.38E-05	mg/kg-day	5.00E-01	mg/kg-day	6.88E-06	3.86E-05	mg/kg-day	3.00E-03	mg/kg-day	1.29E-02
				Cobalt	1.23E+01	mg/kg	4.30E-06	mg/kg-day	--	mg/kg-day	--	1.20E-05	mg/kg-day	3.00E-04	mg/kg-day	4.01E-02
				Copper	9.67E+02	mg/kg	3.38E-04	mg/kg-day	--	mg/kg-day	--	9.46E-04	mg/kg-day	4.00E-02	mg/kg-day	2.37E-02
				Iron	3.36E+04	mg/kg	1.17E-02	mg/kg-day	--	mg/kg-day	--	3.29E-02	mg/kg-day	7.00E-01	mg/kg-day	4.70E-02
				Lead	3.22E+02	mg/kg	1.13E-04	mg/kg-day	--	mg/kg-day	--	3.15E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	4.61E-04	mg/kg-day	--	mg/kg-day	--	1.29E-03	mg/kg-day	2.40E-02	mg/kg-day	5.38E-02
				Mercury	1.15E+00	mg/kg	4.02E-07	mg/kg-day	--	mg/kg-day	--	1.13E-06	mg/kg-day	1.00E-04	mg/kg-day	1.13E-02
				Nickel	3.74E+01	mg/kg	1.31E-05	mg/kg-day	--	mg/kg-day	--	3.66E-05	mg/kg-day	2.00E-02	mg/kg-day	1.83E-03
				Silver	1.60E+01	mg/kg	5.59E-06	mg/kg-day	--	mg/kg-day	--	1.57E-05	mg/kg-day	5.00E-03	mg/kg-day	3.13E-03
				Vanadium	4.45E+01	mg/kg	1.56E-05	mg/kg-day	--	mg/kg-day	--	4.35E-05	mg/kg-day	5.00E-03	mg/kg-day	8.71E-03
				Zinc	1.38E+03	mg/kg	4.82E-04	mg/kg-day	--	mg/kg-day	--	1.35E-03	mg/kg-day	3.00E-01	mg/kg-day	4.50E-03
				4,4'-DDD	4.63E+03	ug/kg	1.62E-06	mg/kg-day	2.40E-01	mg/kg-day	3.88E-07	4.53E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.11E-07	mg/kg-day	3.40E-01	mg/kg-day	7.16E-08	5.90E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	6.05E-06	mg/kg-day	3.40E-01	mg/kg-day	2.06E-06	1.69E-05	mg/kg-day	5.00E-04	mg/kg-day	3.39E-02
				Aroclor-1248	5.60E+02	ug/kg	1.96E-07	mg/kg-day	2.00E+00	mg/kg-day	3.91E-07	5.48E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	4.68E-08	mg/kg-day	2.00E+00	mg/kg-day	9.37E-08	1.31E-07	mg/kg-day	2.00E-05	mg/kg-day	6.56E-03
				Aroclor-1260	4.51E+01	ug/kg	1.58E-08	mg/kg-day	2.00E+00	mg/kg-day	3.15E-08	4.41E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	2.45E-07	mg/kg-day	1.60E+01	mg/kg-day	3.92E-06	6.86E-07	mg/kg-day	5.00E-05	mg/kg-day	1.37E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	4.47E-09	mg/kg-day	9.10E+00	mg/kg-day	4.07E-08	1.25E-08	mg/kg-day	1.30E-05	mg/kg-day	9.63E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.37E-06	mg/kg-day	7.30E-01	mg/kg-day	1.00E-06	3.84E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.01E-06	mg/kg-day	7.30E+00	mg/kg-day	7.37E-06	2.83E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.12E-06	mg/kg-day	7.30E-01	mg/kg-day	8.19E-07	3.14E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	7.48E-07	mg/kg-day	7.30E-02	mg/kg-day	5.46E-08	2.09E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.25E-06	mg/kg-day	7.30E-03	mg/kg-day	9.13E-09	3.50E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	9.78E-08	mg/kg-day	7.30E+00	mg/kg-day	7.14E-07	2.74E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	4.54E-07	mg/kg-day	7.30E-01	mg/kg-day	3.32E-07	1.27E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	2.71E-07	mg/kg-day	--	mg/kg-day	--	7.59E-07	mg/kg-day	2.00E-02	mg/kg-day	3.80E-05
				Phenanthrene	1.25E+04	ug/kg	4.37E-06	mg/kg-day	--	mg/kg-day	--	1.22E-05	mg/kg-day	3.00E-02	mg/kg-day	4.08E-04
				Ethylbenzene	6.55E+02	ug/kg	2.29E-07	mg/kg-day	1.10E-02	mg/kg-day	2.52E-09	6.41E-07	mg/kg-day	1.00E-01	mg/kg-day	6.41E-06
			Exp. Route Total								3.52E-05					6.27E-01

TABLE 7.30a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Industrial
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.68E-11	mg/kg-day	1.30E+05	mg/kg-day	2.19E-06	4.71E-11	mg/kg-day	1.00E-09	mg/kg-day	4.71E-02
				Aluminum	1.98E+04	mg/kg	4.57E-04	mg/kg-day	--	mg/kg-day	--	1.28E-03	mg/kg-day	1.00E+00	mg/kg-day	1.28E-03
				Antimony	2.50E+01	mg/kg	5.77E-07	mg/kg-day	--	mg/kg-day	--	1.61E-06	mg/kg-day	6.00E-05	mg/kg-day	2.69E-02
				Cadmium	4.71E+01	mg/kg	1.09E-07	mg/kg-day	--	mg/kg-day	--	3.04E-07	mg/kg-day	2.50E-05	mg/kg-day	1.22E-02
				Chromium	3.94E+01	mg/kg	9.09E-07	mg/kg-day	2.00E+01	mg/kg-day	1.82E-05	2.54E-06	mg/kg-day	7.50E-05	mg/kg-day	3.39E-02
				Cobalt	1.23E+01	mg/kg	2.84E-07	mg/kg-day	--	mg/kg-day	--	7.94E-07	mg/kg-day	3.00E-04	mg/kg-day	2.65E-03
				Copper	9.67E+02	mg/kg	2.23E-05	mg/kg-day	--	mg/kg-day	--	6.24E-05	mg/kg-day	4.00E-02	mg/kg-day	1.56E-03
				Iron	3.36E+04	mg/kg	7.75E-04	mg/kg-day	--	mg/kg-day	--	2.17E-03	mg/kg-day	7.00E-01	mg/kg-day	3.10E-03
				Lead	3.22E+02	mg/kg	7.43E-06	mg/kg-day	--	mg/kg-day	--	2.08E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	3.04E-05	mg/kg-day	--	mg/kg-day	--	8.52E-05	mg/kg-day	9.60E-04	mg/kg-day	8.88E-02
				Mercury	1.15E+00	mg/kg	2.65E-08	mg/kg-day	--	mg/kg-day	--	7.43E-08	mg/kg-day	1.00E-04	mg/kg-day	7.43E-04
				Nickel	3.74E+01	mg/kg	8.63E-07	mg/kg-day	--	mg/kg-day	--	2.42E-06	mg/kg-day	8.00E-04	mg/kg-day	3.02E-03
				Silver	1.60E+01	mg/kg	3.69E-07	mg/kg-day	--	mg/kg-day	--	1.03E-06	mg/kg-day	2.00E-04	mg/kg-day	5.17E-03
				Vanadium	4.45E+01	mg/kg	1.03E-06	mg/kg-day	--	mg/kg-day	--	2.87E-06	mg/kg-day	1.30E-04	mg/kg-day	2.21E-02
				Zinc	1.38E+03	mg/kg	3.18E-05	mg/kg-day	--	mg/kg-day	--	8.91E-05	mg/kg-day	3.00E-01	mg/kg-day	2.97E-04
				4,4'-DDD	4.63E+03	ug/kg	3.20E-07	mg/kg-day	2.40E-01	mg/kg-day	7.69E-08	8.97E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	4.17E-08	mg/kg-day	3.40E-01	mg/kg-day	1.42E-08	1.17E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.20E-06	mg/kg-day	3.40E-01	mg/kg-day	4.07E-07	3.35E-06	mg/kg-day	5.00E-04	mg/kg-day	6.70E-03
				Aroclor-1248	5.60E+02	ug/kg	1.81E-07	mg/kg-day	2.00E+00	mg/kg-day	3.62E-07	5.06E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	4.33E-08	mg/kg-day	2.00E+00	mg/kg-day	8.65E-08	1.21E-07	mg/kg-day	2.00E-05	mg/kg-day	6.06E-03
				Aroclor-1260	4.51E+01	ug/kg	1.46E-08	mg/kg-day	2.00E+00	mg/kg-day	2.91E-08	4.08E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	1.62E-07	mg/kg-day	1.60E+01	mg/kg-day	2.59E-06	4.53E-07	mg/kg-day	5.00E-05	mg/kg-day	9.05E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	2.95E-09	mg/kg-day	9.10E+00	mg/kg-day	2.69E-08	8.27E-09	mg/kg-day	1.30E-05	mg/kg-day	6.36E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.18E-06	mg/kg-day	7.30E-01	mg/kg-day	8.58E-07	3.29E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	8.67E-07	mg/kg-day	7.30E+00	mg/kg-day	6.33E-06	2.43E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	9.62E-07	mg/kg-day	7.30E-01	mg/kg-day	7.03E-07	2.69E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	6.42E-07	mg/kg-day	7.30E-02	mg/kg-day	4.68E-08	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.07E-06	mg/kg-day	7.30E-03	mg/kg-day	7.84E-09	3.01E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	8.40E-08	mg/kg-day	7.30E+00	mg/kg-day	6.13E-07	2.35E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.90E-07	mg/kg-day	7.30E-01	mg/kg-day	2.85E-07	1.09E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	2.33E-07	mg/kg-day	--	mg/kg-day	--	6.51E-07	mg/kg-day	2.00E-02	mg/kg-day	3.26E-05
				Phenanthrene	1.25E+04	ug/kg	3.75E-06	mg/kg-day	--	mg/kg-day	--	1.05E-05	mg/kg-day	3.00E-02	mg/kg-day	3.50E-04
				Ethylbenzene	6.55E+02	ug/kg	4.53E-08	mg/kg-day	1.10E-02	mg/kg-day	4.99E-10	1.27E-07	mg/kg-day	1.00E-01	mg/kg-day	1.27E-06
			Exp. Route Total								3.28E-05					2.72E-01
		Exposure Point Total									6.80E-05					8.98E-01
	Exposure Medium Total										6.80E-05					8.98E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	1.34E-05	mg/m3	3.40E-02	1/(mg/m3)	4.55E-07	3.75E-05	mg/m3	3.00E-03	mg/m3	1.25E-02
				Ethylbenzene	7.00E+03	ug/kg	4.72E-04	mg/m3	2.50E-03	1/(mg/m3)	1.18E-06	1.32E-03	mg/m3	1.00E+00	mg/m3	1.32E-03
			Exp. Route Total								1.63E-06					1.38E-02
		Exposure Point Total									1.63E-06					1.38E-02
	Exposure Medium Total										1.63E-06					1.38E-02
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	9.93E-10	mg/m3	1.20E+01	1/(mg/m3)	1.19E-08	2.78E-09	mg/m3	1.00E-04	mg/m3	2.78E-05
				Manganese	1.32E+03	mg/kg	3.33E-08	mg/m3	--	1/(mg/m3)	--	9.31E-08	mg/m3	5.00E-05	mg/m3	1.86E-03
			Exp. Route Total								1.19E-08					1.89E-03
		Exposure Point Total									1.19E-08					1.89E-03
	Exposure Medium Total										1.19E-08					1.89E-03
Medium Total											6.97E-05					9.14E-01
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											6.97E-05					9.14E-01

TABLE 7.31.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	5.83E-12	mg/kg-day	1.30E+05	mg/kg-day	7.58E-07	4.08E-10	mg/kg-day	1.00E-09	mg/kg-day	4.08E-01
				Aluminum	1.98E+04	mg/kg	4.75E-04	mg/kg-day	--	mg/kg-day	--	3.32E-02	mg/kg-day	1.00E+00	mg/kg-day	3.32E-02
				Antimony	2.50E+01	mg/kg	6.00E-07	mg/kg-day	--	mg/kg-day	--	4.20E-05	mg/kg-day	4.00E-04	mg/kg-day	1.05E-01
				Arsenic	6.21E+00	mg/kg	1.49E-07	mg/kg-day	1.50E+00	mg/kg-day	2.23E-07	1.04E-05	mg/kg-day	3.00E-04	mg/kg-day	3.48E-02
				Cadmium	4.71E+01	mg/kg	1.13E-06	mg/kg-day	--	mg/kg-day	--	7.91E-05	mg/kg-day	1.00E-03	mg/kg-day	7.91E-02
				Chromium	3.94E+01	mg/kg	9.45E-07	mg/kg-day	5.00E-01	mg/kg-day	4.73E-07	6.62E-05	mg/kg-day	3.00E-03	mg/kg-day	2.21E-02
				Cobalt	1.23E+01	mg/kg	2.95E-07	mg/kg-day	--	mg/kg-day	--	2.07E-05	mg/kg-day	3.00E-04	mg/kg-day	6.88E-02
				Copper	9.67E+02	mg/kg	2.32E-05	mg/kg-day	--	mg/kg-day	--	1.62E-03	mg/kg-day	4.00E-02	mg/kg-day	4.06E-02
				Iron	3.36E+04	mg/kg	8.06E-04	mg/kg-day	--	mg/kg-day	--	5.64E-02	mg/kg-day	7.00E-01	mg/kg-day	8.06E-02
				Lead	3.22E+02	mg/kg	7.72E-06	mg/kg-day	--	mg/kg-day	--	5.41E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	3.17E-05	mg/kg-day	--	mg/kg-day	--	2.22E-03	mg/kg-day	2.40E-02	mg/kg-day	9.23E-02
				Mercury	1.15E+00	mg/kg	2.76E-08	mg/kg-day	--	mg/kg-day	--	1.93E-06	mg/kg-day	1.00E-04	mg/kg-day	1.93E-02
				Nickel	3.74E+01	mg/kg	8.97E-07	mg/kg-day	--	mg/kg-day	--	6.28E-05	mg/kg-day	2.00E-02	mg/kg-day	3.14E-03
				Silver	1.60E+01	mg/kg	3.84E-07	mg/kg-day	--	mg/kg-day	--	2.69E-05	mg/kg-day	5.00E-03	mg/kg-day	5.37E-03
				Vanadium	4.45E+01	mg/kg	1.07E-06	mg/kg-day	--	mg/kg-day	--	7.47E-05	mg/kg-day	5.00E-03	mg/kg-day	1.49E-02
				Zinc	1.38E+03	mg/kg	3.31E-05	mg/kg-day	--	mg/kg-day	--	2.32E-03	mg/kg-day	3.00E-01	mg/kg-day	7.72E-03
				4,4'-DDD	4.63E+03	ug/kg	1.11E-07	mg/kg-day	2.40E-01	mg/kg-day	2.67E-08	7.77E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.45E-08	mg/kg-day	3.40E-01	mg/kg-day	4.92E-09	1.01E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	4.15E-07	mg/kg-day	3.40E-01	mg/kg-day	1.41E-07	2.90E-05	mg/kg-day	5.00E-04	mg/kg-day	5.81E-02
				Aroclor-1248	5.60E+02	ug/kg	1.34E-08	mg/kg-day	2.00E+00	mg/kg-day	2.69E-08	9.40E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	3.21E-09	mg/kg-day	2.00E+00	mg/kg-day	6.43E-09	2.25E-07	mg/kg-day	2.00E-05	mg/kg-day	1.12E-02
				Aroclor-1260	4.51E+01	ug/kg	1.08E-09	mg/kg-day	2.00E+00	mg/kg-day	2.16E-09	7.57E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	1.68E-08	mg/kg-day	1.60E+01	mg/kg-day	2.69E-07	1.18E-06	mg/kg-day	5.00E-05	mg/kg-day	2.35E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	3.07E-10	mg/kg-day	9.10E+00	mg/kg-day	2.79E-09	2.15E-08	mg/kg-day	1.30E-05	mg/kg-day	1.65E-03
				Benz(a)anthracene	3.92E+03	ug/kg	9.40E-08	mg/kg-day	7.30E-01	mg/kg-day	6.86E-08	6.58E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	6.93E-08	mg/kg-day	7.30E+00	mg/kg-day	5.06E-07	4.85E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	7.70E-08	mg/kg-day	7.30E-01	mg/kg-day	5.62E-08	5.39E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	5.13E-08	mg/kg-day	7.30E-02	mg/kg-day	3.75E-09	3.59E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	8.59E-08	mg/kg-day	7.30E-03	mg/kg-day	6.27E-10	6.01E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	6.72E-09	mg/kg-day	7.30E+00	mg/kg-day	4.90E-08	4.70E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.12E-08	mg/kg-day	7.30E-01	mg/kg-day	2.28E-08	2.18E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.86E-08	mg/kg-day	--	mg/kg-day	--	1.30E-06	mg/kg-day	2.00E-02	mg/kg-day	6.51E-05
				Phenanthrene	1.25E+04	ug/kg	3.00E-07	mg/kg-day	--	mg/kg-day	--	2.10E-05	mg/kg-day	3.00E-02	mg/kg-day	7.00E-04
				Ethylbenzene	6.55E+02	ug/kg	1.57E-08	mg/kg-day	1.10E-02	mg/kg-day	1.73E-10	1.10E-06	mg/kg-day	1.00E-01	mg/kg-day	1.10E-05
			Exp. Route Total								2.64E-06					1.11E+00

TABLE 7.31.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.50E-13	mg/kg-day	1.30E+05	mg/kg-day	4.55E-08	2.45E-11	mg/kg-day	1.00E-09	mg/kg-day	2.45E-02
				Aluminum	1.98E+04	mg/kg	9.50E-06	mg/kg-day	--	mg/kg-day	--	6.65E-04	mg/kg-day	1.00E+00	mg/kg-day	6.65E-04
				Antimony	2.50E+01	mg/kg	1.20E-08	mg/kg-day	--	mg/kg-day	--	8.40E-07	mg/kg-day	6.00E-05	mg/kg-day	1.40E-02
				Arsenic	6.21E+00	mg/kg	8.94E-09	mg/kg-day	1.50E+00	mg/kg-day	1.34E-08	6.26E-07	mg/kg-day	3.00E-04	mg/kg-day	2.09E-03
				Cadmium	4.71E+01	mg/kg	2.26E-09	mg/kg-day	--	mg/kg-day	--	1.58E-07	mg/kg-day	2.50E-05	mg/kg-day	6.33E-03
				Chromium	3.94E+01	mg/kg	1.89E-08	mg/kg-day	2.00E+01	mg/kg-day	3.78E-07	1.32E-06	mg/kg-day	7.50E-05	mg/kg-day	1.76E-02
				Cobalt	1.23E+01	mg/kg	5.90E-09	mg/kg-day	--	mg/kg-day	--	4.13E-07	mg/kg-day	3.00E-04	mg/kg-day	1.38E-03
				Copper	9.67E+02	mg/kg	4.64E-07	mg/kg-day	--	mg/kg-day	--	3.25E-05	mg/kg-day	4.00E-02	mg/kg-day	8.12E-04
				Iron	3.36E+04	mg/kg	1.61E-05	mg/kg-day	--	mg/kg-day	--	1.13E-03	mg/kg-day	7.00E-01	mg/kg-day	1.61E-03
				Lead	3.22E+02	mg/kg	1.54E-07	mg/kg-day	--	mg/kg-day	--	1.08E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	6.33E-07	mg/kg-day	--	mg/kg-day	--	4.43E-05	mg/kg-day	9.60E-04	mg/kg-day	4.62E-02
				Mercury	1.15E+00	mg/kg	5.52E-10	mg/kg-day	--	mg/kg-day	--	3.86E-08	mg/kg-day	1.00E-04	mg/kg-day	3.86E-04
				Nickel	3.74E+01	mg/kg	1.79E-08	mg/kg-day	--	mg/kg-day	--	1.26E-06	mg/kg-day	8.00E-04	mg/kg-day	1.57E-03
				Silver	1.60E+01	mg/kg	7.68E-09	mg/kg-day	--	mg/kg-day	--	5.37E-07	mg/kg-day	2.00E-04	mg/kg-day	2.69E-03
				Vanadium	4.45E+01	mg/kg	2.13E-08	mg/kg-day	--	mg/kg-day	--	1.49E-06	mg/kg-day	1.30E-04	mg/kg-day	1.15E-02
				Zinc	1.38E+03	mg/kg	6.62E-07	mg/kg-day	--	mg/kg-day	--	4.63E-05	mg/kg-day	3.00E-01	mg/kg-day	1.54E-04
				4,4'-DDD	4.63E+03	ug/kg	6.66E-09	mg/kg-day	2.40E-01	mg/kg-day	1.60E-09	4.66E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	8.68E-10	mg/kg-day	3.40E-01	mg/kg-day	2.95E-10	6.07E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.49E-08	mg/kg-day	3.40E-01	mg/kg-day	8.47E-09	1.74E-06	mg/kg-day	5.00E-04	mg/kg-day	3.49E-03
				Aroclor-1248	5.60E+02	ug/kg	3.76E-09	mg/kg-day	2.00E+00	mg/kg-day	7.52E-09	2.63E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	9.00E-10	mg/kg-day	2.00E+00	mg/kg-day	1.80E-09	6.30E-08	mg/kg-day	2.00E-05	mg/kg-day	3.15E-03
				Aroclor-1260	4.51E+01	ug/kg	3.03E-10	mg/kg-day	2.00E+00	mg/kg-day	6.06E-10	2.12E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.36E-09	mg/kg-day	1.60E+01	mg/kg-day	5.38E-08	2.35E-07	mg/kg-day	5.00E-05	mg/kg-day	4.71E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	6.14E-11	mg/kg-day	9.10E+00	mg/kg-day	5.59E-10	4.30E-09	mg/kg-day	1.30E-05	mg/kg-day	3.31E-04
				Benz(a)anthracene	3.92E+03	ug/kg	2.44E-08	mg/kg-day	7.30E-01	mg/kg-day	1.78E-08	1.71E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.80E-08	mg/kg-day	7.30E+00	mg/kg-day	1.32E-07	1.26E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	2.00E-08	mg/kg-day	7.30E-01	mg/kg-day	1.46E-08	1.40E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.33E-08	mg/kg-day	7.30E-02	mg/kg-day	9.74E-10	9.34E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	2.23E-08	mg/kg-day	7.30E-03	mg/kg-day	1.63E-10	1.56E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.75E-09	mg/kg-day	7.30E+00	mg/kg-day	1.27E-08	1.22E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	8.11E-09	mg/kg-day	7.30E-01	mg/kg-day	5.92E-09	5.68E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	4.84E-09	mg/kg-day	--	mg/kg-day	--	3.39E-07	mg/kg-day	2.00E-02	mg/kg-day	1.69E-05
				Phenanthrene	1.25E+04	ug/kg	7.80E-08	mg/kg-day	--	mg/kg-day	--	5.46E-06	mg/kg-day	3.00E-02	mg/kg-day	1.82E-04
				Ethylbenzene	6.55E+02	ug/kg	9.43E-10	mg/kg-day	1.10E-02	mg/kg-day	1.04E-11	6.60E-08	mg/kg-day	1.00E-01	mg/kg-day	6.60E-07
			Exp. Route Total								6.95E-07					1.43E-01
		Exposure Point Total									3.34E-06					1.25E+00
	Exposure Medium Total										3.34E-06					1.25E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.78E-07	mg/m3	3.40E-02	1/(mg/m3)	9.46E-09	1.95E-05	mg/m3	3.00E-03	mg/m3	6.49E-03
				Ethylbenzene	7.00E+03	ug/kg	9.81E-06	mg/m3	2.50E-03	1/(mg/m3)	2.45E-08	6.87E-04	mg/m3	1.00E+00	mg/m3	6.87E-04
			Exp. Route Total								3.40E-08					7.18E-03
		Exposure Point Total									3.40E-08					7.18E-03
	Exposure Medium Total										3.40E-08					7.18E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	2.06E-11	mg/m3	1.20E+01	1/(mg/m3)	2.48E-10	1.45E-09	mg/m3	1.00E-04	mg/m3	1.45E-05
				Manganese	1.32E+03	mg/kg	6.92E-10	mg/m3	--	1/(mg/m3)	--	4.84E-08	mg/m3	5.00E-05	mg/m3	9.69E-04
			Exp. Route Total								2.48E-10					9.83E-04
		Exposure Point Total									2.48E-10					9.83E-04
	Exposure Medium Total										2.48E-10					9.83E-04
Medium Total											3.37E-06					1.26E+00
										Total of Receptor Risks Across All Media	3.37E-06			Total of Receptor Hazards Across All Media		1.26E+00

TABLE 7.31a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	5.83E-12	mg/kg-day	1.30E+05	mg/kg-day	7.58E-07	4.08E-10	mg/kg-day	1.00E-09	mg/kg-day	4.08E-01
				Aluminum	1.98E+04	mg/kg	4.75E-04	mg/kg-day	--	mg/kg-day	--	3.32E-02	mg/kg-day	1.00E+00	mg/kg-day	3.32E-02
				Antimony	2.50E+01	mg/kg	6.00E-07	mg/kg-day	--	mg/kg-day	--	4.20E-05	mg/kg-day	4.00E-04	mg/kg-day	1.05E-01
				Cadmium	4.71E+01	mg/kg	1.13E-06	mg/kg-day	--	mg/kg-day	--	7.91E-05	mg/kg-day	1.00E-03	mg/kg-day	7.91E-02
				Chromium	3.94E+01	mg/kg	9.45E-07	mg/kg-day	5.00E-01	mg/kg-day	4.73E-07	6.62E-05	mg/kg-day	3.00E-03	mg/kg-day	2.21E-02
				Cobalt	1.23E+01	mg/kg	2.95E-07	mg/kg-day	--	mg/kg-day	--	2.07E-05	mg/kg-day	3.00E-04	mg/kg-day	6.88E-02
				Copper	9.67E+02	mg/kg	2.32E-05	mg/kg-day	--	mg/kg-day	--	1.62E-03	mg/kg-day	4.00E-02	mg/kg-day	4.06E-02
				Iron	3.36E+04	mg/kg	8.06E-04	mg/kg-day	--	mg/kg-day	--	5.64E-02	mg/kg-day	7.00E-01	mg/kg-day	8.06E-02
				Lead	3.22E+02	mg/kg	7.72E-06	mg/kg-day	--	mg/kg-day	--	5.41E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	3.17E-05	mg/kg-day	--	mg/kg-day	--	2.22E-03	mg/kg-day	2.40E-02	mg/kg-day	9.23E-02
				Mercury	1.15E+00	mg/kg	2.76E-08	mg/kg-day	--	mg/kg-day	--	1.93E-06	mg/kg-day	1.00E-04	mg/kg-day	1.93E-02
				Nickel	3.74E+01	mg/kg	8.97E-07	mg/kg-day	--	mg/kg-day	--	6.28E-05	mg/kg-day	2.00E-02	mg/kg-day	3.14E-03
				Silver	1.60E+01	mg/kg	3.84E-07	mg/kg-day	--	mg/kg-day	--	2.69E-05	mg/kg-day	5.00E-03	mg/kg-day	5.37E-03
				Vanadium	4.45E+01	mg/kg	1.07E-06	mg/kg-day	--	mg/kg-day	--	7.47E-05	mg/kg-day	5.00E-03	mg/kg-day	1.49E-02
				Zinc	1.38E+03	mg/kg	3.31E-05	mg/kg-day	--	mg/kg-day	--	2.32E-03	mg/kg-day	3.00E-01	mg/kg-day	7.72E-03
				4,4'-DDD	4.63E+03	ug/kg	1.11E-07	mg/kg-day	2.40E-01	mg/kg-day	2.67E-08	7.77E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.45E-08	mg/kg-day	3.40E-01	mg/kg-day	4.92E-09	1.01E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	4.15E-07	mg/kg-day	3.40E-01	mg/kg-day	1.41E-07	2.90E-05	mg/kg-day	5.00E-04	mg/kg-day	5.81E-02
				Aroclor-1248	5.60E+02	ug/kg	1.34E-08	mg/kg-day	2.00E+00	mg/kg-day	2.69E-08	9.40E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	3.21E-09	mg/kg-day	2.00E+00	mg/kg-day	6.43E-09	2.25E-07	mg/kg-day	2.00E-05	mg/kg-day	1.12E-02
				Aroclor-1260	4.51E+01	ug/kg	1.08E-09	mg/kg-day	2.00E+00	mg/kg-day	2.16E-09	7.57E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	1.68E-08	mg/kg-day	1.60E+01	mg/kg-day	2.69E-07	1.18E-06	mg/kg-day	5.00E-05	mg/kg-day	2.35E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	3.07E-10	mg/kg-day	9.10E+00	mg/kg-day	2.79E-09	2.15E-08	mg/kg-day	1.30E-05	mg/kg-day	1.65E-03
				Benz(a)anthracene	3.92E+03	ug/kg	9.40E-08	mg/kg-day	7.30E-01	mg/kg-day	6.86E-08	6.58E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	6.93E-08	mg/kg-day	7.30E+00	mg/kg-day	5.06E-07	4.85E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	7.70E-08	mg/kg-day	7.30E-01	mg/kg-day	5.62E-08	5.39E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	5.13E-08	mg/kg-day	7.30E-02	mg/kg-day	3.75E-09	3.59E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	8.59E-08	mg/kg-day	7.30E-03	mg/kg-day	6.27E-10	6.01E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	6.72E-09	mg/kg-day	7.30E+00	mg/kg-day	4.90E-08	4.70E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.12E-08	mg/kg-day	7.30E-01	mg/kg-day	2.28E-08	2.18E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.86E-08	mg/kg-day	--	mg/kg-day	--	1.30E-06	mg/kg-day	2.00E-02	mg/kg-day	6.51E-05
				Phenanthrene	1.25E+04	ug/kg	3.00E-07	mg/kg-day	--	mg/kg-day	--	2.10E-05	mg/kg-day	3.00E-02	mg/kg-day	7.00E-04
				Ethylbenzene	6.55E+02	ug/kg	1.57E-08	mg/kg-day	1.10E-02	mg/kg-day	1.73E-10	1.10E-06	mg/kg-day	1.00E-01	mg/kg-day	1.10E-05
			Exp. Route Total								2.42E-06					1.08E+00

TABLE 7.31a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.50E-13	mg/kg-day	1.30E+05	mg/kg-day	4.55E-08	2.45E-11	mg/kg-day	1.00E-09	mg/kg-day	2.45E-02
				Aluminum	1.98E+04	mg/kg	9.50E-06	mg/kg-day	--	mg/kg-day	--	6.65E-04	mg/kg-day	1.00E+00	mg/kg-day	6.65E-04
				Antimony	2.50E+01	mg/kg	1.20E-08	mg/kg-day	--	mg/kg-day	--	8.40E-07	mg/kg-day	6.00E-05	mg/kg-day	1.40E-02
				Cadmium	4.71E+01	mg/kg	2.26E-09	mg/kg-day	--	mg/kg-day	--	1.58E-07	mg/kg-day	2.50E-05	mg/kg-day	6.33E-03
				Chromium	3.94E+01	mg/kg	1.89E-08	mg/kg-day	2.00E+01	mg/kg-day	3.78E-07	1.32E-06	mg/kg-day	7.50E-05	mg/kg-day	1.76E-02
				Cobalt	1.23E+01	mg/kg	5.90E-09	mg/kg-day	--	mg/kg-day	--	4.13E-07	mg/kg-day	3.00E-04	mg/kg-day	1.38E-03
				Copper	9.67E+02	mg/kg	4.64E-07	mg/kg-day	--	mg/kg-day	--	3.25E-05	mg/kg-day	4.00E-02	mg/kg-day	8.12E-04
				Iron	3.36E+04	mg/kg	1.61E-05	mg/kg-day	--	mg/kg-day	--	1.13E-03	mg/kg-day	7.00E-01	mg/kg-day	1.61E-03
				Lead	3.22E+02	mg/kg	1.54E-07	mg/kg-day	--	mg/kg-day	--	1.08E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	6.33E-07	mg/kg-day	--	mg/kg-day	--	4.43E-05	mg/kg-day	9.60E-04	mg/kg-day	4.62E-02
				Mercury	1.15E+00	mg/kg	5.52E-10	mg/kg-day	--	mg/kg-day	--	3.86E-08	mg/kg-day	1.00E-04	mg/kg-day	3.86E-04
				Nickel	3.74E+01	mg/kg	1.79E-08	mg/kg-day	--	mg/kg-day	--	1.26E-06	mg/kg-day	8.00E-04	mg/kg-day	1.57E-03
				Silver	1.60E+01	mg/kg	7.68E-09	mg/kg-day	--	mg/kg-day	--	5.37E-07	mg/kg-day	2.00E-04	mg/kg-day	2.69E-03
				Vanadium	4.45E+01	mg/kg	2.13E-08	mg/kg-day	--	mg/kg-day	--	1.49E-06	mg/kg-day	1.30E-04	mg/kg-day	1.15E-02
				Zinc	1.38E+03	mg/kg	6.62E-07	mg/kg-day	--	mg/kg-day	--	4.63E-05	mg/kg-day	3.00E-01	mg/kg-day	1.54E-04
				4,4'-DDD	4.63E+03	ug/kg	6.66E-09	mg/kg-day	2.40E-01	mg/kg-day	1.60E-09	4.66E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	8.68E-10	mg/kg-day	3.40E-01	mg/kg-day	2.95E-10	6.07E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.49E-08	mg/kg-day	3.40E-01	mg/kg-day	8.47E-09	1.74E-06	mg/kg-day	5.00E-04	mg/kg-day	3.49E-03
				Aroclor-1248	5.60E+02	ug/kg	3.76E-09	mg/kg-day	2.00E+00	mg/kg-day	7.52E-09	2.63E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	9.00E-10	mg/kg-day	2.00E+00	mg/kg-day	1.80E-09	6.30E-08	mg/kg-day	2.00E-05	mg/kg-day	3.15E-03
				Aroclor-1260	4.51E+01	ug/kg	3.03E-10	mg/kg-day	2.00E+00	mg/kg-day	6.06E-10	2.12E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.36E-09	mg/kg-day	1.60E+01	mg/kg-day	5.38E-08	2.35E-07	mg/kg-day	5.00E-05	mg/kg-day	4.71E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	6.14E-11	mg/kg-day	9.10E+00	mg/kg-day	5.59E-10	4.30E-09	mg/kg-day	1.30E-05	mg/kg-day	3.31E-04
				Benz(a)anthracene	3.92E+03	ug/kg	2.44E-08	mg/kg-day	7.30E-01	mg/kg-day	1.78E-08	1.71E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.80E-08	mg/kg-day	7.30E+00	mg/kg-day	1.32E-07	1.26E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	2.00E-08	mg/kg-day	7.30E-01	mg/kg-day	1.46E-08	1.40E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.33E-08	mg/kg-day	7.30E-02	mg/kg-day	9.74E-10	9.34E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	2.23E-08	mg/kg-day	7.30E-03	mg/kg-day	1.63E-10	1.56E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.75E-09	mg/kg-day	7.30E+00	mg/kg-day	1.27E-08	1.22E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	8.11E-09	mg/kg-day	7.30E-01	mg/kg-day	5.92E-09	5.68E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	4.84E-09	mg/kg-day	--	mg/kg-day	--	3.39E-07	mg/kg-day	2.00E-02	mg/kg-day	1.69E-05
				Phenanthrene	1.25E+04	ug/kg	7.80E-08	mg/kg-day	--	mg/kg-day	--	5.46E-06	mg/kg-day	3.00E-02	mg/kg-day	1.82E-04
				Ethylbenzene	6.55E+02	ug/kg	9.43E-10	mg/kg-day	1.10E-02	mg/kg-day	1.04E-11	6.60E-08	mg/kg-day	1.00E-01	mg/kg-day	6.60E-07
			Exp. Route Total								6.82E-07					1.41E-01
		Exposure Point Total									3.10E-06					1.22E+00
	Exposure Medium Total										3.10E-06					1.22E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.78E-07	mg/m3	3.40E-02	1/(mg/m3)	9.46E-09	1.95E-05	mg/m3	3.00E-03	mg/m3	6.49E-03
				Ethylbenzene	7.00E+03	ug/kg	9.81E-06	mg/m3	2.50E-03	1/(mg/m3)	2.45E-08	6.87E-04	mg/m3	1.00E+00	mg/m3	6.87E-04
			Exp. Route Total								3.40E-08					7.18E-03
		Exposure Point Total									3.40E-08					7.18E-03
	Exposure Medium Total										3.40E-08					7.18E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	2.06E-11	mg/m3	1.20E+01	1/(mg/m3)	2.48E-10	1.45E-09	mg/m3	1.00E-04	mg/m3	1.45E-05
				Manganese	1.32E+03	mg/kg	6.92E-10	mg/m3	--	1/(mg/m3)	--	4.84E-08	mg/m3	5.00E-05	mg/m3	9.69E-04
			Exp. Route Total								2.48E-10					9.83E-04
		Exposure Point Total									2.48E-10					9.83E-04
	Exposure Medium Total										2.48E-10					9.83E-04
Medium Total											3.13E-06					1.22E+00
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											3.13E-06					1.22E+00

TABLE 7.32.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	7.91E-11	mg/kg-day	1.30E+05	mg/kg-day	1.03E-05	9.23E-10	mg/kg-day	1.00E-09	mg/kg-day	9.23E-01
				Aluminum	1.98E+04	mg/kg	6.45E-03	mg/kg-day	--	mg/kg-day	--	7.52E-02	mg/kg-day	1.00E+00	mg/kg-day	7.52E-02
				Antimony	2.50E+01	mg/kg	8.14E-06	mg/kg-day	--	mg/kg-day	--	9.50E-05	mg/kg-day	4.00E-04	mg/kg-day	2.37E-01
				Arsenic	6.21E+00	mg/kg	2.02E-06	mg/kg-day	1.50E+00	mg/kg-day	3.03E-06	2.36E-05	mg/kg-day	3.00E-04	mg/kg-day	7.86E-02
				Cadmium	4.71E+01	mg/kg	1.53E-05	mg/kg-day	--	mg/kg-day	--	1.79E-04	mg/kg-day	1.00E-03	mg/kg-day	1.79E-01
				Chromium	3.94E+01	mg/kg	1.28E-05	mg/kg-day	5.00E-01	mg/kg-day	3.42E-05	1.50E-04	mg/kg-day	3.00E-03	mg/kg-day	4.99E-02
				Cobalt	1.23E+01	mg/kg	4.01E-06	mg/kg-day	--	mg/kg-day	--	4.67E-05	mg/kg-day	3.00E-04	mg/kg-day	1.56E-01
				Copper	9.67E+02	mg/kg	3.15E-04	mg/kg-day	--	mg/kg-day	--	3.67E-03	mg/kg-day	4.00E-02	mg/kg-day	9.18E-02
				Iron	3.36E+04	mg/kg	1.09E-02	mg/kg-day	--	mg/kg-day	--	1.28E-01	mg/kg-day	7.00E-01	mg/kg-day	1.82E-01
				Lead	3.22E+02	mg/kg	1.05E-04	mg/kg-day	--	mg/kg-day	--	1.22E-03	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	4.30E-04	mg/kg-day	--	mg/kg-day	--	5.01E-03	mg/kg-day	2.40E-02	mg/kg-day	2.09E-01
				Mercury	1.15E+00	mg/kg	3.74E-07	mg/kg-day	--	mg/kg-day	--	4.37E-06	mg/kg-day	1.00E-04	mg/kg-day	4.37E-02
				Nickel	3.74E+01	mg/kg	1.22E-05	mg/kg-day	--	mg/kg-day	--	1.42E-04	mg/kg-day	2.00E-02	mg/kg-day	7.10E-03
				Silver	1.60E+01	mg/kg	5.21E-06	mg/kg-day	--	mg/kg-day	--	6.08E-05	mg/kg-day	5.00E-03	mg/kg-day	1.22E-02
				Vanadium	4.45E+01	mg/kg	1.45E-05	mg/kg-day	--	mg/kg-day	--	1.69E-04	mg/kg-day	5.00E-03	mg/kg-day	3.38E-02
				Zinc	1.38E+03	mg/kg	4.49E-04	mg/kg-day	--	mg/kg-day	--	5.24E-03	mg/kg-day	3.00E-01	mg/kg-day	1.75E-02
				4,4'-DDD	4.63E+03	ug/kg	1.51E-06	mg/kg-day	2.40E-01	mg/kg-day	3.62E-07	1.76E-05	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.96E-07	mg/kg-day	3.40E-01	mg/kg-day	6.68E-08	2.29E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	5.63E-06	mg/kg-day	3.40E-01	mg/kg-day	1.92E-06	6.57E-05	mg/kg-day	5.00E-04	mg/kg-day	1.31E-01
				Aroclor-1248	5.60E+02	ug/kg	1.82E-07	mg/kg-day	2.00E+00	mg/kg-day	3.65E-07	2.13E-06	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	4.36E-08	mg/kg-day	2.00E+00	mg/kg-day	8.73E-08	5.09E-07	mg/kg-day	2.00E-05	mg/kg-day	2.55E-02
				Aroclor-1260	4.51E+01	ug/kg	1.47E-08	mg/kg-day	2.00E+00	mg/kg-day	2.94E-08	1.71E-07	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	2.28E-07	mg/kg-day	1.60E+01	mg/kg-day	3.65E-06	2.66E-06	mg/kg-day	5.00E-05	mg/kg-day	5.33E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	4.17E-09	mg/kg-day	9.10E+00	mg/kg-day	3.79E-08	4.86E-08	mg/kg-day	1.30E-05	mg/kg-day	3.74E-03
				Benz(a)anthracene	3.92E+03	ug/kg	1.28E-06	mg/kg-day	7.30E-01	mg/kg-day	4.97E-06	1.49E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	9.41E-07	mg/kg-day	7.30E+00	mg/kg-day	3.66E-05	1.10E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.05E-06	mg/kg-day	7.30E-01	mg/kg-day	4.07E-06	1.22E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	6.97E-07	mg/kg-day	7.30E-02	mg/kg-day	2.71E-07	8.13E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.17E-06	mg/kg-day	7.30E-03	mg/kg-day	4.54E-08	1.36E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	9.12E-08	mg/kg-day	7.30E+00	mg/kg-day	3.55E-06	1.06E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	4.23E-07	mg/kg-day	7.30E-01	mg/kg-day	1.65E-06	4.94E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	2.53E-07	mg/kg-day	--	mg/kg-day	--	2.95E-06	mg/kg-day	2.00E-02	mg/kg-day	1.47E-04
				Phenanthrene	1.25E+04	ug/kg	4.07E-06	mg/kg-day	--	mg/kg-day	--	4.75E-05	mg/kg-day	3.00E-02	mg/kg-day	1.58E-03
				Ethylbenzene	6.55E+02	ug/kg	2.13E-07	mg/kg-day	1.10E-02	mg/kg-day	2.35E-09	2.49E-06	mg/kg-day	1.00E-01	mg/kg-day	2.49E-05
			Exp. Route Total								1.05E-04					2.51E+00

TABLE 7.32.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	6.65E-12	mg/kg-day	1.30E+05	mg/kg-day	8.64E-07	7.75E-11	mg/kg-day	1.00E-09	mg/kg-day	7.75E-02
				Aluminum	1.98E+04	mg/kg	1.81E-04	mg/kg-day	--	mg/kg-day	--	2.11E-03	mg/kg-day	1.00E+00	mg/kg-day	2.11E-03
				Antimony	2.50E+01	mg/kg	2.28E-07	mg/kg-day	--	mg/kg-day	--	2.66E-06	mg/kg-day	6.00E-05	mg/kg-day	4.43E-02
				Arsenic	6.21E+00	mg/kg	1.70E-07	mg/kg-day	1.50E+00	mg/kg-day	2.55E-07	1.98E-06	mg/kg-day	3.00E-04	mg/kg-day	6.61E-03
				Cadmium	4.71E+01	mg/kg	4.29E-08	mg/kg-day	--	mg/kg-day	--	5.01E-07	mg/kg-day	2.50E-05	mg/kg-day	2.00E-02
				Chromium	3.94E+01	mg/kg	3.59E-07	mg/kg-day	2.00E+01	mg/kg-day	3.83E-05	4.19E-06	mg/kg-day	7.50E-05	mg/kg-day	5.59E-02
				Cobalt	1.23E+01	mg/kg	1.12E-07	mg/kg-day	--	mg/kg-day	--	1.31E-06	mg/kg-day	3.00E-04	mg/kg-day	4.36E-03
				Copper	9.67E+02	mg/kg	8.82E-06	mg/kg-day	--	mg/kg-day	--	1.03E-04	mg/kg-day	4.00E-02	mg/kg-day	2.57E-03
				Iron	3.36E+04	mg/kg	3.06E-04	mg/kg-day	--	mg/kg-day	--	3.57E-03	mg/kg-day	7.00E-01	mg/kg-day	5.11E-03
				Lead	3.22E+02	mg/kg	2.94E-06	mg/kg-day	--	mg/kg-day	--	3.43E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.20E-05	mg/kg-day	--	mg/kg-day	--	1.40E-04	mg/kg-day	9.60E-04	mg/kg-day	1.46E-01
				Mercury	1.15E+00	mg/kg	1.05E-08	mg/kg-day	--	mg/kg-day	--	1.22E-07	mg/kg-day	1.00E-04	mg/kg-day	1.22E-03
				Nickel	3.74E+01	mg/kg	3.41E-07	mg/kg-day	--	mg/kg-day	--	3.98E-06	mg/kg-day	8.00E-04	mg/kg-day	4.97E-03
				Silver	1.60E+01	mg/kg	1.46E-07	mg/kg-day	--	mg/kg-day	--	1.70E-06	mg/kg-day	2.00E-04	mg/kg-day	8.51E-03
				Vanadium	4.45E+01	mg/kg	4.06E-07	mg/kg-day	--	mg/kg-day	--	4.73E-06	mg/kg-day	1.30E-04	mg/kg-day	3.64E-02
				Zinc	1.38E+03	mg/kg	1.26E-05	mg/kg-day	--	mg/kg-day	--	1.47E-04	mg/kg-day	3.00E-01	mg/kg-day	4.89E-04
				4,4'-DDD	4.63E+03	ug/kg	1.27E-07	mg/kg-day	2.40E-01	mg/kg-day	3.04E-08	1.48E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.65E-08	mg/kg-day	3.40E-01	mg/kg-day	5.61E-09	1.92E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	4.73E-07	mg/kg-day	3.40E-01	mg/kg-day	1.61E-07	5.52E-06	mg/kg-day	5.00E-04	mg/kg-day	1.10E-02
				Aroclor-1248	5.60E+02	ug/kg	7.15E-08	mg/kg-day	2.00E+00	mg/kg-day	1.43E-07	8.34E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.71E-08	mg/kg-day	2.00E+00	mg/kg-day	3.42E-08	2.00E-07	mg/kg-day	2.00E-05	mg/kg-day	9.98E-03
				Aroclor-1260	4.51E+01	ug/kg	5.76E-09	mg/kg-day	2.00E+00	mg/kg-day	1.15E-08	6.72E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	6.39E-08	mg/kg-day	1.60E+01	mg/kg-day	1.02E-06	7.46E-07	mg/kg-day	5.00E-05	mg/kg-day	1.49E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	1.17E-09	mg/kg-day	9.10E+00	mg/kg-day	1.06E-08	1.36E-08	mg/kg-day	1.30E-05	mg/kg-day	1.05E-03
				Benz(a)anthracene	3.92E+03	ug/kg	4.65E-07	mg/kg-day	7.30E-01	mg/kg-day	1.81E-06	5.42E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	3.43E-07	mg/kg-day	7.30E+00	mg/kg-day	1.33E-05	4.00E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	3.80E-07	mg/kg-day	7.30E-01	mg/kg-day	1.48E-06	4.44E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.54E-07	mg/kg-day	7.30E-02	mg/kg-day	9.88E-08	2.96E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	4.24E-07	mg/kg-day	7.30E-03	mg/kg-day	1.65E-08	4.95E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	3.32E-08	mg/kg-day	7.30E+00	mg/kg-day	1.29E-06	3.87E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.54E-07	mg/kg-day	7.30E-01	mg/kg-day	6.00E-07	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	9.20E-08	mg/kg-day	--	mg/kg-day	--	1.07E-06	mg/kg-day	2.00E-02	mg/kg-day	5.37E-05
				Phenanthrene	1.25E+04	ug/kg	1.48E-06	mg/kg-day	--	mg/kg-day	--	1.73E-05	mg/kg-day	3.00E-02	mg/kg-day	5.76E-04
				Ethylbenzene	6.55E+02	ug/kg	1.79E-08	mg/kg-day	1.10E-02	mg/kg-day	1.97E-10	2.09E-07	mg/kg-day	1.00E-01	mg/kg-day	2.09E-06
			Exp. Route Total								5.95E-05					4.54E-01
		Exposure Point Total									1.65E-04					2.97E+00
	Exposure Medium Total										1.65E-04					2.97E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	5.01E-07	mg/m3	3.40E-02	1/(mg/m3)	1.70E-08	5.84E-06	mg/m3	3.00E-03	mg/m3	1.95E-03
				Ethylbenzene	7.00E+03	ug/kg	1.77E-05	mg/m3	2.50E-03	1/(mg/m3)	4.41E-08	2.06E-04	mg/m3	1.00E+00	mg/m3	2.06E-04
			Exp. Route Total								6.12E-08					2.15E-03
		Exposure Point Total									6.12E-08					2.15E-03
	Exposure Medium Total										6.12E-08					2.15E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	3.72E-11	mg/m3	1.20E+01	1/(mg/m3)	2.38E-09	4.34E-10	mg/m3	1.00E-04	mg/m3	4.34E-06
				Manganese	1.32E+03	mg/kg	1.25E-09	mg/m3	--	1/(mg/m3)	--	1.45E-08	mg/m3	5.00E-05	mg/m3	2.91E-04
			Exp. Route Total								2.38E-09					2.95E-04
		Exposure Point Total									2.38E-09					2.95E-04
	Exposure Medium Total										2.38E-09					2.95E-04
Medium Total											1.65E-04					2.97E+00
										Total of Receptor Risks Across All Media	1.65E-04			Total of Receptor Hazards Across All Media		2.97E+00

TABLE 7.32a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	7.91E-11	mg/kg-day	1.30E+05	mg/kg-day	1.03E-05	9.23E-10	mg/kg-day	1.00E-09	mg/kg-day	9.23E-01
				Aluminum	1.98E+04	mg/kg	6.45E-03	mg/kg-day	--	mg/kg-day	--	7.52E-02	mg/kg-day	1.00E+00	mg/kg-day	7.52E-02
				Antimony	2.50E+01	mg/kg	8.14E-06	mg/kg-day	--	mg/kg-day	--	9.50E-05	mg/kg-day	4.00E-04	mg/kg-day	2.37E-01
				Cadmium	4.71E+01	mg/kg	1.53E-05	mg/kg-day	--	mg/kg-day	--	1.79E-04	mg/kg-day	1.00E-03	mg/kg-day	1.79E-01
				Chromium	3.94E+01	mg/kg	1.28E-05	mg/kg-day	5.00E-01	mg/kg-day	3.42E-05	1.50E-04	mg/kg-day	3.00E-03	mg/kg-day	4.99E-02
				Cobalt	1.23E+01	mg/kg	4.01E-06	mg/kg-day	--	mg/kg-day	--	4.67E-05	mg/kg-day	3.00E-04	mg/kg-day	1.56E-01
				Copper	9.67E+02	mg/kg	3.15E-04	mg/kg-day	--	mg/kg-day	--	3.67E-03	mg/kg-day	4.00E-02	mg/kg-day	9.18E-02
				Iron	3.36E+04	mg/kg	1.09E-02	mg/kg-day	--	mg/kg-day	--	1.28E-01	mg/kg-day	7.00E-01	mg/kg-day	1.82E-01
				Lead	3.22E+02	mg/kg	1.05E-04	mg/kg-day	--	mg/kg-day	--	1.22E-03	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	4.30E-04	mg/kg-day	--	mg/kg-day	--	5.01E-03	mg/kg-day	2.40E-02	mg/kg-day	2.09E-01
				Mercury	1.15E+00	mg/kg	3.74E-07	mg/kg-day	--	mg/kg-day	--	4.37E-06	mg/kg-day	1.00E-04	mg/kg-day	4.37E-02
				Nickel	3.74E+01	mg/kg	1.22E-05	mg/kg-day	--	mg/kg-day	--	1.42E-04	mg/kg-day	2.00E-02	mg/kg-day	7.10E-03
				Silver	1.60E+01	mg/kg	5.21E-06	mg/kg-day	--	mg/kg-day	--	6.08E-05	mg/kg-day	5.00E-03	mg/kg-day	1.22E-02
				Vanadium	4.45E+01	mg/kg	1.45E-05	mg/kg-day	--	mg/kg-day	--	1.69E-04	mg/kg-day	5.00E-03	mg/kg-day	3.38E-02
				Zinc	1.38E+03	mg/kg	4.49E-04	mg/kg-day	--	mg/kg-day	--	5.24E-03	mg/kg-day	3.00E-01	mg/kg-day	1.75E-02
				4,4'-DDD	4.63E+03	ug/kg	1.51E-06	mg/kg-day	2.40E-01	mg/kg-day	3.62E-07	1.76E-05	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.96E-07	mg/kg-day	3.40E-01	mg/kg-day	6.68E-08	2.29E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	5.63E-06	mg/kg-day	3.40E-01	mg/kg-day	1.92E-06	6.57E-05	mg/kg-day	5.00E-04	mg/kg-day	1.31E-01
				Aroclor-1248	5.60E+02	ug/kg	1.82E-07	mg/kg-day	2.00E+00	mg/kg-day	3.65E-07	2.13E-06	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	4.36E-08	mg/kg-day	2.00E+00	mg/kg-day	8.73E-08	5.09E-07	mg/kg-day	2.00E-05	mg/kg-day	2.55E-02
				Aroclor-1260	4.51E+01	ug/kg	1.47E-08	mg/kg-day	2.00E+00	mg/kg-day	2.94E-08	1.71E-07	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	2.28E-07	mg/kg-day	1.60E+01	mg/kg-day	3.65E-06	2.66E-06	mg/kg-day	5.00E-05	mg/kg-day	5.33E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	4.17E-09	mg/kg-day	9.10E+00	mg/kg-day	3.79E-08	4.86E-08	mg/kg-day	1.30E-05	mg/kg-day	3.74E-03
				Benz(a)anthracene	3.92E+03	ug/kg	1.28E-06	mg/kg-day	7.30E-01	mg/kg-day	4.97E-06	1.49E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	9.41E-07	mg/kg-day	7.30E+00	mg/kg-day	3.66E-05	1.10E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.05E-06	mg/kg-day	7.30E-01	mg/kg-day	4.07E-06	1.22E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	6.97E-07	mg/kg-day	7.30E-02	mg/kg-day	2.71E-07	8.13E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.17E-06	mg/kg-day	7.30E-03	mg/kg-day	4.54E-08	1.36E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	9.12E-08	mg/kg-day	7.30E+00	mg/kg-day	3.55E-06	1.06E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	4.23E-07	mg/kg-day	7.30E-01	mg/kg-day	1.65E-06	4.94E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	2.53E-07	mg/kg-day	--	mg/kg-day	--	2.95E-06	mg/kg-day	2.00E-02	mg/kg-day	1.47E-04
				Phenanthrene	1.25E+04	ug/kg	4.07E-06	mg/kg-day	--	mg/kg-day	--	4.75E-05	mg/kg-day	3.00E-02	mg/kg-day	1.58E-03
				Ethylbenzene	6.55E+02	ug/kg	2.13E-07	mg/kg-day	1.10E-02	mg/kg-day	2.35E-09	2.49E-06	mg/kg-day	1.00E-01	mg/kg-day	2.49E-05
			Exp. Route Total								1.02E-04					2.43E+00

TABLE 7.32a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	6.65E-12	mg/kg-day	1.30E+05	mg/kg-day	8.64E-07	7.75E-11	mg/kg-day	1.00E-09	mg/kg-day	7.75E-02
				Aluminum	1.98E+04	mg/kg	1.81E-04	mg/kg-day	--	mg/kg-day	--	2.11E-03	mg/kg-day	1.00E+00	mg/kg-day	2.11E-03
				Antimony	2.50E+01	mg/kg	2.28E-07	mg/kg-day	--	mg/kg-day	--	2.66E-06	mg/kg-day	6.00E-05	mg/kg-day	4.43E-02
				Cadmium	4.71E+01	mg/kg	4.29E-08	mg/kg-day	--	mg/kg-day	--	5.01E-07	mg/kg-day	2.50E-05	mg/kg-day	2.00E-02
				Chromium	3.94E+01	mg/kg	3.59E-07	mg/kg-day	2.00E+01	mg/kg-day	3.83E-05	4.19E-06	mg/kg-day	7.50E-05	mg/kg-day	5.59E-02
				Cobalt	1.23E+01	mg/kg	1.12E-07	mg/kg-day	--	mg/kg-day	--	1.31E-06	mg/kg-day	3.00E-04	mg/kg-day	4.36E-03
				Copper	9.67E+02	mg/kg	8.82E-06	mg/kg-day	--	mg/kg-day	--	1.03E-04	mg/kg-day	4.00E-02	mg/kg-day	2.57E-03
				Iron	3.36E+04	mg/kg	3.06E-04	mg/kg-day	--	mg/kg-day	--	3.57E-03	mg/kg-day	7.00E-01	mg/kg-day	5.11E-03
				Lead	3.22E+02	mg/kg	2.94E-06	mg/kg-day	--	mg/kg-day	--	3.43E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.20E-05	mg/kg-day	--	mg/kg-day	--	1.40E-04	mg/kg-day	9.60E-04	mg/kg-day	1.46E-01
				Mercury	1.15E+00	mg/kg	1.05E-08	mg/kg-day	--	mg/kg-day	--	1.22E-07	mg/kg-day	1.00E-04	mg/kg-day	1.22E-03
				Nickel	3.74E+01	mg/kg	3.41E-07	mg/kg-day	--	mg/kg-day	--	3.98E-06	mg/kg-day	8.00E-04	mg/kg-day	4.97E-03
				Silver	1.60E+01	mg/kg	1.46E-07	mg/kg-day	--	mg/kg-day	--	1.70E-06	mg/kg-day	2.00E-04	mg/kg-day	8.51E-03
				Vanadium	4.45E+01	mg/kg	4.06E-07	mg/kg-day	--	mg/kg-day	--	4.73E-06	mg/kg-day	1.30E-04	mg/kg-day	3.64E-02
				Zinc	1.38E+03	mg/kg	1.26E-05	mg/kg-day	--	mg/kg-day	--	1.47E-04	mg/kg-day	3.00E-01	mg/kg-day	4.89E-04
				4,4'-DDD	4.63E+03	ug/kg	1.27E-07	mg/kg-day	2.40E-01	mg/kg-day	3.04E-08	1.48E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.65E-08	mg/kg-day	3.40E-01	mg/kg-day	5.61E-09	1.92E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	4.73E-07	mg/kg-day	3.40E-01	mg/kg-day	1.61E-07	5.52E-06	mg/kg-day	5.00E-04	mg/kg-day	1.10E-02
				Aroclor-1248	5.60E+02	ug/kg	7.15E-08	mg/kg-day	2.00E+00	mg/kg-day	1.43E-07	8.34E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.71E-08	mg/kg-day	2.00E+00	mg/kg-day	3.42E-08	2.00E-07	mg/kg-day	2.00E-05	mg/kg-day	9.98E-03
				Aroclor-1260	4.51E+01	ug/kg	5.76E-09	mg/kg-day	2.00E+00	mg/kg-day	1.15E-08	6.72E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	6.39E-08	mg/kg-day	1.60E+01	mg/kg-day	1.02E-06	7.46E-07	mg/kg-day	5.00E-05	mg/kg-day	1.49E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	1.17E-09	mg/kg-day	9.10E+00	mg/kg-day	1.06E-08	1.36E-08	mg/kg-day	1.30E-05	mg/kg-day	1.05E-03
				Benz(a)anthracene	3.92E+03	ug/kg	4.65E-07	mg/kg-day	7.30E-01	mg/kg-day	1.81E-06	5.42E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	3.43E-07	mg/kg-day	7.30E+00	mg/kg-day	1.33E-05	4.00E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	3.80E-07	mg/kg-day	7.30E-01	mg/kg-day	1.48E-06	4.44E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.54E-07	mg/kg-day	7.30E-02	mg/kg-day	9.88E-08	2.96E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	4.24E-07	mg/kg-day	7.30E-03	mg/kg-day	1.65E-08	4.95E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	3.32E-08	mg/kg-day	7.30E+00	mg/kg-day	1.29E-06	3.87E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.54E-07	mg/kg-day	7.30E-01	mg/kg-day	6.00E-07	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	9.20E-08	mg/kg-day	--	mg/kg-day	--	1.07E-06	mg/kg-day	2.00E-02	mg/kg-day	5.37E-05
				Phenanthrene	1.25E+04	ug/kg	1.48E-06	mg/kg-day	--	mg/kg-day	--	1.73E-05	mg/kg-day	3.00E-02	mg/kg-day	5.76E-04
				Ethylbenzene	6.55E+02	ug/kg	1.79E-08	mg/kg-day	1.10E-02	mg/kg-day	1.97E-10	2.09E-07	mg/kg-day	1.00E-01	mg/kg-day	2.09E-06
			Exp. Route Total								5.92E-05					4.47E-01
		Exposure Point Total									1.61E-04					2.88E+00
	Exposure Medium Total										1.61E-04					2.88E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	5.01E-07	mg/m3	3.40E-02	1/(mg/m3)	1.70E-08	5.84E-06	mg/m3	3.00E-03	mg/m3	1.95E-03
				Ethylbenzene	7.00E+03	ug/kg	1.77E-05	mg/m3	2.50E-03	1/(mg/m3)	4.41E-08	2.06E-04	mg/m3	1.00E+00	mg/m3	2.06E-04
			Exp. Route Total								6.12E-08					2.15E-03
		Exposure Point Total									6.12E-08					2.15E-03
	Exposure Medium Total										6.12E-08					2.15E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	3.72E-11	mg/m3	1.20E+01	1/(mg/m3)	2.38E-09	4.34E-10	mg/m3	1.00E-04	mg/m3	4.34E-06
				Manganese	1.32E+03	mg/kg	1.25E-09	mg/m3	--	1/(mg/m3)	--	1.45E-08	mg/m3	5.00E-05	mg/m3	2.91E-04
			Exp. Route Total								2.38E-09					2.95E-04
		Exposure Point Total									2.38E-09					2.95E-04
	Exposure Medium Total										2.38E-09					2.95E-04
Medium Total											1.62E-04					2.88E+00
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											1.62E-04					2.88E+00

TABLE 7.33.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.39E-11	mg/kg-day	1.30E+05	mg/kg-day	4.41E-06	9.89E-11	mg/kg-day	1.00E-09	mg/kg-day	9.89E-02
				Aluminum	1.98E+04	mg/kg	2.76E-03	mg/kg-day	--	mg/kg-day	--	8.06E-03	mg/kg-day	1.00E+00	mg/kg-day	8.06E-03
				Antimony	2.50E+01	mg/kg	3.49E-06	mg/kg-day	--	mg/kg-day	--	1.02E-05	mg/kg-day	4.00E-04	mg/kg-day	2.54E-02
				Arsenic	6.21E+00	mg/kg	8.67E-07	mg/kg-day	1.50E+00	mg/kg-day	1.30E-06	2.53E-06	mg/kg-day	3.00E-04	mg/kg-day	8.43E-03
				Cadmium	4.71E+01	mg/kg	6.57E-06	mg/kg-day	--	mg/kg-day	--	1.92E-05	mg/kg-day	1.00E-03	mg/kg-day	1.92E-02
				Chromium	3.94E+01	mg/kg	5.50E-06	mg/kg-day	5.00E-01	mg/kg-day	5.04E-06	1.60E-05	mg/kg-day	3.00E-03	mg/kg-day	5.35E-03
				Cobalt	1.23E+01	mg/kg	1.72E-06	mg/kg-day	--	mg/kg-day	--	5.01E-06	mg/kg-day	3.00E-04	mg/kg-day	1.67E-02
				Copper	9.67E+02	mg/kg	1.35E-04	mg/kg-day	--	mg/kg-day	--	3.94E-04	mg/kg-day	4.00E-02	mg/kg-day	9.84E-03
				Iron	3.36E+04	mg/kg	4.69E-03	mg/kg-day	--	mg/kg-day	--	1.37E-02	mg/kg-day	7.00E-01	mg/kg-day	1.95E-02
				Lead	3.22E+02	mg/kg	4.49E-05	mg/kg-day	--	mg/kg-day	--	1.31E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.84E-04	mg/kg-day	--	mg/kg-day	--	5.37E-04	mg/kg-day	2.40E-02	mg/kg-day	2.24E-02
				Mercury	1.15E+00	mg/kg	1.60E-07	mg/kg-day	--	mg/kg-day	--	4.68E-07	mg/kg-day	1.00E-04	mg/kg-day	4.68E-03
				Nickel	3.74E+01	mg/kg	5.22E-06	mg/kg-day	--	mg/kg-day	--	1.52E-05	mg/kg-day	2.00E-02	mg/kg-day	7.61E-04
				Silver	1.60E+01	mg/kg	2.23E-06	mg/kg-day	--	mg/kg-day	--	6.51E-06	mg/kg-day	5.00E-03	mg/kg-day	1.30E-03
				Vanadium	4.45E+01	mg/kg	6.21E-06	mg/kg-day	--	mg/kg-day	--	1.81E-05	mg/kg-day	5.00E-03	mg/kg-day	3.62E-03
				Zinc	1.38E+03	mg/kg	1.93E-04	mg/kg-day	--	mg/kg-day	--	5.62E-04	mg/kg-day	3.00E-01	mg/kg-day	1.87E-03
				4,4'-DDD	4.63E+03	ug/kg	6.46E-07	mg/kg-day	2.40E-01	mg/kg-day	1.55E-07	1.88E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	8.42E-08	mg/kg-day	3.40E-01	mg/kg-day	2.86E-08	2.45E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.41E-06	mg/kg-day	3.40E-01	mg/kg-day	8.21E-07	7.04E-06	mg/kg-day	5.00E-04	mg/kg-day	1.41E-02
				Aroclor-1248	5.60E+02	ug/kg	7.82E-08	mg/kg-day	2.00E+00	mg/kg-day	1.56E-07	2.28E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.87E-08	mg/kg-day	2.00E+00	mg/kg-day	3.74E-08	5.45E-08	mg/kg-day	2.00E-05	mg/kg-day	2.73E-03
				Aroclor-1260	4.51E+01	ug/kg	6.29E-09	mg/kg-day	2.00E+00	mg/kg-day	1.26E-08	1.84E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	9.78E-08	mg/kg-day	1.60E+01	mg/kg-day	1.57E-06	2.85E-07	mg/kg-day	5.00E-05	mg/kg-day	5.71E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	1.79E-09	mg/kg-day	9.10E+00	mg/kg-day	1.63E-08	5.21E-09	mg/kg-day	1.30E-05	mg/kg-day	4.01E-04
				Benz(a)anthracene	3.92E+03	ug/kg	5.47E-07	mg/kg-day	7.30E-01	mg/kg-day	7.32E-07	1.60E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	4.03E-07	mg/kg-day	7.30E+00	mg/kg-day	5.40E-06	1.18E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	4.48E-07	mg/kg-day	7.30E-01	mg/kg-day	6.00E-07	1.31E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.99E-07	mg/kg-day	7.30E-02	mg/kg-day	4.00E-08	8.71E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	5.00E-07	mg/kg-day	7.30E-03	mg/kg-day	6.69E-09	1.46E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	3.91E-08	mg/kg-day	7.30E+00	mg/kg-day	5.23E-07	1.14E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.81E-07	mg/kg-day	7.30E-01	mg/kg-day	2.43E-07	5.29E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.08E-07	mg/kg-day	--	mg/kg-day	--	3.16E-07	mg/kg-day	2.00E-02	mg/kg-day	1.58E-05
				Phenanthrene	1.25E+04	ug/kg	1.74E-06	mg/kg-day	--	mg/kg-day	--	5.09E-06	mg/kg-day	3.00E-02	mg/kg-day	1.70E-04
				Ethylbenzene	6.55E+02	ug/kg	9.14E-08	mg/kg-day	1.10E-02	mg/kg-day	1.01E-09	2.67E-07	mg/kg-day	1.00E-01	mg/kg-day	2.67E-06
			Exp. Route Total								2.11E-05					2.69E-01

TABLE 7.33.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	4.06E-12	mg/kg-day	1.30E+05	mg/kg-day	5.28E-07	1.18E-11	mg/kg-day	1.00E-09	mg/kg-day	1.18E-02
				Aluminum	1.98E+04	mg/kg	1.10E-04	mg/kg-day	--	mg/kg-day	--	3.22E-04	mg/kg-day	1.00E+00	mg/kg-day	3.22E-04
				Antimony	2.50E+01	mg/kg	1.39E-07	mg/kg-day	--	mg/kg-day	--	4.06E-07	mg/kg-day	6.00E-05	mg/kg-day	6.77E-03
				Arsenic	6.21E+00	mg/kg	1.04E-07	mg/kg-day	1.50E+00	mg/kg-day	1.56E-07	3.03E-07	mg/kg-day	3.00E-04	mg/kg-day	1.01E-03
				Cadmium	4.71E+01	mg/kg	2.62E-08	mg/kg-day	--	mg/kg-day	--	7.65E-08	mg/kg-day	2.50E-05	mg/kg-day	3.06E-03
				Chromium	3.94E+01	mg/kg	2.19E-07	mg/kg-day	2.00E+01	mg/kg-day	8.04E-06	6.40E-07	mg/kg-day	7.50E-05	mg/kg-day	8.53E-03
				Cobalt	1.23E+01	mg/kg	6.85E-08	mg/kg-day	--	mg/kg-day	--	2.00E-07	mg/kg-day	3.00E-04	mg/kg-day	6.66E-04
				Copper	9.67E+02	mg/kg	5.38E-06	mg/kg-day	--	mg/kg-day	--	1.57E-05	mg/kg-day	4.00E-02	mg/kg-day	3.93E-04
				Iron	3.36E+04	mg/kg	1.87E-04	mg/kg-day	--	mg/kg-day	--	5.46E-04	mg/kg-day	7.00E-01	mg/kg-day	7.80E-04
				Lead	3.22E+02	mg/kg	1.79E-06	mg/kg-day	--	mg/kg-day	--	5.23E-06	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	7.35E-06	mg/kg-day	--	mg/kg-day	--	2.14E-05	mg/kg-day	9.60E-04	mg/kg-day	2.23E-02
				Mercury	1.15E+00	mg/kg	6.40E-09	mg/kg-day	--	mg/kg-day	--	1.87E-08	mg/kg-day	1.00E-04	mg/kg-day	1.87E-04
				Nickel	3.74E+01	mg/kg	2.08E-07	mg/kg-day	--	mg/kg-day	--	6.07E-07	mg/kg-day	8.00E-04	mg/kg-day	7.59E-04
				Silver	1.60E+01	mg/kg	8.91E-08	mg/kg-day	--	mg/kg-day	--	2.60E-07	mg/kg-day	2.00E-04	mg/kg-day	1.30E-03
				Vanadium	4.45E+01	mg/kg	2.48E-07	mg/kg-day	--	mg/kg-day	--	7.23E-07	mg/kg-day	1.30E-04	mg/kg-day	5.56E-03
				Zinc	1.38E+03	mg/kg	7.68E-06	mg/kg-day	--	mg/kg-day	--	2.24E-05	mg/kg-day	3.00E-01	mg/kg-day	7.47E-05
				4,4'-DDD	4.63E+03	ug/kg	7.73E-08	mg/kg-day	2.40E-01	mg/kg-day	1.86E-08	2.26E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.01E-08	mg/kg-day	3.40E-01	mg/kg-day	3.42E-09	2.94E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.89E-07	mg/kg-day	3.40E-01	mg/kg-day	9.83E-08	8.43E-07	mg/kg-day	5.00E-04	mg/kg-day	1.69E-03
				Aroclor-1248	5.60E+02	ug/kg	4.37E-08	mg/kg-day	2.00E+00	mg/kg-day	8.73E-08	1.27E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.04E-08	mg/kg-day	2.00E+00	mg/kg-day	2.09E-08	3.05E-08	mg/kg-day	2.00E-05	mg/kg-day	1.52E-03
				Aroclor-1260	4.51E+01	ug/kg	3.52E-09	mg/kg-day	2.00E+00	mg/kg-day	7.03E-09	1.03E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.90E-08	mg/kg-day	1.60E+01	mg/kg-day	6.25E-07	1.14E-07	mg/kg-day	5.00E-05	mg/kg-day	2.28E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	7.13E-10	mg/kg-day	9.10E+00	mg/kg-day	6.49E-09	2.08E-09	mg/kg-day	1.30E-05	mg/kg-day	1.60E-04
				Benz(a)anthracene	3.92E+03	ug/kg	2.84E-07	mg/kg-day	7.30E-01	mg/kg-day	3.80E-07	8.28E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	2.09E-07	mg/kg-day	7.30E+00	mg/kg-day	2.80E-06	6.10E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	2.32E-07	mg/kg-day	7.30E-01	mg/kg-day	3.11E-07	6.78E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.55E-07	mg/kg-day	7.30E-02	mg/kg-day	2.07E-08	4.52E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	2.59E-07	mg/kg-day	7.30E-03	mg/kg-day	3.47E-09	7.56E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	2.03E-08	mg/kg-day	7.30E+00	mg/kg-day	2.71E-07	5.91E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	9.41E-08	mg/kg-day	7.30E-01	mg/kg-day	1.26E-07	2.74E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	5.62E-08	mg/kg-day	--	mg/kg-day	--	1.64E-07	mg/kg-day	2.00E-02	mg/kg-day	8.19E-06
				Phenanthrene	1.25E+04	ug/kg	9.05E-07	mg/kg-day	--	mg/kg-day	--	2.64E-06	mg/kg-day	3.00E-02	mg/kg-day	8.80E-05
				Ethylbenzene	6.55E+02	ug/kg	1.09E-08	mg/kg-day	1.10E-02	mg/kg-day	1.20E-10	3.19E-08	mg/kg-day	1.00E-01	mg/kg-day	3.19E-07
			Exp. Route Total								1.35E-05					6.93E-02
		Exposure Point Total									3.46E-05					3.38E-01
	Exposure Medium Total										3.46E-05					3.38E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.00E-06	mg/m3	3.40E-02	1/(mg/m3)	6.81E-08	5.84E-06	mg/m3	3.00E-03	mg/m3	1.95E-03
				Ethylbenzene	7.00E+03	ug/kg	7.06E-05	mg/m3	2.50E-03	1/(mg/m3)	1.77E-07	2.06E-04	mg/m3	1.00E+00	mg/m3	2.06E-04
			Exp. Route Total								2.45E-07					2.15E-03
		Exposure Point Total									2.45E-07					2.15E-03
	Exposure Medium Total										2.45E-07					2.15E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.49E-10	mg/m3	1.20E+01	1/(mg/m3)	3.27E-09	4.34E-10	mg/m3	1.00E-04	mg/m3	4.34E-06
				Manganese	1.32E+03	mg/kg	4.98E-09	mg/m3	--	1/(mg/m3)	--	1.45E-08	mg/m3	5.00E-05	mg/m3	2.91E-04
			Exp. Route Total								3.27E-09					2.95E-04
		Exposure Point Total									3.27E-09					2.95E-04
	Exposure Medium Total										3.27E-09					2.95E-04
Medium Total											3.48E-05					3.41E-01
										Total of Receptor Risks Across All Media	3.48E-05			Total of Receptor Hazards Across All Media		3.41E-01

TABLE 7.33a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.39E-11	mg/kg-day	1.30E+05	mg/kg-day	4.41E-06	9.89E-11	mg/kg-day	1.00E-09	mg/kg-day	9.89E-02
				Aluminum	1.98E+04	mg/kg	2.76E-03	mg/kg-day	--	mg/kg-day	--	8.06E-03	mg/kg-day	1.00E+00	mg/kg-day	8.06E-03
				Antimony	2.50E+01	mg/kg	3.49E-06	mg/kg-day	--	mg/kg-day	--	1.02E-05	mg/kg-day	4.00E-04	mg/kg-day	2.54E-02
				Cadmium	4.71E+01	mg/kg	6.57E-06	mg/kg-day	--	mg/kg-day	--	1.92E-05	mg/kg-day	1.00E-03	mg/kg-day	1.92E-02
				Chromium	3.94E+01	mg/kg	5.50E-06	mg/kg-day	5.00E-01	mg/kg-day	5.04E-06	1.60E-05	mg/kg-day	3.00E-03	mg/kg-day	5.35E-03
				Cobalt	1.23E+01	mg/kg	1.72E-06	mg/kg-day	--	mg/kg-day	--	5.01E-06	mg/kg-day	3.00E-04	mg/kg-day	1.67E-02
				Copper	9.67E+02	mg/kg	1.35E-04	mg/kg-day	--	mg/kg-day	--	3.94E-04	mg/kg-day	4.00E-02	mg/kg-day	9.84E-03
				Iron	3.36E+04	mg/kg	4.69E-03	mg/kg-day	--	mg/kg-day	--	1.37E-02	mg/kg-day	7.00E-01	mg/kg-day	1.95E-02
				Lead	3.22E+02	mg/kg	4.49E-05	mg/kg-day	--	mg/kg-day	--	1.31E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.84E-04	mg/kg-day	--	mg/kg-day	--	5.37E-04	mg/kg-day	2.40E-02	mg/kg-day	2.24E-02
				Mercury	1.15E+00	mg/kg	1.60E-07	mg/kg-day	--	mg/kg-day	--	4.68E-07	mg/kg-day	1.00E-04	mg/kg-day	4.68E-03
				Nickel	3.74E+01	mg/kg	5.22E-06	mg/kg-day	--	mg/kg-day	--	1.52E-05	mg/kg-day	2.00E-02	mg/kg-day	7.61E-04
				Silver	1.60E+01	mg/kg	2.23E-06	mg/kg-day	--	mg/kg-day	--	6.51E-06	mg/kg-day	5.00E-03	mg/kg-day	1.30E-03
				Vanadium	4.45E+01	mg/kg	6.21E-06	mg/kg-day	--	mg/kg-day	--	1.81E-05	mg/kg-day	5.00E-03	mg/kg-day	3.62E-03
				Zinc	1.38E+03	mg/kg	1.93E-04	mg/kg-day	--	mg/kg-day	--	5.62E-04	mg/kg-day	3.00E-01	mg/kg-day	1.87E-03
				4,4'-DDD	4.63E+03	ug/kg	6.46E-07	mg/kg-day	2.40E-01	mg/kg-day	1.55E-07	1.88E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	8.42E-08	mg/kg-day	3.40E-01	mg/kg-day	2.86E-08	2.45E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.41E-06	mg/kg-day	3.40E-01	mg/kg-day	8.21E-07	7.04E-06	mg/kg-day	5.00E-04	mg/kg-day	1.41E-02
				Aroclor-1248	5.60E+02	ug/kg	7.82E-08	mg/kg-day	2.00E+00	mg/kg-day	1.56E-07	2.28E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.87E-08	mg/kg-day	2.00E+00	mg/kg-day	3.74E-08	5.45E-08	mg/kg-day	2.00E-05	mg/kg-day	2.73E-03
				Aroclor-1260	4.51E+01	ug/kg	6.29E-09	mg/kg-day	2.00E+00	mg/kg-day	1.26E-08	1.84E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	9.78E-08	mg/kg-day	1.60E+01	mg/kg-day	1.57E-06	2.85E-07	mg/kg-day	5.00E-05	mg/kg-day	5.71E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	1.79E-09	mg/kg-day	9.10E+00	mg/kg-day	1.63E-08	5.21E-09	mg/kg-day	1.30E-05	mg/kg-day	4.01E-04
				Benz(a)anthracene	3.92E+03	ug/kg	5.47E-07	mg/kg-day	7.30E-01	mg/kg-day	7.32E-07	1.60E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	4.03E-07	mg/kg-day	7.30E+00	mg/kg-day	5.40E-06	1.18E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	4.48E-07	mg/kg-day	7.30E-01	mg/kg-day	6.00E-07	1.31E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.99E-07	mg/kg-day	7.30E-02	mg/kg-day	4.00E-08	8.71E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	5.00E-07	mg/kg-day	7.30E-03	mg/kg-day	6.69E-09	1.46E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	3.91E-08	mg/kg-day	7.30E+00	mg/kg-day	5.23E-07	1.14E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.81E-07	mg/kg-day	7.30E-01	mg/kg-day	2.43E-07	5.29E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.08E-07	mg/kg-day	--	mg/kg-day	--	3.16E-07	mg/kg-day	2.00E-02	mg/kg-day	1.58E-05
				Phenanthrene	1.25E+04	ug/kg	1.74E-06	mg/kg-day	--	mg/kg-day	--	5.09E-06	mg/kg-day	3.00E-02	mg/kg-day	1.70E-04
				Ethylbenzene	6.55E+02	ug/kg	9.14E-08	mg/kg-day	1.10E-02	mg/kg-day	1.01E-09	2.67E-07	mg/kg-day	1.00E-01	mg/kg-day	2.67E-06
			Exp. Route Total								1.98E-05					2.61E-01

TABLE 7.33a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

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Receptor Population: Trespasser/Recreational Person
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Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	4.06E-12	mg/kg-day	1.30E+05	mg/kg-day	5.28E-07	1.18E-11	mg/kg-day	1.00E-09	mg/kg-day	1.18E-02
				Aluminum	1.98E+04	mg/kg	1.10E-04	mg/kg-day	--	mg/kg-day	--	3.22E-04	mg/kg-day	1.00E+00	mg/kg-day	3.22E-04
				Antimony	2.50E+01	mg/kg	1.39E-07	mg/kg-day	--	mg/kg-day	--	4.06E-07	mg/kg-day	6.00E-05	mg/kg-day	6.77E-03
				Cadmium	4.71E+01	mg/kg	2.62E-08	mg/kg-day	--	mg/kg-day	--	7.65E-08	mg/kg-day	2.50E-05	mg/kg-day	3.06E-03
				Chromium	3.94E+01	mg/kg	2.19E-07	mg/kg-day	2.00E+01	mg/kg-day	8.04E-06	6.40E-07	mg/kg-day	7.50E-05	mg/kg-day	8.53E-03
				Cobalt	1.23E+01	mg/kg	6.85E-08	mg/kg-day	--	mg/kg-day	--	2.00E-07	mg/kg-day	3.00E-04	mg/kg-day	6.66E-04
				Copper	9.67E+02	mg/kg	5.38E-06	mg/kg-day	--	mg/kg-day	--	1.57E-05	mg/kg-day	4.00E-02	mg/kg-day	3.93E-04
				Iron	3.36E+04	mg/kg	1.87E-04	mg/kg-day	--	mg/kg-day	--	5.46E-04	mg/kg-day	7.00E-01	mg/kg-day	7.80E-04
				Lead	3.22E+02	mg/kg	1.79E-06	mg/kg-day	--	mg/kg-day	--	5.23E-06	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	7.35E-06	mg/kg-day	--	mg/kg-day	--	2.14E-05	mg/kg-day	9.60E-04	mg/kg-day	2.23E-02
				Mercury	1.15E+00	mg/kg	6.40E-09	mg/kg-day	--	mg/kg-day	--	1.87E-08	mg/kg-day	1.00E-04	mg/kg-day	1.87E-04
				Nickel	3.74E+01	mg/kg	2.08E-07	mg/kg-day	--	mg/kg-day	--	6.07E-07	mg/kg-day	8.00E-04	mg/kg-day	7.59E-04
				Silver	1.60E+01	mg/kg	8.91E-08	mg/kg-day	--	mg/kg-day	--	2.60E-07	mg/kg-day	2.00E-04	mg/kg-day	1.30E-03
				Vanadium	4.45E+01	mg/kg	2.48E-07	mg/kg-day	--	mg/kg-day	--	7.23E-07	mg/kg-day	1.30E-04	mg/kg-day	5.56E-03
				Zinc	1.38E+03	mg/kg	7.68E-06	mg/kg-day	--	mg/kg-day	--	2.24E-05	mg/kg-day	3.00E-01	mg/kg-day	7.47E-05
				4,4'-DDD	4.63E+03	ug/kg	7.73E-08	mg/kg-day	2.40E-01	mg/kg-day	1.86E-08	2.26E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.01E-08	mg/kg-day	3.40E-01	mg/kg-day	3.42E-09	2.94E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.89E-07	mg/kg-day	3.40E-01	mg/kg-day	9.83E-08	8.43E-07	mg/kg-day	5.00E-04	mg/kg-day	1.69E-03
				Aroclor-1248	5.60E+02	ug/kg	4.37E-08	mg/kg-day	2.00E+00	mg/kg-day	8.73E-08	1.27E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.04E-08	mg/kg-day	2.00E+00	mg/kg-day	2.09E-08	3.05E-08	mg/kg-day	2.00E-05	mg/kg-day	1.52E-03
				Aroclor-1260	4.51E+01	ug/kg	3.52E-09	mg/kg-day	2.00E+00	mg/kg-day	7.03E-09	1.03E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.90E-08	mg/kg-day	1.60E+01	mg/kg-day	6.25E-07	1.14E-07	mg/kg-day	5.00E-05	mg/kg-day	2.28E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	7.13E-10	mg/kg-day	9.10E+00	mg/kg-day	6.49E-09	2.08E-09	mg/kg-day	1.30E-05	mg/kg-day	1.60E-04
				Benz(a)anthracene	3.92E+03	ug/kg	2.84E-07	mg/kg-day	7.30E-01	mg/kg-day	3.80E-07	8.28E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	2.09E-07	mg/kg-day	7.30E+00	mg/kg-day	2.80E-06	6.10E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	2.32E-07	mg/kg-day	7.30E-01	mg/kg-day	3.11E-07	6.78E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.55E-07	mg/kg-day	7.30E-02	mg/kg-day	2.07E-08	4.52E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	2.59E-07	mg/kg-day	7.30E-03	mg/kg-day	3.47E-09	7.56E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	2.03E-08	mg/kg-day	7.30E+00	mg/kg-day	2.71E-07	5.91E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	9.41E-08	mg/kg-day	7.30E-01	mg/kg-day	1.26E-07	2.74E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	5.62E-08	mg/kg-day	--	mg/kg-day	--	1.64E-07	mg/kg-day	2.00E-02	mg/kg-day	8.19E-06
				Phenanthrene	1.25E+04	ug/kg	9.05E-07	mg/kg-day	--	mg/kg-day	--	2.64E-06	mg/kg-day	3.00E-02	mg/kg-day	8.80E-05
				Ethylbenzene	6.55E+02	ug/kg	1.09E-08	mg/kg-day	1.10E-02	mg/kg-day	1.20E-10	3.19E-08	mg/kg-day	1.00E-01	mg/kg-day	3.19E-07
			Exp. Route Total								1.34E-05					6.83E-02
		Exposure Point Total									3.31E-05					3.29E-01
	Exposure Medium Total										3.31E-05					3.29E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.00E-06	mg/m3	3.40E-02	1/(mg/m3)	6.81E-08	5.84E-06	mg/m3	3.00E-03	mg/m3	1.95E-03
				Ethylbenzene	7.00E+03	ug/kg	7.06E-05	mg/m3	2.50E-03	1/(mg/m3)	1.77E-07	2.06E-04	mg/m3	1.00E+00	mg/m3	2.06E-04
			Exp. Route Total								2.45E-07					2.15E-03
		Exposure Point Total									2.45E-07					2.15E-03
	Exposure Medium Total										2.45E-07					2.15E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.49E-10	mg/m3	1.20E+01	1/(mg/m3)	3.27E-09	4.34E-10	mg/m3	1.00E-04	mg/m3	4.34E-06
				Manganese	1.32E+03	mg/kg	4.98E-09	mg/m3	--	1/(mg/m3)	--	1.45E-08	mg/m3	5.00E-05	mg/m3	2.91E-04
			Exp. Route Total								3.27E-09					2.95E-04
		Exposure Point Total									3.27E-09					2.95E-04
	Exposure Medium Total										3.27E-09					2.95E-04
Medium Total											3.34E-05					3.31E-01
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											3.34E-05					3.31E-01

TABLE 7.34.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.13E-10	mg/kg-day	1.30E+05	mg/kg-day	1.47E-05					N/A
				Aluminum	1.98E+04	mg/kg	2.76E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	3.49E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	6.21E+00	mg/kg	2.89E-06	mg/kg-day	1.50E+00	mg/kg-day	4.33E-06					N/A
				Cadmium	4.71E+01	mg/kg	6.57E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	1.83E-05	mg/kg-day	5.00E-01	mg/kg-day	3.93E-05					N/A
				Cobalt	1.23E+01	mg/kg	1.72E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	1.35E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	4.69E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	4.49E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	1.84E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	1.60E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	5.22E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	2.23E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	6.21E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	1.93E-04	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	2.15E-06	mg/kg-day	2.40E-01	mg/kg-day	5.17E-07					N/A
				4,4'-DDE	6.03E+02	ug/kg	2.81E-07	mg/kg-day	3.40E-01	mg/kg-day	9.54E-08					N/A
				4,4'-DDT	1.73E+04	ug/kg	8.05E-06	mg/kg-day	3.40E-01	mg/kg-day	2.74E-06					N/A
				Aroclor-1248	5.60E+02	ug/kg	2.61E-07	mg/kg-day	2.00E+00	mg/kg-day	5.21E-07					N/A
				Aroclor-1254	1.34E+02	ug/kg	6.23E-08	mg/kg-day	2.00E+00	mg/kg-day	1.25E-07					N/A
				Aroclor-1260	4.51E+01	ug/kg	2.10E-08	mg/kg-day	2.00E+00	mg/kg-day	4.20E-08					N/A
				Dieldrin	7.01E+02	ug/kg	3.26E-07	mg/kg-day	1.60E+01	mg/kg-day	5.22E-06					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	5.95E-09	mg/kg-day	9.10E+00	mg/kg-day	5.42E-08					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	1.82E-06	mg/kg-day	7.30E-01	mg/kg-day	5.70E-06					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	1.34E-06	mg/kg-day	7.30E+00	mg/kg-day	4.20E-05					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.49E-06	mg/kg-day	7.30E-01	mg/kg-day	4.67E-06					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	9.96E-07	mg/kg-day	7.30E-02	mg/kg-day	3.11E-07					N/A
				Chrysene	3.58E+03	ug/kg	1.67E-06	mg/kg-day	7.30E-03	mg/kg-day	5.21E-08					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.30E-07	mg/kg-day	7.30E+00	mg/kg-day	4.07E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	6.05E-07	mg/kg-day	7.30E-01	mg/kg-day	1.89E-06					N/A
				Naphthalene	7.76E+02	ug/kg	1.08E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	1.74E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	3.05E-07	mg/kg-day	1.10E-02	mg/kg-day	3.35E-09					N/A
			Exp. Route Total								1.26E-04					--

TABLE 7.34.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.07E-11	mg/kg-day	1.30E+05	mg/kg-day	1.39E-06					N/A
				Aluminum	1.98E+04	mg/kg	1.10E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	1.39E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	6.21E+00	mg/kg	2.74E-07	mg/kg-day	1.50E+00	mg/kg-day	4.10E-07					N/A
				Cadmium	4.71E+01	mg/kg	2.62E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	5.79E-07	mg/kg-day	2.00E+01	mg/kg-day	4.64E-05					N/A
				Cobalt	1.23E+01	mg/kg	6.85E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	5.38E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	1.87E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	1.79E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	7.35E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	6.40E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	2.08E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	8.91E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	2.48E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	7.68E-06	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	2.04E-07	mg/kg-day	2.40E-01	mg/kg-day	4.90E-08					N/A
				4,4'-DDE	6.03E+02	ug/kg	2.66E-08	mg/kg-day	3.40E-01	mg/kg-day	9.03E-09					N/A
				4,4'-DDT	1.73E+04	ug/kg	7.62E-07	mg/kg-day	3.40E-01	mg/kg-day	2.59E-07					N/A
				Aroclor-1248	5.60E+02	ug/kg	1.15E-07	mg/kg-day	2.00E+00	mg/kg-day	2.30E-07					N/A
				Aroclor-1254	1.34E+02	ug/kg	2.76E-08	mg/kg-day	2.00E+00	mg/kg-day	5.51E-08					N/A
				Aroclor-1260	4.51E+01	ug/kg	9.27E-09	mg/kg-day	2.00E+00	mg/kg-day	1.85E-08					N/A
				Dieldrin	7.01E+02	ug/kg	1.03E-07	mg/kg-day	1.60E+01	mg/kg-day	1.65E-06					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	1.88E-09	mg/kg-day	9.10E+00	mg/kg-day	1.71E-08					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	7.48E-07	mg/kg-day	7.30E-01	mg/kg-day	2.19E-06					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	5.52E-07	mg/kg-day	7.30E+00	mg/kg-day	1.61E-05					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	6.13E-07	mg/kg-day	7.30E-01	mg/kg-day	1.79E-06					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	4.09E-07	mg/kg-day	7.30E-02	mg/kg-day	1.19E-07					N/A
				Chrysene	3.58E+03	ug/kg	6.83E-07	mg/kg-day	7.30E-03	mg/kg-day	2.00E-08					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	5.35E-08	mg/kg-day	7.30E+00	mg/kg-day	1.56E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	2.48E-07	mg/kg-day	7.30E-01	mg/kg-day	7.26E-07					N/A
				Naphthalene	7.76E+02	ug/kg	5.62E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	9.05E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	2.89E-08	mg/kg-day	1.10E-02	mg/kg-day	3.17E-10					N/A
			Exp. Route Total								7.30E-05					--
		Exposure Point Total									1.99E-04					--
	Exposure Medium Total										1.99E-04					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.50E-06	mg/m3	3.40E-02	1/(mg/m3)	8.52E-08					N/A
				Ethylbenzene	7.00E+03	ug/kg	8.83E-05	mg/m3	2.50E-03	1/(mg/m3)	2.21E-07					N/A
			Exp. Route Total								3.06E-07					--
		Exposure Point Total									3.06E-07					--
	Exposure Medium Total										3.06E-07					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.86E-10	mg/m3	1.20E+01	1/(mg/m3)	5.65E-09					N/A
				Manganese	1.32E+03	mg/kg	4.98E-09	mg/m3	--	1/(mg/m3)	--					N/A
			Exp. Route Total								5.65E-09					--
		Exposure Point Total									5.65E-09					--
	Exposure Medium Total										5.65E-09					--
Medium Total											2.00E-04					--
										Total of Receptor Risks Across All Media	2.00E-04			Total of Receptor Hazards Across All Media		--

TABLE 7.34a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.13E-10	mg/kg-day	1.30E+05	mg/kg-day	1.47E-05					N/A
				Aluminum	1.98E+04	mg/kg	2.76E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	3.49E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	4.71E+01	mg/kg	6.57E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	1.83E-05	mg/kg-day	5.00E-01	mg/kg-day	3.93E-05					N/A
				Cobalt	1.23E+01	mg/kg	1.72E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	1.35E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	4.69E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	4.49E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	1.84E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	1.60E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	5.22E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	2.23E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	6.21E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	1.93E-04	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	2.15E-06	mg/kg-day	2.40E-01	mg/kg-day	5.17E-07					N/A
				4,4'-DDE	6.03E+02	ug/kg	2.81E-07	mg/kg-day	3.40E-01	mg/kg-day	9.54E-08					N/A
				4,4'-DDT	1.73E+04	ug/kg	8.05E-06	mg/kg-day	3.40E-01	mg/kg-day	2.74E-06					N/A
				Aroclor-1248	5.60E+02	ug/kg	2.61E-07	mg/kg-day	2.00E+00	mg/kg-day	5.21E-07					N/A
				Aroclor-1254	1.34E+02	ug/kg	6.23E-08	mg/kg-day	2.00E+00	mg/kg-day	1.25E-07					N/A
				Aroclor-1260	4.51E+01	ug/kg	2.10E-08	mg/kg-day	2.00E+00	mg/kg-day	4.20E-08					N/A
				Dieldrin	7.01E+02	ug/kg	3.26E-07	mg/kg-day	1.60E+01	mg/kg-day	5.22E-06					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	5.95E-09	mg/kg-day	9.10E+00	mg/kg-day	5.42E-08					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	1.82E-06	mg/kg-day	7.30E-01	mg/kg-day	5.70E-06					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	1.34E-06	mg/kg-day	7.30E+00	mg/kg-day	4.20E-05					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.49E-06	mg/kg-day	7.30E-01	mg/kg-day	4.67E-06					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	9.96E-07	mg/kg-day	7.30E-02	mg/kg-day	3.11E-07					N/A
				Chrysene	3.58E+03	ug/kg	1.67E-06	mg/kg-day	7.30E-03	mg/kg-day	5.21E-08					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.30E-07	mg/kg-day	7.30E+00	mg/kg-day	4.07E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	6.05E-07	mg/kg-day	7.30E-01	mg/kg-day	1.89E-06					N/A
				Naphthalene	7.76E+02	ug/kg	1.08E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	1.74E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	3.05E-07	mg/kg-day	1.10E-02	mg/kg-day	3.35E-09					N/A
			Exp. Route Total								1.22E-04					--

TABLE 7.34a.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

REASONABLE MAXIMUM EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.07E-11	mg/kg-day	1.30E+05	mg/kg-day	1.39E-06					N/A
				Aluminum	1.98E+04	mg/kg	1.10E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	1.39E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	4.71E+01	mg/kg	2.62E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	5.79E-07	mg/kg-day	2.00E+01	mg/kg-day	4.64E-05					N/A
				Cobalt	1.23E+01	mg/kg	6.85E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	5.38E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	1.87E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	1.79E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	7.35E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	6.40E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	2.08E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	8.91E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	2.48E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	7.68E-06	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	2.04E-07	mg/kg-day	2.40E-01	mg/kg-day	4.90E-08					N/A
				4,4'-DDE	6.03E+02	ug/kg	2.66E-08	mg/kg-day	3.40E-01	mg/kg-day	9.03E-09					N/A
				4,4'-DDT	1.73E+04	ug/kg	7.62E-07	mg/kg-day	3.40E-01	mg/kg-day	2.59E-07					N/A
				Aroclor-1248	5.60E+02	ug/kg	1.15E-07	mg/kg-day	2.00E+00	mg/kg-day	2.30E-07					N/A
				Aroclor-1254	1.34E+02	ug/kg	2.76E-08	mg/kg-day	2.00E+00	mg/kg-day	5.51E-08					N/A
				Aroclor-1260	4.51E+01	ug/kg	9.27E-09	mg/kg-day	2.00E+00	mg/kg-day	1.85E-08					N/A
				Dieldrin	7.01E+02	ug/kg	1.03E-07	mg/kg-day	1.60E+01	mg/kg-day	1.65E-06					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	1.88E-09	mg/kg-day	9.10E+00	mg/kg-day	1.71E-08					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	7.48E-07	mg/kg-day	7.30E-01	mg/kg-day	2.19E-06					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	5.52E-07	mg/kg-day	7.30E+00	mg/kg-day	1.61E-05					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	6.13E-07	mg/kg-day	7.30E-01	mg/kg-day	1.79E-06					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	4.09E-07	mg/kg-day	7.30E-02	mg/kg-day	1.19E-07					N/A
				Chrysene	3.58E+03	ug/kg	6.83E-07	mg/kg-day	7.30E-03	mg/kg-day	2.00E-08					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	5.35E-08	mg/kg-day	7.30E+00	mg/kg-day	1.56E-06					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	2.48E-07	mg/kg-day	7.30E-01	mg/kg-day	7.26E-07					N/A
				Naphthalene	7.76E+02	ug/kg	5.62E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	9.05E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	2.89E-08	mg/kg-day	1.10E-02	mg/kg-day	3.17E-10					N/A
			Exp. Route Total								7.26E-05					--
		Exposure Point Total									1.95E-04					--
	Exposure Medium Total										1.95E-04					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.50E-06	mg/m3	3.40E-02	1/(mg/m3)	8.52E-08					N/A
				Ethylbenzene	7.00E+03	ug/kg	8.83E-05	mg/m3	2.50E-03	1/(mg/m3)	2.21E-07					N/A
			Exp. Route Total								3.06E-07					--
		Exposure Point Total									3.06E-07					--
	Exposure Medium Total										3.06E-07					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.86E-10	mg/m3	1.20E+01	1/(mg/m3)	5.65E-09					N/A
				Manganese	1.32E+03	mg/kg	4.98E-09	mg/m3	--	1/(mg/m3)	--					N/A
			Exp. Route Total								5.65E-09					--
		Exposure Point Total									5.65E-09					--
	Exposure Medium Total										5.65E-09					--
Medium Total											1.95E-04					--
										Total of Receptor Risks Across All Media	1.95E-04				Total of Receptor Hazards Across All Media		--

TABLE 7.35.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER EXPOSURE TO SITE 3 SURFACE WATER

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Site 3 Contact with Surface Water	Ingestion	Chromium	1.17E+00	ug/l	4.25E-10	mg/kg-day	5.00E-01	mg/kg-day	2.13E-10	2.98E-08	mg/kg-day	3.00E-03	mg/kg-day	9.92E-06
				Benzo(a)pyrene	4.70E-02	ug/l	1.71E-11	mg/kg-day	7.30E+00	mg/kg-day	1.25E-10	1.20E-09	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								3.37E-10					9.92E-06
			Dermal	Chromium	1.17E+00	ug/l	7.07E-10	mg/kg-day	2.00E+01	mg/kg-day	1.41E-08	4.95E-08	mg/kg-day	7.50E-05	mg/kg-day	6.59E-04
				Benzo(a)pyrene	4.70E-02	ug/l	3.18E-08	mg/kg-day	7.30E+00	mg/kg-day	2.32E-07	2.23E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.47E-07					6.59E-04
		Exposure Point Total									2.47E-07					6.69E-04
	Exposure Medium Total										2.47E-07					6.69E-04
Medium Total											2.47E-07					6.69E-04
										Total of Receptor Risks Across All Media	2.47E-07				Total of Receptor Hazards Across All Media	6.69E-04

TABLE 7.36.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SURFACE WATER

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Site 3 Contact with Surface Water	Ingestion	Chromium	1.17E+00	ug/l	4.76E-09	mg/kg-day	5.00E-01	mg/kg-day	1.27E-08	5.56E-08	mg/kg-day	3.00E-03	mg/kg-day	1.85E-05
				Benzo(a)pyrene	4.70E-02	ug/l	1.91E-10	mg/kg-day	7.30E+00	mg/kg-day	7.45E-09	2.23E-09	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.01E-08					1.85E-05
			Dermal	Chromium	1.17E+00	ug/l	8.47E-09	mg/kg-day	2.00E+01	mg/kg-day	9.03E-07	9.88E-08	mg/kg-day	7.50E-05	mg/kg-day	1.32E-03
				Benzo(a)pyrene	4.70E-02	ug/l	3.82E-07	mg/kg-day	7.30E+00	mg/kg-day	1.49E-05	4.45E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.58E-05					1.32E-03
		Exposure Point Total									1.58E-05					1.34E-03
	Exposure Medium Total										1.58E-05					1.34E-03
Medium Total											1.58E-05					1.34E-03
										Total of Receptor Risks Across All Media	1.58E-05				Total of Receptor Hazards Across All Media	1.34E-03

TABLE 7.37.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SURFACE WATER

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Site 3 Contact with Surface Water	Ingestion	Chromium	1.17E+00	ug/l	4.08E-09	mg/kg-day	5.00E-01	mg/kg-day	3.74E-09	1.19E-08	mg/kg-day	3.00E-03	mg/kg-day	3.97E-06
				Benzo(a)pyrene	4.70E-02	ug/l	1.64E-10	mg/kg-day	7.30E+00	mg/kg-day	2.19E-09	4.78E-10	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								5.94E-09					3.97E-06
			Dermal	Chromium	1.17E+00	ug/l	6.78E-09	mg/kg-day	2.00E+01	mg/kg-day	2.49E-07	1.98E-08	mg/kg-day	7.50E-05	mg/kg-day	2.64E-04
				Benzo(a)pyrene	4.70E-02	ug/l	3.06E-07	mg/kg-day	7.30E+00	mg/kg-day	4.09E-06	8.92E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								4.34E-06					2.64E-04
		Exposure Point Total									4.35E-06					2.68E-04
	Exposure Medium Total										4.35E-06					2.68E-04
Medium Total											4.35E-06					2.68E-04
										Total of Receptor Risks Across All Media	4.35E-06			Total of Receptor Hazards Across All Media		2.68E-04

TABLE 7.38.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SURFACE WATER

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Site 3 Contact with Surface Water	Ingestion	Chromium	1.17E+00	ug/l	8.84E-09	mg/kg-day	5.00E-01	mg/kg-day	1.64E-08					N/A
				Benzo(a)pyrene	4.70E-02	ug/l	3.55E-10	mg/kg-day	7.30E+00	mg/kg-day	9.64E-09					N/A
			Exp. Route Total								2.61E-08					--
			Dermal	Chromium	1.17E+00	ug/l	1.52E-08	mg/kg-day	2.00E+01	mg/kg-day	1.15E-06					N/A
				Benzo(a)pyrene	4.70E-02	ug/l	6.87E-07	mg/kg-day	7.30E+00	mg/kg-day	1.89E-05					N/A
			Exp. Route Total								2.01E-05					--
		Exposure Point Total									2.01E-05					--
	Exposure Medium Total										2.01E-05					--
Medium Total											2.01E-05					--
										Total of Receptor Risks Across All Media	2.01E-05			Total of Receptor Hazards Across All Media		--

TABLE 7.39.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CONSTRUCTION WORKER EXPOSURE TO SITE 3 SEDIMENT

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Site 3 Contact with Sediment	Ingestion	Arsenic	1.11E+01	mg/kg	2.66E-07	mg/kg-day	1.50E+00	mg/kg-day	3.99E-07	1.86E-05	mg/kg-day	3.00E-04	mg/kg-day	6.21E-02
				Chromium	2.61E+01	mg/kg	6.26E-07	mg/kg-day	5.00E-01	mg/kg-day	3.13E-07	4.38E-05	mg/kg-day	3.00E-03	mg/kg-day	1.46E-02
				Benzo(a)pyrene	9.76E+02	ug/kg	2.34E-08	mg/kg-day	7.30E+00	mg/kg-day	1.71E-07	1.64E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.07E+03	ug/kg	7.36E-08	mg/kg-day	7.30E-01	mg/kg-day	5.38E-08	5.15E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	3.06E+02	ug/kg	7.34E-09	mg/kg-day	7.30E+00	mg/kg-day	5.36E-08	5.14E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								9.91E-07					7.67E-02
			Dermal	Arsenic	1.11E+01	mg/kg	1.60E-08	mg/kg-day	1.50E+00	mg/kg-day	2.40E-08	1.12E-06	mg/kg-day	3.00E-04	mg/kg-day	3.73E-03
				Chromium	2.61E+01	mg/kg	1.25E-08	mg/kg-day	2.00E+01	mg/kg-day	2.50E-07	8.76E-07	mg/kg-day	7.50E-05	mg/kg-day	1.17E-02
				Benzo(a)pyrene	9.76E+02	ug/kg	6.09E-09	mg/kg-day	7.30E+00	mg/kg-day	4.44E-08	4.26E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.07E+03	ug/kg	1.91E-08	mg/kg-day	7.30E-01	mg/kg-day	1.40E-08	1.34E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	3.06E+02	ug/kg	1.91E-09	mg/kg-day	7.30E+00	mg/kg-day	1.39E-08	1.34E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								3.47E-07					1.54E-02
		Exposure Point Total									1.34E-06					9.21E-02
	Exposure Medium Total										1.34E-06					9.21E-02
Medium Total											1.34E-06					9.21E-02
											Total of Receptor Risks Across All Media	1.34E-06				Total of Receptor Hazards Across All Media	9.21E-02

TABLE 7.40.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SEDIMENT

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Site 3 Contact with Sediment	Ingestion	Arsenic	1.11E+01	mg/kg	9.04E-07	mg/kg-day	1.50E+00	mg/kg-day	1.36E-06	1.05E-05	mg/kg-day	3.00E-04	mg/kg-day	3.51E-02
				Chromium	2.61E+01	mg/kg	2.12E-06	mg/kg-day	5.00E-01	mg/kg-day	5.67E-06	2.48E-05	mg/kg-day	3.00E-03	mg/kg-day	8.26E-03
				Benzo(a)pyrene	9.76E+02	ug/kg	7.95E-08	mg/kg-day	7.30E+00	mg/kg-day	3.09E-06	9.27E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.07E+03	ug/kg	2.50E-07	mg/kg-day	7.30E-01	mg/kg-day	9.73E-07	2.92E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	3.06E+02	ug/kg	2.49E-08	mg/kg-day	7.30E+00	mg/kg-day	9.70E-07	2.91E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.21E-05					4.34E-02
			Dermal	Arsenic	1.11E+01	mg/kg	1.52E-07	mg/kg-day	1.50E+00	mg/kg-day	2.28E-07	1.77E-06	mg/kg-day	3.00E-04	mg/kg-day	5.90E-03
				Chromium	2.61E+01	mg/kg	1.19E-07	mg/kg-day	2.00E+01	mg/kg-day	1.27E-05	1.39E-06	mg/kg-day	7.50E-05	mg/kg-day	1.85E-02
				Benzo(a)pyrene	9.76E+02	ug/kg	5.78E-08	mg/kg-day	7.30E+00	mg/kg-day	2.25E-06	6.75E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.07E+03	ug/kg	1.82E-07	mg/kg-day	7.30E-01	mg/kg-day	7.08E-07	2.12E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	3.06E+02	ug/kg	1.81E-08	mg/kg-day	7.30E+00	mg/kg-day	7.06E-07	2.12E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.66E-05					2.44E-02
		Exposure Point Total									2.86E-05					6.78E-02
	Exposure Medium Total										2.86E-05					6.78E-02
Medium Total											2.86E-05					6.78E-02
											Total of Receptor Risks Across All Media	2.86E-05				Total of Receptor Hazards Across All Media	6.78E-02

TABLE 7.41.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SEDIMENT

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Site 3 Contact with Sediment	Ingestion	Arsenic	1.11E+01	mg/kg	3.87E-07	mg/kg-day	1.50E+00	mg/kg-day	5.81E-07	1.13E-06	mg/kg-day	3.00E-04	mg/kg-day	3.77E-03
				Chromium	2.61E+01	mg/kg	9.11E-07	mg/kg-day	5.00E-01	mg/kg-day	8.35E-07	2.66E-06	mg/kg-day	3.00E-03	mg/kg-day	8.85E-04
				Benzo(a)pyrene	9.76E+02	ug/kg	3.41E-08	mg/kg-day	7.30E+00	mg/kg-day	4.56E-07	9.93E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.07E+03	ug/kg	1.07E-07	mg/kg-day	7.30E-01	mg/kg-day	1.43E-07	3.12E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	3.06E+02	ug/kg	1.07E-08	mg/kg-day	7.30E+00	mg/kg-day	1.43E-07	3.11E-08	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.16E-06					4.65E-03
			Dermal	Arsenic	1.11E+01	mg/kg	2.65E-07	mg/kg-day	1.50E+00	mg/kg-day	3.97E-07	7.73E-07	mg/kg-day	3.00E-04	mg/kg-day	2.58E-03
				Chromium	2.61E+01	mg/kg	2.08E-07	mg/kg-day	2.00E+01	mg/kg-day	7.61E-06	6.06E-07	mg/kg-day	7.50E-05	mg/kg-day	8.07E-03
				Benzo(a)pyrene	9.76E+02	ug/kg	1.01E-07	mg/kg-day	7.30E+00	mg/kg-day	1.35E-06	2.94E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.07E+03	ug/kg	3.17E-07	mg/kg-day	7.30E-01	mg/kg-day	4.25E-07	9.26E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	3.06E+02	ug/kg	3.16E-08	mg/kg-day	7.30E+00	mg/kg-day	4.24E-07	9.23E-08	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.02E-05					1.06E-02
		Exposure Point Total									1.24E-05					1.53E-02
	Exposure Medium Total										1.24E-05					1.53E-02
Medium Total											1.24E-05					1.53E-02
											Total of Receptor Risks Across All Media	1.24E-05				Total of Receptor Hazards Across All Media	1.53E-02

TABLE 7.42.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SEDIMENT

REASONABLE MAXIMUM EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Site 3 Contact with Sediment	Ingestion	Arsenic	1.11E+01	mg/kg	1.29E-06	mg/kg-day	1.50E+00	mg/kg-day	1.94E-06					N/A
				Chromium	2.61E+01	mg/kg	3.04E-06	mg/kg-day	5.00E-01	mg/kg-day	6.50E-06					N/A
				Benzo(a)pyrene	9.76E+02	ug/kg	1.14E-07	mg/kg-day	7.30E+00	mg/kg-day	3.55E-06					N/A
				Benzo(b)fluoranthene	3.07E+03	ug/kg	3.57E-07	mg/kg-day	7.30E-01	mg/kg-day	1.12E-06					N/A
				Dibenz(a,h)anthracene	3.06E+02	ug/kg	3.56E-08	mg/kg-day	7.30E+00	mg/kg-day	1.11E-06					N/A
			Exp. Route Total								1.42E-05					--
			Dermal	Arsenic	1.11E+01	mg/kg	4.17E-07	mg/kg-day	1.50E+00	mg/kg-day	6.25E-07					N/A
				Chromium	2.61E+01	mg/kg	3.27E-07	mg/kg-day	2.00E+01	mg/kg-day	2.03E-05					N/A
				Benzo(a)pyrene	9.76E+02	ug/kg	1.59E-07	mg/kg-day	7.30E+00	mg/kg-day	3.60E-06					N/A
				Benzo(b)fluoranthene	3.07E+03	ug/kg	4.99E-07	mg/kg-day	7.30E-01	mg/kg-day	1.13E-06					N/A
				Dibenz(a,h)anthracene	3.06E+02	ug/kg	4.98E-08	mg/kg-day	7.30E+00	mg/kg-day	1.13E-06					N/A
			Exp. Route Total								2.68E-05					--
		Exposure Point Total									4.10E-05					--
	Exposure Medium Total										4.10E-05					--
Medium Total											4.10E-05					--
											Total of Receptor Risks Across All Media	4.10E-05			Total of Receptor Hazards Across All Media		--

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CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURES

TABLE NO.	
7.01.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 GROUNDWATER
7.02.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER
7.03.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 GROUNDWATER
7.04.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.05.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.06.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
7.07.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.07a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.08.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.08a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.09.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.09a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.10.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.10a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.11.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.11a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.12.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
7.12a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
7.13.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.13a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.14.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.14a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.15.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.15a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.16.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.16a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.17.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.17a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
7.18.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
7.18a.CTE	CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION

TABLE 7.01.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO GROUNDWATER

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site 3 Tap Water Contact With Groundwater	Ingestion	Arsenic	4.52E+00	ug/l	6.11E-06	mg/kg-day	1.50E+00	mg/kg-day	9.16E-06	2.14E-04	mg/kg-day	3.00E-04	mg/kg-day	7.13E-01
				Cobalt	2.40E+00	ug/l	3.24E-06	mg/kg-day	--	mg/kg-day	--	1.14E-04	mg/kg-day	3.00E-04	mg/kg-day	3.78E-01
				Manganese	4.33E+01	ug/l	5.85E-05	mg/kg-day	--	mg/kg-day	--	2.05E-03	mg/kg-day	2.40E-02	mg/kg-day	8.53E-02
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	1.49E-05	mg/kg-day	1.40E-02	mg/kg-day	2.08E-07	5.20E-04	mg/kg-day	2.00E-02	mg/kg-day	2.60E-02
				1,1-Dichloroethane	8.20E+00	ug/l	1.11E-05	mg/kg-day	5.70E-03	mg/kg-day	6.32E-08	3.88E-04	mg/kg-day	2.00E-01	mg/kg-day	1.94E-03
				Bromodichloromethane	1.10E+00	ug/l	1.49E-06	mg/kg-day	6.20E-02	mg/kg-day	9.22E-08	5.20E-05	mg/kg-day	2.00E-02	mg/kg-day	2.60E-03
				Carbon Tetrachloride	3.80E-01	ug/l	5.14E-07	mg/kg-day	7.00E-02	mg/kg-day	3.60E-08	1.80E-05	mg/kg-day	4.00E-03	mg/kg-day	4.49E-03
				Chloroform	5.23E-01	ug/l	7.07E-07	mg/kg-day	3.10E-02	mg/kg-day	2.19E-08	2.47E-05	mg/kg-day	1.00E-02	mg/kg-day	2.47E-03
				Dibromochloromethane	1.50E+00	ug/l	2.03E-06	mg/kg-day	8.40E-02	mg/kg-day	1.70E-07	7.10E-05	mg/kg-day	2.00E-02	mg/kg-day	3.55E-03
				Tetrachloroethene	5.26E+00	ug/l	7.11E-06	mg/kg-day	5.20E-02	mg/kg-day	3.70E-07	2.49E-04	mg/kg-day	1.00E-02	mg/kg-day	2.49E-02
				Trichloroethene	3.10E+00	ug/l	4.19E-06	mg/kg-day	1.10E-02	mg/kg-day	4.61E-08	1.47E-04	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.02E-05					1.24E+00
			Dermal	Arsenic	4.52E+00	ug/l	1.80E-08	mg/kg-day	1.50E+00	mg/kg-day	2.70E-08	6.29E-07	mg/kg-day	3.00E-04	mg/kg-day	2.10E-03
				Cobalt	2.40E+00	ug/l	3.82E-09	mg/kg-day	--	mg/kg-day	--	1.34E-07	mg/kg-day	3.00E-04	mg/kg-day	4.46E-04
				Manganese	4.33E+01	ug/l	1.72E-07	mg/kg-day	--	mg/kg-day	--	6.03E-06	mg/kg-day	9.60E-04	mg/kg-day	6.28E-03
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	1.72E-05	mg/kg-day	1.40E-02	mg/kg-day	2.40E-07	6.01E-04	mg/kg-day	2.00E-02	mg/kg-day	3.01E-02
				1,1-Dichloroethane	8.20E+00	ug/l	6.48E-07	mg/kg-day	5.70E-03	mg/kg-day	3.69E-09	2.27E-05	mg/kg-day	2.00E-01	mg/kg-day	1.13E-04
				Bromodichloromethane	1.10E+00	ug/l	9.09E-08	mg/kg-day	6.20E-02	mg/kg-day	5.63E-09	3.18E-06	mg/kg-day	2.00E-02	mg/kg-day	1.59E-04
				Carbon Tetrachloride	3.80E-01	ug/l	1.03E-07	mg/kg-day	7.00E-02	mg/kg-day	7.19E-09	3.60E-06	mg/kg-day	4.00E-03	mg/kg-day	8.99E-04
				Chloroform	5.23E-01	ug/l	4.81E-08	mg/kg-day	3.10E-02	mg/kg-day	1.49E-09	1.68E-06	mg/kg-day	1.00E-02	mg/kg-day	1.68E-04
				Dibromochloromethane	1.50E+00	ug/l	1.15E-07	mg/kg-day	8.40E-02	mg/kg-day	9.67E-09	4.03E-06	mg/kg-day	2.00E-02	mg/kg-day	2.01E-04
				Tetrachloroethene	5.26E+00	ug/l	3.17E-06	mg/kg-day	5.20E-02	mg/kg-day	1.65E-07	1.11E-04	mg/kg-day	1.00E-02	mg/kg-day	1.11E-02
				Trichloroethene	3.10E+00	ug/l	5.42E-07	mg/kg-day	1.10E-02	mg/kg-day	5.96E-09	1.90E-05	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								4.66E-07					5.15E-02
		Exposure Point Total									1.06E-05					1.29E+00
	Exposure Medium Total										1.06E-05					1.29E+00
Medium Total											1.06E-05					1.29E+00
										Total of Receptor Risks Across All Media	1.06E-05			Total of Receptor Hazards Across All Media		1.29E+00

TABLE 7.02.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO GROUNDWATER

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site 3 Tap Water Contact With Groundwater	Ingestion	Arsenic	4.52E+00	ug/l	8.67E-06	mg/kg-day	1.50E+00	mg/kg-day	1.30E-05	8.67E-05	mg/kg-day	3.00E-04	mg/kg-day	2.89E-01
				Cobalt	2.40E+00	ug/l	4.60E-06	mg/kg-day	--	mg/kg-day	--	4.60E-05	mg/kg-day	3.00E-04	mg/kg-day	1.53E-01
				Manganese	4.33E+01	ug/l	8.30E-05	mg/kg-day	--	mg/kg-day	--	8.30E-04	mg/kg-day	2.40E-02	mg/kg-day	3.46E-02
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	2.11E-05	mg/kg-day	1.40E-02	mg/kg-day	2.95E-07	2.11E-04	mg/kg-day	2.00E-02	mg/kg-day	1.05E-02
				1,1-Dichloroethane	8.20E+00	ug/l	1.57E-05	mg/kg-day	5.70E-03	mg/kg-day	8.96E-08	1.57E-04	mg/kg-day	2.00E-01	mg/kg-day	7.86E-04
				Bromodichloromethane	1.10E+00	ug/l	2.11E-06	mg/kg-day	6.20E-02	mg/kg-day	1.31E-07	2.11E-05	mg/kg-day	2.00E-02	mg/kg-day	1.05E-03
				Carbon Tetrachloride	3.80E-01	ug/l	7.29E-07	mg/kg-day	7.00E-02	mg/kg-day	5.10E-08	7.29E-06	mg/kg-day	4.00E-03	mg/kg-day	1.82E-03
				Chloroform	5.23E-01	ug/l	1.00E-06	mg/kg-day	3.10E-02	mg/kg-day	3.11E-08	1.00E-05	mg/kg-day	1.00E-02	mg/kg-day	1.00E-03
				Dibromochloromethane	1.50E+00	ug/l	2.88E-06	mg/kg-day	8.40E-02	mg/kg-day	2.42E-07	2.88E-05	mg/kg-day	2.00E-02	mg/kg-day	1.44E-03
				Tetrachloroethene	5.26E+00	ug/l	1.01E-05	mg/kg-day	5.20E-02	mg/kg-day	5.25E-07	1.01E-04	mg/kg-day	1.00E-02	mg/kg-day	1.01E-02
				Trichloroethene	3.10E+00	ug/l	5.95E-06	mg/kg-day	1.10E-02	mg/kg-day	6.54E-08	5.95E-05	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.44E-05					5.04E-01
			Dermal	Arsenic	4.52E+00	ug/l	1.86E-08	mg/kg-day	1.50E+00	mg/kg-day	2.79E-08	1.86E-07	mg/kg-day	3.00E-04	mg/kg-day	6.20E-04
				Cobalt	2.40E+00	ug/l	3.95E-09	mg/kg-day	--	mg/kg-day	--	3.95E-08	mg/kg-day	3.00E-04	mg/kg-day	1.32E-04
				Manganese	4.33E+01	ug/l	1.78E-07	mg/kg-day	--	mg/kg-day	--	1.78E-06	mg/kg-day	9.60E-04	mg/kg-day	1.86E-03
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	2.50E-05	mg/kg-day	1.40E-02	mg/kg-day	3.50E-07	2.50E-04	mg/kg-day	2.00E-02	mg/kg-day	1.25E-02
				1,1-Dichloroethane	8.20E+00	ug/l	8.14E-07	mg/kg-day	5.70E-03	mg/kg-day	4.64E-09	8.14E-06	mg/kg-day	2.00E-01	mg/kg-day	4.07E-05
				Bromodichloromethane	1.10E+00	ug/l	1.18E-07	mg/kg-day	6.20E-02	mg/kg-day	7.35E-09	1.18E-06	mg/kg-day	2.00E-02	mg/kg-day	5.92E-05
				Carbon Tetrachloride	3.80E-01	ug/l	1.33E-07	mg/kg-day	7.00E-02	mg/kg-day	9.29E-09	1.33E-06	mg/kg-day	4.00E-03	mg/kg-day	3.32E-04
				Chloroform	5.23E-01	ug/l	6.14E-08	mg/kg-day	3.10E-02	mg/kg-day	1.90E-09	6.14E-07	mg/kg-day	1.00E-02	mg/kg-day	6.14E-05
				Dibromochloromethane	1.50E+00	ug/l	1.53E-07	mg/kg-day	8.40E-02	mg/kg-day	1.28E-08	1.53E-06	mg/kg-day	2.00E-02	mg/kg-day	7.64E-05
				Tetrachloroethene	5.26E+00	ug/l	4.11E-06	mg/kg-day	5.20E-02	mg/kg-day	2.14E-07	4.11E-05	mg/kg-day	1.00E-02	mg/kg-day	4.11E-03
				Trichloroethene	3.10E+00	ug/l	6.94E-07	mg/kg-day	1.10E-02	mg/kg-day	7.63E-09	6.94E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								6.35E-07					1.98E-02
		Exposure Point Total									1.51E-05					5.23E-01
	Exposure Medium Total										1.51E-05					5.23E-01
	Air	Site 3 Groundwater Vapors During Showering	Inhalation	Arsenic	4.52E+00	ug/l	NA	mg/m3	4.30E+00	1/(mg/m3)	NA	NA	mg/m3	1.50E-05	mg/m3	NA
				Cobalt	2.40E+00	ug/l	NA	mg/m3	9.00E+00	1/(mg/m3)	NA	NA	mg/m3	6.00E-06	mg/m3	NA
				Manganese	4.33E+01	ug/l	NA	mg/m3	--	1/(mg/m3)	--	NA	mg/m3	5.00E-05	mg/m3	NA
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	NA	mg/m3	2.40E-03	1/(mg/m3)	NA	NA	mg/m3	--	mg/m3	--
				1,1-Dichloroethane	8.20E+00	ug/l	8.22E-06	mg/m3	1.60E-03	1/(mg/m3)	1.32E-08	8.22E-05	mg/m3	--	mg/m3	--
				Bromodichloromethane	1.10E+00	ug/l	8.37E-07	mg/m3	3.70E-02	1/(mg/m3)	3.10E-08	8.37E-06	mg/m3	--	mg/m3	--
				Carbon Tetrachloride	3.80E-01	ug/l	3.15E-07	mg/m3	6.00E-03	1/(mg/m3)	1.89E-09	3.15E-06	mg/m3	1.00E-01	mg/m3	3.15E-05
				Chloroform	5.23E-01	ug/l	4.76E-07	mg/m3	2.30E-02	1/(mg/m3)	1.09E-08	4.76E-06	mg/m3	9.80E-02	mg/m3	4.86E-05
				Dibromochloromethane	1.50E+00	ug/l	9.69E-07	mg/m3	2.70E-02	1/(mg/m3)	2.62E-08	9.69E-06	mg/m3	--	mg/m3	--
				Tetrachloroethene	5.26E+00	ug/l	4.20E-06	mg/m3	2.90E-03	1/(mg/m3)	1.22E-08	4.20E-05	mg/m3	2.70E-01	mg/m3	1.56E-04
				Trichloroethene	3.10E+00	ug/l	2.75E-06	mg/m3	1.70E-03	1/(mg/m3)	4.68E-09	2.75E-05	mg/m3	--	mg/m3	--
			Exp. Route Total								1.00E-07					2.36E-04
		Exposure Point Total									1.00E-07					2.36E-04
	Exposure Medium Total										1.00E-07					2.36E-04
Medium Total											1.52E-05					5.24E-01
										Total of Receptor Risks Across All Media	1.52E-05			Total of Receptor Hazards Across All Media		5.24E-01

TABLE 7.03.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO GROUNDWATER

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site 3 Tap Water Contact With Groundwater	Ingestion	Arsenic	4.52E+00	ug/l	1.48E-05	mg/kg-day	1.50E+00	mg/kg-day	2.22E-05					N/A
				Cobalt	2.40E+00	ug/l	4.60E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	4.33E+01	ug/l	8.30E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	3.60E-05	mg/kg-day	1.40E-02	mg/kg-day	5.03E-07					N/A
				1,1-Dichloroethane	8.20E+00	ug/l	2.68E-05	mg/kg-day	5.70E-03	mg/kg-day	1.53E-07					N/A
				Bromodichloromethane	1.10E+00	ug/l	3.60E-06	mg/kg-day	6.20E-02	mg/kg-day	2.23E-07					N/A
				Carbon Tetrachloride	3.80E-01	ug/l	1.24E-06	mg/kg-day	7.00E-02	mg/kg-day	8.70E-08					N/A
				Chloroform	5.23E-01	ug/l	1.71E-06	mg/kg-day	3.10E-02	mg/kg-day	5.30E-08					N/A
				Dibromochloromethane	1.50E+00	ug/l	4.90E-06	mg/kg-day	8.40E-02	mg/kg-day	4.12E-07					N/A
				Tetrachloroethene	5.26E+00	ug/l	1.72E-05	mg/kg-day	5.20E-02	mg/kg-day	8.94E-07					N/A
				Trichloroethene	3.10E+00	ug/l	1.01E-05	mg/kg-day	1.10E-02	mg/kg-day	1.11E-07					N/A
			Exp. Route Total								2.46E-05					--
			Dermal	Arsenic	4.52E+00	ug/l	3.66E-08	mg/kg-day	1.50E+00	mg/kg-day	5.49E-08					N/A
				Cobalt	2.40E+00	ug/l	3.95E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	4.33E+01	ug/l	1.78E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	4.22E-05	mg/kg-day	1.40E-02	mg/kg-day	5.90E-07					N/A
				1,1-Dichloroethane	8.20E+00	ug/l	1.46E-06	mg/kg-day	5.70E-03	mg/kg-day	8.34E-09					N/A
				Bromodichloromethane	1.10E+00	ug/l	2.09E-07	mg/kg-day	6.20E-02	mg/kg-day	1.30E-08					N/A
				Carbon Tetrachloride	3.80E-01	ug/l	2.35E-07	mg/kg-day	7.00E-02	mg/kg-day	1.65E-08					N/A
				Chloroform	5.23E-01	ug/l	1.09E-07	mg/kg-day	3.10E-02	mg/kg-day	3.39E-09					N/A
				Dibromochloromethane	1.50E+00	ug/l	2.68E-07	mg/kg-day	8.40E-02	mg/kg-day	2.25E-08					N/A
				Tetrachloroethene	5.26E+00	ug/l	7.28E-06	mg/kg-day	5.20E-02	mg/kg-day	3.78E-07					N/A
				Trichloroethene	3.10E+00	ug/l	1.24E-06	mg/kg-day	1.10E-02	mg/kg-day	1.36E-08					N/A
			Exp. Route Total								1.10E-06					--
		Exposure Point Total									2.57E-05					--
	Exposure Medium Total										2.57E-05					--
	Air	Site 3 Groundwater Vapors During Showering	Inhalation	Arsenic	4.52E+00	ug/l	NA	mg/m3	4.30E+00	1/(mg/m3)	--					N/A
				Cobalt	2.40E+00	ug/l	NA	mg/m3	9.00E+00	1/(mg/m3)	--					N/A
				Manganese	4.33E+01	ug/l	NA	mg/m3	--	1/(mg/m3)	--					N/A
				Bis(2-ethylhexyl) Phthalate	1.10E+01	ug/l	NA	mg/m3	2.40E-03	1/(mg/m3)	--					N/A
				1,1-Dichloroethane	8.20E+00	ug/l	8.22E-06	mg/m3	1.60E-03	1/(mg/m3)	1.32E-08					N/A
				Bromodichloromethane	1.10E+00	ug/l	8.37E-07	mg/m3	3.70E-02	1/(mg/m3)	3.10E-08					N/A
				Carbon Tetrachloride	3.80E-01	ug/l	3.15E-07	mg/m3	6.00E-03	1/(mg/m3)	1.89E-09					N/A
				Chloroform	5.23E-01	ug/l	4.76E-07	mg/m3	2.30E-02	1/(mg/m3)	1.09E-08					N/A
				Dibromochloromethane	1.50E+00	ug/l	9.69E-07	mg/m3	2.70E-02	1/(mg/m3)	2.62E-08					N/A
				Tetrachloroethene	5.26E+00	ug/l	4.20E-06	mg/m3	2.90E-03	1/(mg/m3)	1.22E-08					N/A
				Trichloroethene	3.10E+00	ug/l	2.75E-06	mg/m3	1.70E-03	1/(mg/m3)	4.68E-09					N/A
			Exp. Route Total								1.00E-07					--
		Exposure Point Total									1.00E-07					--
	Exposure Medium Total										1.00E-07					--
Medium Total											2.58E-05					--
										Total of Receptor Risks Across All Media	2.58E-05				Total of Receptor Hazards Across All Media	--

TABLE 7.04.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 HANGAR AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	5.13E-07	mg/kg-day	7.30E-01	mg/kg-day	1.12E-06	1.80E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	3.91E-07	mg/kg-day	7.30E+00	mg/kg-day	8.56E-06	1.37E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	5.13E-07	mg/kg-day	7.30E-01	mg/kg-day	1.12E-06	1.80E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	7.08E-08	mg/kg-day	7.30E+00	mg/kg-day	1.55E-06	2.48E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	2.44E-07	mg/kg-day	7.30E-01	mg/kg-day	5.35E-07	8.55E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.29E-05					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	7.47E-08	mg/kg-day	7.30E-01	mg/kg-day	1.64E-07	2.61E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	5.69E-08	mg/kg-day	7.30E+00	mg/kg-day	1.25E-06	1.99E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	7.47E-08	mg/kg-day	7.30E-01	mg/kg-day	1.64E-07	2.61E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	1.03E-08	mg/kg-day	7.30E+00	mg/kg-day	2.26E-07	3.61E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	3.56E-08	mg/kg-day	7.30E-01	mg/kg-day	7.79E-08	1.24E-06	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.88E-06					--
		Exposure Point Total									1.48E-05					--
	Exposure Medium Total										1.48E-05					--
Medium Total											1.48E-05					--
											Total of Receptor Risks Across All Media					--

TABLE 7.05.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 HANGAR AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	1.92E-07	mg/kg-day	7.30E-01	mg/kg-day	1.40E-07	1.92E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	1.47E-07	mg/kg-day	7.30E+00	mg/kg-day	1.07E-06	1.47E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.92E-07	mg/kg-day	7.30E-01	mg/kg-day	1.40E-07	1.92E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	2.66E-08	mg/kg-day	7.30E+00	mg/kg-day	1.94E-07	2.66E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	9.16E-08	mg/kg-day	7.30E-01	mg/kg-day	6.69E-08	9.16E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								1.61E-06					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	2.85E-08	mg/kg-day	7.30E-01	mg/kg-day	2.08E-08	2.85E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	3.20E+03	ug/kg	2.17E-08	mg/kg-day	7.30E+00	mg/kg-day	1.59E-07	2.17E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.20E+03	ug/kg	2.85E-08	mg/kg-day	7.30E-01	mg/kg-day	2.08E-08	2.85E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	3.94E-09	mg/kg-day	7.30E+00	mg/kg-day	2.87E-08	3.94E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	1.36E-08	mg/kg-day	7.30E-01	mg/kg-day	9.91E-09	1.36E-07	mg/kg-day	--	mg/kg-day	--
			Exp. Route Total								2.39E-07					--
		Exposure Point Total									1.85E-06					--
	Exposure Medium Total										1.85E-06					--
Medium Total											1.85E-06					--
											Total of Receptor Risks Across All Media	1.85E-06		Total of Receptor Hazards Across All Media		--

TABLE 7.06.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Hangar Area Contact with Soil	Ingestion	Benz(a)anthracene	4.20E+03	ug/kg	7.05E-07	mg/kg-day	7.30E-01	mg/kg-day	1.26E-06					N/A
				Benzo(a)pyrene	3.20E+03	ug/kg	5.37E-07	mg/kg-day	7.30E+00	mg/kg-day	9.63E-06					N/A
				Benzo(b)fluoranthene	4.20E+03	ug/kg	7.05E-07	mg/kg-day	7.30E-01	mg/kg-day	1.26E-06					N/A
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	9.74E-08	mg/kg-day	7.30E+00	mg/kg-day	1.74E-06					N/A
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	3.36E-07	mg/kg-day	7.30E-01	mg/kg-day	6.02E-07					N/A
			Exp. Route Total								1.45E-05					--
			Dermal	Benz(a)anthracene	4.20E+03	ug/kg	1.03E-07	mg/kg-day	7.30E-01	mg/kg-day	1.84E-07					N/A
				Benzo(a)pyrene	3.20E+03	ug/kg	7.86E-08	mg/kg-day	7.30E+00	mg/kg-day	1.40E-06					N/A
				Benzo(b)fluoranthene	4.20E+03	ug/kg	1.03E-07	mg/kg-day	7.30E-01	mg/kg-day	1.84E-07					N/A
				Dibenz(a,h)anthracene	5.80E+02	ug/kg	1.42E-08	mg/kg-day	7.30E+00	mg/kg-day	2.55E-07					N/A
				Indeno(1,2,3-cd)pyrene	2.00E+03	ug/kg	4.91E-08	mg/kg-day	7.30E-01	mg/kg-day	8.78E-08					N/A
			Exp. Route Total								2.12E-06					--
		Exposure Point Total									1.66E-05					--
	Exposure Medium Total										1.66E-05					--
Medium Total											1.66E-05					--
											Total of Receptor Risks Across All Media	1.66E-05		Total of Receptor Hazards Across All Media		--

TABLE 7.07.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.54E-12	mg/kg-day	1.30E+05	mg/kg-day	2.00E-07	5.39E-11	mg/kg-day	1.00E-09	mg/kg-day	5.39E-02
				Aluminum	1.64E+04	mg/kg	2.00E-03	mg/kg-day	--	mg/kg-day	--	7.01E-02	mg/kg-day	1.00E+00	mg/kg-day	7.01E-02
				Antimony	1.33E+00	mg/kg	1.62E-07	mg/kg-day	--	mg/kg-day	--	5.68E-06	mg/kg-day	4.00E-04	mg/kg-day	1.42E-02
				Arsenic	5.35E+00	mg/kg	6.53E-07	mg/kg-day	1.50E+00	mg/kg-day	9.80E-07	2.29E-05	mg/kg-day	3.00E-04	mg/kg-day	7.62E-02
				Cadmium	2.81E+00	mg/kg	3.43E-07	mg/kg-day	--	mg/kg-day	--	1.20E-05	mg/kg-day	1.00E-03	mg/kg-day	1.20E-02
				Chromium	2.14E+01	mg/kg	2.61E-06	mg/kg-day	5.00E-01	mg/kg-day	3.92E-06	9.15E-05	mg/kg-day	3.00E-03	mg/kg-day	3.05E-02
				Cobalt	8.76E+00	mg/kg	1.07E-06	mg/kg-day	--	mg/kg-day	--	3.74E-05	mg/kg-day	3.00E-04	mg/kg-day	1.25E-01
				Iron	2.17E+04	mg/kg	2.65E-03	mg/kg-day	--	mg/kg-day	--	9.27E-02	mg/kg-day	7.00E-01	mg/kg-day	1.32E-01
				Manganese	6.78E+02	mg/kg	8.28E-05	mg/kg-day	--	mg/kg-day	--	2.90E-03	mg/kg-day	2.40E-02	mg/kg-day	1.21E-01
				Vanadium	3.16E+01	mg/kg	3.86E-06	mg/kg-day	--	mg/kg-day	--	1.35E-04	mg/kg-day	5.00E-03	mg/kg-day	2.70E-02
				Dieldrin	1.38E+02	ug/kg	1.69E-08	mg/kg-day	1.60E+01	mg/kg-day	2.70E-07	5.90E-07	mg/kg-day	5.00E-05	mg/kg-day	1.18E-02
				Benz(a)anthracene	5.60E+03	ug/kg	6.84E-07	mg/kg-day	7.30E-01	mg/kg-day	1.50E-06	2.39E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	5.14E-07	mg/kg-day	7.30E+00	mg/kg-day	1.13E-05	1.80E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	5.67E-07	mg/kg-day	7.30E-01	mg/kg-day	1.24E-06	1.98E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	3.69E-07	mg/kg-day	7.30E-02	mg/kg-day	8.08E-08	1.29E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	5.73E-07	mg/kg-day	7.30E-03	mg/kg-day	1.25E-08	2.00E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	3.30E-08	mg/kg-day	7.30E+00	mg/kg-day	7.22E-07	1.15E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.32E-07	mg/kg-day	7.30E-01	mg/kg-day	5.08E-07	8.12E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	6.80E-08	mg/kg-day	--	mg/kg-day	--	2.38E-06	mg/kg-day	2.00E-02	mg/kg-day	1.19E-04
				Phenanthrene	1.79E+04	ug/kg	2.19E-06	mg/kg-day	--	mg/kg-day	--	7.65E-05	mg/kg-day	3.00E-02	mg/kg-day	2.55E-03
			Exp. Route Total								2.07E-05					6.76E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.17E-14	mg/kg-day	1.30E+05	mg/kg-day	6.72E-09	1.81E-12	mg/kg-day	1.00E-09	mg/kg-day	1.81E-03
				Aluminum	1.64E+04	mg/kg	2.24E-05	mg/kg-day	--	mg/kg-day	--	7.85E-04	mg/kg-day	1.00E+00	mg/kg-day	7.85E-04
				Antimony	1.33E+00	mg/kg	1.82E-09	mg/kg-day	--	mg/kg-day	--	6.37E-08	mg/kg-day	6.00E-05	mg/kg-day	1.06E-03
				Arsenic	5.35E+00	mg/kg	2.20E-08	mg/kg-day	1.50E+00	mg/kg-day	3.29E-08	7.68E-07	mg/kg-day	3.00E-04	mg/kg-day	2.56E-03
				Cadmium	2.81E+00	mg/kg	3.84E-10	mg/kg-day	--	mg/kg-day	--	1.35E-08	mg/kg-day	2.50E-05	mg/kg-day	5.38E-04
				Chromium	2.14E+01	mg/kg	2.93E-08	mg/kg-day	2.00E+01	mg/kg-day	1.76E-06	1.02E-06	mg/kg-day	7.50E-05	mg/kg-day	1.37E-02
				Cobalt	8.76E+00	mg/kg	1.20E-08	mg/kg-day	--	mg/kg-day	--	4.19E-07	mg/kg-day	3.00E-04	mg/kg-day	1.40E-03
				Iron	2.17E+04	mg/kg	2.97E-05	mg/kg-day	--	mg/kg-day	--	1.04E-03	mg/kg-day	7.00E-01	mg/kg-day	1.48E-03
				Manganese	6.78E+02	mg/kg	9.27E-07	mg/kg-day	--	mg/kg-day	--	3.25E-05	mg/kg-day	9.60E-04	mg/kg-day	3.38E-02
				Vanadium	3.16E+01	mg/kg	4.32E-08	mg/kg-day	--	mg/kg-day	--	1.51E-06	mg/kg-day	1.30E-04	mg/kg-day	1.16E-02
				Dieldrin	1.38E+02	ug/kg	1.89E-09	mg/kg-day	1.60E+01	mg/kg-day	3.02E-08	6.61E-08	mg/kg-day	5.00E-05	mg/kg-day	1.32E-03
				Benz(a)anthracene	5.60E+03	ug/kg	9.96E-08	mg/kg-day	7.30E-01	mg/kg-day	2.18E-07	3.48E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	7.49E-08	mg/kg-day	7.30E+00	mg/kg-day	1.64E-06	2.62E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	8.25E-08	mg/kg-day	7.30E-01	mg/kg-day	1.81E-07	2.89E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	5.37E-08	mg/kg-day	7.30E-02	mg/kg-day	1.18E-08	1.88E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	8.34E-08	mg/kg-day	7.30E-03	mg/kg-day	1.83E-09	2.92E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	4.80E-09	mg/kg-day	7.30E+00	mg/kg-day	1.05E-07	1.68E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	3.38E-08	mg/kg-day	7.30E-01	mg/kg-day	7.40E-08	1.18E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	9.90E-09	mg/kg-day	--	mg/kg-day	--	3.47E-07	mg/kg-day	2.00E-02	mg/kg-day	1.73E-05
				Phenanthrene	1.79E+04	ug/kg	3.18E-07	mg/kg-day	--	mg/kg-day	--	1.11E-05	mg/kg-day	3.00E-02	mg/kg-day	3.71E-04
			Exp. Route Total								4.06E-06					7.04E-02
		Exposure Point Total									2.47E-05					7.47E-01
	Exposure Medium Total										2.47E-05					7.47E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	5.39E-07	mg/m3	3.40E-02	1/(mg/m3)	1.83E-08	1.89E-05	mg/m3	3.00E-03	mg/m3	6.29E-03
			Exp. Route Total								1.83E-08					6.29E-03
		Exposure Point Total									1.83E-08					6.29E-03
	Exposure Medium Total										1.83E-08					6.29E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	3.03E-11	mg/m3	1.20E+01	1/(mg/m3)	1.09E-09	1.06E-09	mg/m3	1.00E-04	mg/m3	1.06E-05
			Exp. Route Total								1.09E-09					1.06E-05
		Exposure Point Total									1.09E-09					1.06E-05
	Exposure Medium Total										1.09E-09					1.06E-05
Medium Total											2.48E-05					7.53E-01
											Total of Receptor Risks Across All Media	2.48E-05				Total of Receptor Hazards Across All Media	7.53E-01

TABLE 7.07a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.54E-12	mg/kg-day	1.30E+05	mg/kg-day	2.00E-07	5.39E-11	mg/kg-day	1.00E-09	mg/kg-day	5.39E-02
				Aluminum	1.64E+04	mg/kg	2.00E-03	mg/kg-day	--	mg/kg-day	--	7.01E-02	mg/kg-day	1.00E+00	mg/kg-day	7.01E-02
				Antimony	1.33E+00	mg/kg	1.62E-07	mg/kg-day	--	mg/kg-day	--	5.68E-06	mg/kg-day	4.00E-04	mg/kg-day	1.42E-02
				Cadmium	2.81E+00	mg/kg	3.43E-07	mg/kg-day	--	mg/kg-day	--	1.20E-05	mg/kg-day	1.00E-03	mg/kg-day	1.20E-02
				Chromium	2.14E+01	mg/kg	2.61E-06	mg/kg-day	5.00E-01	mg/kg-day	3.92E-06	9.15E-05	mg/kg-day	3.00E-03	mg/kg-day	3.05E-02
				Cobalt	8.76E+00	mg/kg	1.07E-06	mg/kg-day	--	mg/kg-day	--	3.74E-05	mg/kg-day	3.00E-04	mg/kg-day	1.25E-01
				Iron	2.17E+04	mg/kg	2.65E-03	mg/kg-day	--	mg/kg-day	--	9.27E-02	mg/kg-day	7.00E-01	mg/kg-day	1.32E-01
				Vanadium	3.16E+01	mg/kg	3.86E-06	mg/kg-day	--	mg/kg-day	--	1.35E-04	mg/kg-day	5.00E-03	mg/kg-day	2.70E-02
				Dieldrin	1.38E+02	ug/kg	1.69E-08	mg/kg-day	1.60E+01	mg/kg-day	2.70E-07	5.90E-07	mg/kg-day	5.00E-05	mg/kg-day	1.18E-02
				Benz(a)anthracene	5.60E+03	ug/kg	6.84E-07	mg/kg-day	7.30E-01	mg/kg-day	1.50E-06	2.39E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	5.14E-07	mg/kg-day	7.30E+00	mg/kg-day	1.13E-05	1.80E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	5.67E-07	mg/kg-day	7.30E-01	mg/kg-day	1.24E-06	1.98E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	3.69E-07	mg/kg-day	7.30E-02	mg/kg-day	8.08E-08	1.29E-05	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	5.73E-07	mg/kg-day	7.30E-03	mg/kg-day	1.25E-08	2.00E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	3.30E-08	mg/kg-day	7.30E+00	mg/kg-day	7.22E-07	1.15E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.32E-07	mg/kg-day	7.30E-01	mg/kg-day	5.08E-07	8.12E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	6.80E-08	mg/kg-day	--	mg/kg-day	--	2.38E-06	mg/kg-day	2.00E-02	mg/kg-day	1.19E-04
				Phenanthrene	1.79E+04	ug/kg	2.19E-06	mg/kg-day	--	mg/kg-day	--	7.65E-05	mg/kg-day	3.00E-02	mg/kg-day	2.55E-03
			Exp. Route Total								1.97E-05					4.79E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.17E-14	mg/kg-day	1.30E+05	mg/kg-day	6.72E-09	1.81E-12	mg/kg-day	1.00E-09	mg/kg-day	1.81E-03
				Aluminum	1.64E+04	mg/kg	2.24E-05	mg/kg-day	--	mg/kg-day	--	7.85E-04	mg/kg-day	1.00E+00	mg/kg-day	7.85E-04
				Antimony	1.33E+00	mg/kg	1.82E-09	mg/kg-day	--	mg/kg-day	--	6.37E-08	mg/kg-day	6.00E-05	mg/kg-day	1.06E-03
				Cadmium	2.81E+00	mg/kg	3.84E-10	mg/kg-day	--	mg/kg-day	--	1.35E-08	mg/kg-day	2.50E-05	mg/kg-day	5.38E-04
				Chromium	2.14E+01	mg/kg	2.93E-08	mg/kg-day	2.00E+01	mg/kg-day	1.76E-06	1.02E-06	mg/kg-day	7.50E-05	mg/kg-day	1.37E-02
				Cobalt	8.76E+00	mg/kg	1.20E-08	mg/kg-day	--	mg/kg-day	--	4.19E-07	mg/kg-day	3.00E-04	mg/kg-day	1.40E-03
				Iron	2.17E+04	mg/kg	2.97E-05	mg/kg-day	--	mg/kg-day	--	1.04E-03	mg/kg-day	7.00E-01	mg/kg-day	1.48E-03
				Vanadium	3.16E+01	mg/kg	4.32E-08	mg/kg-day	--	mg/kg-day	--	1.51E-06	mg/kg-day	1.30E-04	mg/kg-day	1.16E-02
				Dieldrin	1.38E+02	ug/kg	1.89E-09	mg/kg-day	1.60E+01	mg/kg-day	3.02E-08	6.61E-08	mg/kg-day	5.00E-05	mg/kg-day	1.32E-03
				Benz(a)anthracene	5.60E+03	ug/kg	9.96E-08	mg/kg-day	7.30E-01	mg/kg-day	2.18E-07	3.48E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	7.49E-08	mg/kg-day	7.30E+00	mg/kg-day	1.64E-06	2.62E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	8.25E-08	mg/kg-day	7.30E-01	mg/kg-day	1.81E-07	2.89E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	5.37E-08	mg/kg-day	7.30E-02	mg/kg-day	1.18E-08	1.88E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	8.34E-08	mg/kg-day	7.30E-03	mg/kg-day	1.83E-09	2.92E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	4.80E-09	mg/kg-day	7.30E+00	mg/kg-day	1.05E-07	1.68E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	3.38E-08	mg/kg-day	7.30E-01	mg/kg-day	7.40E-08	1.18E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	9.90E-09	mg/kg-day	--	mg/kg-day	--	3.47E-07	mg/kg-day	2.00E-02	mg/kg-day	1.73E-05
				Phenanthrene	1.79E+04	ug/kg	3.18E-07	mg/kg-day	--	mg/kg-day	--	1.11E-05	mg/kg-day	3.00E-02	mg/kg-day	3.71E-04
			Exp. Route Total								4.02E-06					3.41E-02
		Exposure Point Total									2.37E-05					5.14E-01
	Exposure Medium Total										2.37E-05					5.14E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	5.39E-07	mg/m3	3.40E-02	1/(mg/m3)	1.83E-08	1.89E-05	mg/m3	3.00E-03	mg/m3	6.29E-03
			Exp. Route Total								1.83E-08					6.29E-03
		Exposure Point Total									1.83E-08					6.29E-03
	Exposure Medium Total										1.83E-08					6.29E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	3.03E-11	mg/m3	1.20E+01	1/(mg/m3)	1.09E-09	1.06E-09	mg/m3	1.00E-04	mg/m3	1.06E-05
			Exp. Route Total								1.09E-09					1.06E-05
		Exposure Point Total									1.09E-09					1.06E-05
	Exposure Medium Total										1.09E-09					1.06E-05
Medium Total											2.38E-05					5.20E-01
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											2.38E-05					5.20E-01

TABLE 7.08.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.77E-13	mg/kg-day	1.30E+05	mg/kg-day	7.50E-08	5.77E-12	mg/kg-day	1.00E-09	mg/kg-day	5.77E-03
				Aluminum	1.64E+04	mg/kg	7.51E-04	mg/kg-day	--	mg/kg-day	--	7.51E-03	mg/kg-day	1.00E+00	mg/kg-day	7.51E-03
				Antimony	1.33E+00	mg/kg	6.09E-08	mg/kg-day	--	mg/kg-day	--	6.09E-07	mg/kg-day	4.00E-04	mg/kg-day	1.52E-03
				Arsenic	5.35E+00	mg/kg	2.45E-07	mg/kg-day	1.50E+00	mg/kg-day	3.67E-07	2.45E-06	mg/kg-day	3.00E-04	mg/kg-day	8.17E-03
				Cadmium	2.81E+00	mg/kg	1.29E-07	mg/kg-day	--	mg/kg-day	--	1.29E-06	mg/kg-day	1.00E-03	mg/kg-day	1.29E-03
				Chromium	2.14E+01	mg/kg	9.80E-07	mg/kg-day	5.00E-01	mg/kg-day	4.90E-07	9.80E-06	mg/kg-day	3.00E-03	mg/kg-day	3.27E-03
				Cobalt	8.76E+00	mg/kg	4.01E-07	mg/kg-day	--	mg/kg-day	--	4.01E-06	mg/kg-day	3.00E-04	mg/kg-day	1.34E-02
				Iron	2.17E+04	mg/kg	9.94E-04	mg/kg-day	--	mg/kg-day	--	9.94E-03	mg/kg-day	7.00E-01	mg/kg-day	1.42E-02
				Manganese	6.78E+02	mg/kg	3.10E-05	mg/kg-day	--	mg/kg-day	--	3.10E-04	mg/kg-day	2.40E-02	mg/kg-day	1.29E-02
				Vanadium	3.16E+01	mg/kg	1.45E-06	mg/kg-day	--	mg/kg-day	--	1.45E-05	mg/kg-day	5.00E-03	mg/kg-day	2.89E-03
				Dieldrin	1.38E+02	ug/kg	6.32E-09	mg/kg-day	1.60E+01	mg/kg-day	1.01E-07	6.32E-08	mg/kg-day	5.00E-05	mg/kg-day	1.26E-03
				Benz(a)anthracene	5.60E+03	ug/kg	2.56E-07	mg/kg-day	7.30E-01	mg/kg-day	1.87E-07	2.56E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.93E-07	mg/kg-day	7.30E+00	mg/kg-day	1.41E-06	1.93E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.12E-07	mg/kg-day	7.30E-01	mg/kg-day	1.55E-07	2.12E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.38E-07	mg/kg-day	7.30E-02	mg/kg-day	1.01E-08	1.38E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	2.15E-07	mg/kg-day	7.30E-03	mg/kg-day	1.57E-09	2.15E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.24E-08	mg/kg-day	7.30E+00	mg/kg-day	9.03E-08	1.24E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	8.70E-08	mg/kg-day	7.30E-01	mg/kg-day	6.35E-08	8.70E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	2.55E-08	mg/kg-day	--	mg/kg-day	--	2.55E-07	mg/kg-day	2.00E-02	mg/kg-day	1.28E-05
				Phenanthrene	1.79E+04	ug/kg	8.20E-07	mg/kg-day	--	mg/kg-day	--	8.20E-06	mg/kg-day	3.00E-02	mg/kg-day	2.73E-04
			Exp. Route Total								2.95E-06					7.25E-02
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.97E-14	mg/kg-day	1.30E+05	mg/kg-day	2.57E-09	1.97E-13	mg/kg-day	1.00E-09	mg/kg-day	1.97E-04
				Aluminum	1.64E+04	mg/kg	8.56E-06	mg/kg-day	--	mg/kg-day	--	8.56E-05	mg/kg-day	1.00E+00	mg/kg-day	8.56E-05
				Antimony	1.33E+00	mg/kg	6.94E-10	mg/kg-day	--	mg/kg-day	--	6.94E-09	mg/kg-day	6.00E-05	mg/kg-day	1.16E-04
				Arsenic	5.35E+00	mg/kg	8.38E-09	mg/kg-day	1.50E+00	mg/kg-day	1.26E-08	8.38E-08	mg/kg-day	3.00E-04	mg/kg-day	2.79E-04
				Cadmium	2.81E+00	mg/kg	1.47E-10	mg/kg-day	--	mg/kg-day	--	1.47E-09	mg/kg-day	2.50E-05	mg/kg-day	5.87E-05
				Chromium	2.14E+01	mg/kg	1.12E-08	mg/kg-day	2.00E+01	mg/kg-day	2.23E-07	1.12E-07	mg/kg-day	7.50E-05	mg/kg-day	1.49E-03
				Cobalt	8.76E+00	mg/kg	4.57E-09	mg/kg-day	--	mg/kg-day	--	4.57E-08	mg/kg-day	3.00E-04	mg/kg-day	1.52E-04
				Iron	2.17E+04	mg/kg	1.13E-05	mg/kg-day	--	mg/kg-day	--	1.13E-04	mg/kg-day	7.00E-01	mg/kg-day	1.62E-04
				Manganese	6.78E+02	mg/kg	3.54E-07	mg/kg-day	--	mg/kg-day	--	3.54E-06	mg/kg-day	9.60E-04	mg/kg-day	3.69E-03
				Vanadium	3.16E+01	mg/kg	1.65E-08	mg/kg-day	--	mg/kg-day	--	1.65E-07	mg/kg-day	1.30E-04	mg/kg-day	1.27E-03
				Dieldrin	1.38E+02	ug/kg	7.20E-10	mg/kg-day	1.60E+01	mg/kg-day	1.15E-08	7.20E-09	mg/kg-day	5.00E-05	mg/kg-day	1.44E-04
				Benz(a)anthracene	5.60E+03	ug/kg	3.80E-08	mg/kg-day	7.30E-01	mg/kg-day	2.77E-08	3.80E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	2.86E-08	mg/kg-day	7.30E+00	mg/kg-day	2.09E-07	2.86E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	3.15E-08	mg/kg-day	7.30E-01	mg/kg-day	2.30E-08	3.15E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	2.05E-08	mg/kg-day	7.30E-02	mg/kg-day	1.50E-09	2.05E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	3.18E-08	mg/kg-day	7.30E-03	mg/kg-day	2.32E-10	3.18E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.83E-09	mg/kg-day	7.30E+00	mg/kg-day	1.34E-08	1.83E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.29E-08	mg/kg-day	7.30E-01	mg/kg-day	9.41E-09	1.29E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	3.78E-09	mg/kg-day	--	mg/kg-day	--	3.78E-08	mg/kg-day	2.00E-02	mg/kg-day	1.89E-06
				Phenanthrene	1.79E+04	ug/kg	1.21E-07	mg/kg-day	--	mg/kg-day	--	1.21E-06	mg/kg-day	3.00E-02	mg/kg-day	4.05E-05
			Exp. Route Total								5.34E-07					7.68E-03
		Exposure Point Total									3.48E-06					8.02E-02
	Exposure Medium Total										3.48E-06					8.02E-02
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.89E-06	mg/m3	3.40E-02	1/(mg/m3)	6.42E-08	1.89E-05	mg/m3	3.00E-03	mg/m3	6.29E-03
			Exp. Route Total								6.42E-08					6.29E-03
		Exposure Point Total									6.42E-08					6.29E-03
	Exposure Medium Total										6.42E-08					6.29E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.06E-10	mg/m3	1.20E+01	1/(mg/m3)	1.27E-09	1.06E-09	mg/m3	1.00E-04	mg/m3	1.06E-05
			Exp. Route Total								1.27E-09					1.06E-05
		Exposure Point Total									1.27E-09					1.06E-05
	Exposure Medium Total										1.27E-09					1.06E-05
Medium Total											3.55E-06					8.65E-02
										Total of Receptor Risks Across All Media	3.55E-06			Total of Receptor Hazards Across All Media		8.65E-02

TABLE 7.08a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	5.77E-13	mg/kg-day	1.30E+05	mg/kg-day	7.50E-08	5.77E-12	mg/kg-day	1.00E-09	mg/kg-day	5.77E-03
				Aluminum	1.64E+04	mg/kg	7.51E-04	mg/kg-day	--	mg/kg-day	--	7.51E-03	mg/kg-day	1.00E+00	mg/kg-day	7.51E-03
				Antimony	1.33E+00	mg/kg	6.09E-08	mg/kg-day	--	mg/kg-day	--	6.09E-07	mg/kg-day	4.00E-04	mg/kg-day	1.52E-03
				Cadmium	2.81E+00	mg/kg	1.29E-07	mg/kg-day	--	mg/kg-day	--	1.29E-06	mg/kg-day	1.00E-03	mg/kg-day	1.29E-03
				Chromium	2.14E+01	mg/kg	9.80E-07	mg/kg-day	5.00E-01	mg/kg-day	4.90E-07	9.80E-06	mg/kg-day	3.00E-03	mg/kg-day	3.27E-03
				Cobalt	8.76E+00	mg/kg	4.01E-07	mg/kg-day	--	mg/kg-day	--	4.01E-06	mg/kg-day	3.00E-04	mg/kg-day	1.34E-02
				Iron	2.17E+04	mg/kg	9.94E-04	mg/kg-day	--	mg/kg-day	--	9.94E-03	mg/kg-day	7.00E-01	mg/kg-day	1.42E-02
				Vanadium	3.16E+01	mg/kg	1.45E-06	mg/kg-day	--	mg/kg-day	--	1.45E-05	mg/kg-day	5.00E-03	mg/kg-day	2.89E-03
				Dieldrin	1.38E+02	ug/kg	6.32E-09	mg/kg-day	1.60E+01	mg/kg-day	1.01E-07	6.32E-08	mg/kg-day	5.00E-05	mg/kg-day	1.26E-03
				Benz(a)anthracene	5.60E+03	ug/kg	2.56E-07	mg/kg-day	7.30E-01	mg/kg-day	1.87E-07	2.56E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.93E-07	mg/kg-day	7.30E+00	mg/kg-day	1.41E-06	1.93E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.12E-07	mg/kg-day	7.30E-01	mg/kg-day	1.55E-07	2.12E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.38E-07	mg/kg-day	7.30E-02	mg/kg-day	1.01E-08	1.38E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	2.15E-07	mg/kg-day	7.30E-03	mg/kg-day	1.57E-09	2.15E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.24E-08	mg/kg-day	7.30E+00	mg/kg-day	9.03E-08	1.24E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	8.70E-08	mg/kg-day	7.30E-01	mg/kg-day	6.35E-08	8.70E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	2.55E-08	mg/kg-day	--	mg/kg-day	--	2.55E-07	mg/kg-day	2.00E-02	mg/kg-day	1.28E-05
				Phenanthrene	1.79E+04	ug/kg	8.20E-07	mg/kg-day	--	mg/kg-day	--	8.20E-06	mg/kg-day	3.00E-02	mg/kg-day	2.73E-04
			Exp. Route Total								2.58E-06					5.14E-02
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.97E-14	mg/kg-day	1.30E+05	mg/kg-day	2.57E-09	1.97E-13	mg/kg-day	1.00E-09	mg/kg-day	1.97E-04
				Aluminum	1.64E+04	mg/kg	8.56E-06	mg/kg-day	--	mg/kg-day	--	8.56E-05	mg/kg-day	1.00E+00	mg/kg-day	8.56E-05
				Antimony	1.33E+00	mg/kg	6.94E-10	mg/kg-day	--	mg/kg-day	--	6.94E-09	mg/kg-day	6.00E-05	mg/kg-day	1.16E-04
				Cadmium	2.81E+00	mg/kg	1.47E-10	mg/kg-day	--	mg/kg-day	--	1.47E-09	mg/kg-day	2.50E-05	mg/kg-day	5.87E-05
				Chromium	2.14E+01	mg/kg	1.12E-08	mg/kg-day	2.00E+01	mg/kg-day	2.23E-07	1.12E-07	mg/kg-day	7.50E-05	mg/kg-day	1.49E-03
				Cobalt	8.76E+00	mg/kg	4.57E-09	mg/kg-day	--	mg/kg-day	--	4.57E-08	mg/kg-day	3.00E-04	mg/kg-day	1.52E-04
				Iron	2.17E+04	mg/kg	1.13E-05	mg/kg-day	--	mg/kg-day	--	1.13E-04	mg/kg-day	7.00E-01	mg/kg-day	1.62E-04
				Vanadium	3.16E+01	mg/kg	1.65E-08	mg/kg-day	--	mg/kg-day	--	1.65E-07	mg/kg-day	1.30E-04	mg/kg-day	1.27E-03
				Dieldrin	1.38E+02	ug/kg	7.20E-10	mg/kg-day	1.60E+01	mg/kg-day	1.15E-08	7.20E-09	mg/kg-day	5.00E-05	mg/kg-day	1.44E-04
				Benz(a)anthracene	5.60E+03	ug/kg	3.80E-08	mg/kg-day	7.30E-01	mg/kg-day	2.77E-08	3.80E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	2.86E-08	mg/kg-day	7.30E+00	mg/kg-day	2.09E-07	2.86E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	3.15E-08	mg/kg-day	7.30E-01	mg/kg-day	2.30E-08	3.15E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	2.05E-08	mg/kg-day	7.30E-02	mg/kg-day	1.50E-09	2.05E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	3.18E-08	mg/kg-day	7.30E-03	mg/kg-day	2.32E-10	3.18E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.83E-09	mg/kg-day	7.30E+00	mg/kg-day	1.34E-08	1.83E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.29E-08	mg/kg-day	7.30E-01	mg/kg-day	9.41E-09	1.29E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	3.78E-09	mg/kg-day	--	mg/kg-day	--	3.78E-08	mg/kg-day	2.00E-02	mg/kg-day	1.89E-06
				Phenanthrene	1.79E+04	ug/kg	1.21E-07	mg/kg-day	--	mg/kg-day	--	1.21E-06	mg/kg-day	3.00E-02	mg/kg-day	4.05E-05
			Exp. Route Total								5.21E-07					3.72E-03
		Exposure Point Total									3.10E-06					5.51E-02
	Exposure Medium Total										3.10E-06					5.51E-02
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.89E-06	mg/m3	3.40E-02	1/(mg/m3)	6.42E-08	1.89E-05	mg/m3	3.00E-03	mg/m3	6.29E-03
			Exp. Route Total								6.42E-08					6.29E-03
		Exposure Point Total									6.42E-08					6.29E-03
	Exposure Medium Total										6.42E-08					6.29E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.06E-10	mg/m3	1.20E+01	1/(mg/m3)	1.27E-09	1.06E-09	mg/m3	1.00E-04	mg/m3	1.06E-05
			Exp. Route Total								1.27E-09					1.06E-05
		Exposure Point Total									1.27E-09					1.06E-05
	Exposure Medium Total										1.27E-09					1.06E-05
Medium Total											3.17E-06					6.14E-02
										Total of Receptor Risks Across All Media	3.17E-06			Total of Receptor Hazards Across All Media		6.14E-02

TABLE 7.09.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	2.12E-12	mg/kg-day	1.30E+05	mg/kg-day	2.75E-07					N/A
				Aluminum	1.64E+04	mg/kg	7.51E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	6.09E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	5.35E+00	mg/kg	8.98E-07	mg/kg-day	1.50E+00	mg/kg-day	1.35E-06					N/A
				Cadmium	2.81E+00	mg/kg	1.29E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	3.59E-06	mg/kg-day	5.00E-01	mg/kg-day	4.41E-06					N/A
				Cobalt	8.76E+00	mg/kg	4.01E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	9.94E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	6.78E+02	mg/kg	3.10E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	1.45E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	2.32E-08	mg/kg-day	1.60E+01	mg/kg-day	3.71E-07					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	9.40E-07	mg/kg-day	7.30E-01	mg/kg-day	1.68E-06					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	7.07E-07	mg/kg-day	7.30E+00	mg/kg-day	1.27E-05					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	7.79E-07	mg/kg-day	7.30E-01	mg/kg-day	1.40E-06					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	5.07E-07	mg/kg-day	7.30E-02	mg/kg-day	9.09E-08					N/A
				Chrysene	4.69E+03	ug/kg	7.87E-07	mg/kg-day	7.30E-03	mg/kg-day	1.41E-08					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	4.53E-08	mg/kg-day	7.30E+00	mg/kg-day	8.12E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	3.19E-07	mg/kg-day	7.30E-01	mg/kg-day	5.72E-07					N/A
				Naphthalene	5.57E+02	ug/kg	2.55E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	8.20E-07	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								2.36E-05					--
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	7.14E-14	mg/kg-day	1.30E+05	mg/kg-day	9.29E-09					N/A
				Aluminum	1.64E+04	mg/kg	8.56E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	6.94E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	5.35E+00	mg/kg	3.03E-08	mg/kg-day	1.50E+00	mg/kg-day	4.55E-08					N/A
				Cadmium	2.81E+00	mg/kg	1.47E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	4.04E-08	mg/kg-day	2.00E+01	mg/kg-day	1.98E-06					N/A
				Cobalt	8.76E+00	mg/kg	4.57E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	1.13E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	6.78E+02	mg/kg	3.54E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	1.65E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	2.61E-09	mg/kg-day	1.60E+01	mg/kg-day	4.17E-08					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	1.38E-07	mg/kg-day	7.30E-01	mg/kg-day	2.46E-07					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	1.03E-07	mg/kg-day	7.30E+00	mg/kg-day	1.85E-06					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.14E-07	mg/kg-day	7.30E-01	mg/kg-day	2.04E-07					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	7.42E-08	mg/kg-day	7.30E-02	mg/kg-day	1.33E-08					N/A
				Chrysene	4.69E+03	ug/kg	1.15E-07	mg/kg-day	7.30E-03	mg/kg-day	2.06E-09					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	6.63E-09	mg/kg-day	7.30E+00	mg/kg-day	1.19E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	4.67E-08	mg/kg-day	7.30E-01	mg/kg-day	8.34E-08					N/A
				Naphthalene	5.57E+02	ug/kg	3.78E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	1.21E-07	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								4.59E-06					--
		Exposure Point Total									2.82E-05					--
	Exposure Medium Total										2.82E-05					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	2.43E-06	mg/m3	3.40E-02	1/(mg/m3)	8.25E-08					N/A
			Exp. Route Total								8.25E-08					--
		Exposure Point Total									8.25E-08					--
	Exposure Medium Total										8.25E-08					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.36E-10	mg/m3	1.20E+01	1/(mg/m3)	2.36E-09					N/A
			Exp. Route Total								2.36E-09					--
		Exposure Point Total									2.36E-09					--
	Exposure Medium Total										2.36E-09					--
Medium Total											2.83E-05					--
											Total of Receptor Risks Across All Media	2.83E-05		Total of Receptor Hazards Across All Media			--

TABLE 7.09a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	2.12E-12	mg/kg-day	1.30E+05	mg/kg-day	2.75E-07					N/A
				Aluminum	1.64E+04	mg/kg	7.51E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	6.09E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	2.81E+00	mg/kg	1.29E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	3.59E-06	mg/kg-day	5.00E-01	mg/kg-day	4.41E-06					N/A
				Cobalt	8.76E+00	mg/kg	4.01E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	9.94E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	1.45E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	2.32E-08	mg/kg-day	1.60E+01	mg/kg-day	3.71E-07					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	9.40E-07	mg/kg-day	7.30E-01	mg/kg-day	1.68E-06					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	7.07E-07	mg/kg-day	7.30E+00	mg/kg-day	1.27E-05					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	7.79E-07	mg/kg-day	7.30E-01	mg/kg-day	1.40E-06					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	5.07E-07	mg/kg-day	7.30E-02	mg/kg-day	9.09E-08					N/A
				Chrysene	4.69E+03	ug/kg	7.87E-07	mg/kg-day	7.30E-03	mg/kg-day	1.41E-08					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	4.53E-08	mg/kg-day	7.30E+00	mg/kg-day	8.12E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	3.19E-07	mg/kg-day	7.30E-01	mg/kg-day	5.72E-07					N/A
				Naphthalene	5.57E+02	ug/kg	2.55E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	8.20E-07	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								2.23E-05					--
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	7.14E-14	mg/kg-day	1.30E+05	mg/kg-day	9.29E-09					N/A
				Aluminum	1.64E+04	mg/kg	8.56E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	6.94E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	2.81E+00	mg/kg	1.47E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	4.04E-08	mg/kg-day	2.00E+01	mg/kg-day	1.98E-06					N/A
				Cobalt	8.76E+00	mg/kg	4.57E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	1.13E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	1.65E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	2.61E-09	mg/kg-day	1.60E+01	mg/kg-day	4.17E-08					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	1.38E-07	mg/kg-day	7.30E-01	mg/kg-day	2.46E-07					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	1.03E-07	mg/kg-day	7.30E+00	mg/kg-day	1.85E-06					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.14E-07	mg/kg-day	7.30E-01	mg/kg-day	2.04E-07					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	7.42E-08	mg/kg-day	7.30E-02	mg/kg-day	1.33E-08					N/A
				Chrysene	4.69E+03	ug/kg	1.15E-07	mg/kg-day	7.30E-03	mg/kg-day	2.06E-09					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	6.63E-09	mg/kg-day	7.30E+00	mg/kg-day	1.19E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	4.67E-08	mg/kg-day	7.30E-01	mg/kg-day	8.34E-08					N/A
				Naphthalene	5.57E+02	ug/kg	3.78E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	1.21E-07	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								4.55E-06					--
		Exposure Point Total									2.68E-05					--
	Exposure Medium Total										2.68E-05					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	2.43E-06	mg/m3	3.40E-02	1/(mg/m3)	8.25E-08					N/A
			Exp. Route Total								8.25E-08					--
		Exposure Point Total									8.25E-08					--
	Exposure Medium Total										8.25E-08					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.36E-10	mg/m3	1.20E+01	1/(mg/m3)	2.36E-09					N/A
			Exp. Route Total								2.36E-09					--
		Exposure Point Total									2.36E-09					--
	Exposure Medium Total										2.36E-09					--
Medium Total											2.69E-05					--
											Total of Receptor Risks Across All Media	2.69E-05				Total of Receptor Hazards Across All Media	--

TABLE 7.10.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	3.42E-13	mg/kg-day	1.30E+05	mg/kg-day	4.44E-08	1.20E-11	mg/kg-day	1.00E-09	mg/kg-day	1.20E-02
				Aluminum	1.64E+04	mg/kg	4.45E-04	mg/kg-day	--	mg/kg-day	--	1.56E-02	mg/kg-day	1.00E+00	mg/kg-day	1.56E-02
				Antimony	1.33E+00	mg/kg	3.61E-08	mg/kg-day	--	mg/kg-day	--	1.26E-06	mg/kg-day	4.00E-04	mg/kg-day	3.16E-03
				Arsenic	5.35E+00	mg/kg	1.45E-07	mg/kg-day	1.50E+00	mg/kg-day	2.18E-07	5.08E-06	mg/kg-day	3.00E-04	mg/kg-day	1.69E-02
				Cadmium	2.81E+00	mg/kg	7.63E-08	mg/kg-day	--	mg/kg-day	--	2.67E-06	mg/kg-day	1.00E-03	mg/kg-day	2.67E-03
				Chromium	2.14E+01	mg/kg	5.81E-07	mg/kg-day	5.00E-01	mg/kg-day	8.71E-07	2.03E-05	mg/kg-day	3.00E-03	mg/kg-day	6.78E-03
				Cobalt	8.76E+00	mg/kg	2.38E-07	mg/kg-day	--	mg/kg-day	--	8.32E-06	mg/kg-day	3.00E-04	mg/kg-day	2.77E-02
				Iron	2.17E+04	mg/kg	5.89E-04	mg/kg-day	--	mg/kg-day	--	2.06E-02	mg/kg-day	7.00E-01	mg/kg-day	2.94E-02
				Manganese	6.78E+02	mg/kg	1.84E-05	mg/kg-day	--	mg/kg-day	--	6.44E-04	mg/kg-day	2.40E-02	mg/kg-day	2.68E-02
				Vanadium	3.16E+01	mg/kg	8.58E-07	mg/kg-day	--	mg/kg-day	--	3.00E-05	mg/kg-day	5.00E-03	mg/kg-day	6.00E-03
				Dieldrin	1.38E+02	ug/kg	3.74E-09	mg/kg-day	1.60E+01	mg/kg-day	5.99E-08	1.31E-07	mg/kg-day	5.00E-05	mg/kg-day	2.62E-03
				Benz(a)anthracene	5.60E+03	ug/kg	1.52E-07	mg/kg-day	7.30E-01	mg/kg-day	3.33E-07	5.32E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.14E-07	mg/kg-day	7.30E+00	mg/kg-day	2.50E-06	4.00E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.26E-07	mg/kg-day	7.30E-01	mg/kg-day	2.76E-07	4.41E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	8.20E-08	mg/kg-day	7.30E-02	mg/kg-day	1.79E-08	2.87E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.27E-07	mg/kg-day	7.30E-03	mg/kg-day	2.79E-09	4.45E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	7.33E-09	mg/kg-day	7.30E+00	mg/kg-day	1.60E-07	2.56E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	5.16E-08	mg/kg-day	7.30E-01	mg/kg-day	1.13E-07	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.51E-08	mg/kg-day	--	mg/kg-day	--	5.29E-07	mg/kg-day	2.00E-02	mg/kg-day	2.65E-05
				Phenanthrene	1.79E+04	ug/kg	4.86E-07	mg/kg-day	--	mg/kg-day	--	1.70E-05	mg/kg-day	3.00E-02	mg/kg-day	5.67E-04
			Exp. Route Total								4.60E-06					1.50E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.15E-14	mg/kg-day	1.30E+05	mg/kg-day	1.49E-09	4.02E-13	mg/kg-day	1.00E-09	mg/kg-day	4.02E-04
				Aluminum	1.64E+04	mg/kg	4.98E-06	mg/kg-day	--	mg/kg-day	--	1.74E-04	mg/kg-day	1.00E+00	mg/kg-day	1.74E-04
				Antimony	1.33E+00	mg/kg	4.04E-10	mg/kg-day	--	mg/kg-day	--	1.41E-08	mg/kg-day	6.00E-05	mg/kg-day	2.36E-04
				Arsenic	5.35E+00	mg/kg	4.88E-09	mg/kg-day	1.50E+00	mg/kg-day	7.32E-09	1.71E-07	mg/kg-day	3.00E-04	mg/kg-day	5.69E-04
				Cadmium	2.81E+00	mg/kg	8.54E-11	mg/kg-day	--	mg/kg-day	--	2.99E-09	mg/kg-day	2.50E-05	mg/kg-day	1.20E-04
				Chromium	2.14E+01	mg/kg	6.50E-09	mg/kg-day	2.00E+01	mg/kg-day	3.90E-07	2.28E-07	mg/kg-day	7.50E-05	mg/kg-day	3.04E-03
				Cobalt	8.76E+00	mg/kg	2.66E-09	mg/kg-day	--	mg/kg-day	--	9.32E-08	mg/kg-day	3.00E-04	mg/kg-day	3.11E-04
				Iron	2.17E+04	mg/kg	6.60E-06	mg/kg-day	--	mg/kg-day	--	2.31E-04	mg/kg-day	7.00E-01	mg/kg-day	3.30E-04
				Manganese	6.78E+02	mg/kg	2.06E-07	mg/kg-day	--	mg/kg-day	--	7.21E-06	mg/kg-day	9.60E-04	mg/kg-day	7.51E-03
				Vanadium	3.16E+01	mg/kg	9.60E-09	mg/kg-day	--	mg/kg-day	--	3.36E-07	mg/kg-day	1.30E-04	mg/kg-day	2.59E-03
				Dieldrin	1.38E+02	ug/kg	4.19E-10	mg/kg-day	1.60E+01	mg/kg-day	6.71E-09	1.47E-08	mg/kg-day	5.00E-05	mg/kg-day	2.94E-04
				Benz(a)anthracene	5.60E+03	ug/kg	2.21E-08	mg/kg-day	7.30E-01	mg/kg-day	4.85E-08	7.74E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.66E-08	mg/kg-day	7.30E+00	mg/kg-day	3.64E-07	5.82E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.83E-08	mg/kg-day	7.30E-01	mg/kg-day	4.01E-08	6.42E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.19E-08	mg/kg-day	7.30E-02	mg/kg-day	2.61E-09	4.18E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.85E-08	mg/kg-day	7.30E-03	mg/kg-day	4.06E-10	6.49E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.07E-09	mg/kg-day	7.30E+00	mg/kg-day	2.34E-08	3.73E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	7.51E-09	mg/kg-day	7.30E-01	mg/kg-day	1.64E-08	2.63E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	2.20E-09	mg/kg-day	--	mg/kg-day	--	7.70E-08	mg/kg-day	2.00E-02	mg/kg-day	3.85E-06
				Phenanthrene	1.79E+04	ug/kg	7.07E-08	mg/kg-day	--	mg/kg-day	--	2.48E-06	mg/kg-day	3.00E-02	mg/kg-day	8.25E-05
			Exp. Route Total								9.01E-07					1.57E-02
		Exposure Point Total									5.50E-06					1.66E-01
	Exposure Medium Total										5.50E-06					1.66E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	3.99E-08	mg/m3	3.40E-02	1/(mg/m3)	1.36E-09	1.40E-06	mg/m3	3.00E-03	mg/m3	4.66E-04
			Exp. Route Total								1.36E-09					4.66E-04
		Exposure Point Total									1.36E-09					4.66E-04
	Exposure Medium Total										1.36E-09					4.66E-04
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	2.24E-12	mg/m3	1.20E+01	1/(mg/m3)	8.08E-11	7.85E-11	mg/m3	1.00E-04	mg/m3	7.85E-07
			Exp. Route Total								8.08E-11					7.85E-07
		Exposure Point Total									8.08E-11					7.85E-07
	Exposure Medium Total										8.08E-11					7.85E-07
Medium Total											5.50E-06					1.66E-01
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											5.50E-06					1.66E-01

TABLE 7.10a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	3.42E-13	mg/kg-day	1.30E+05	mg/kg-day	4.44E-08	1.20E-11	mg/kg-day	1.00E-09	mg/kg-day	1.20E-02
				Aluminum	1.64E+04	mg/kg	4.45E-04	mg/kg-day	--	mg/kg-day	--	1.56E-02	mg/kg-day	1.00E+00	mg/kg-day	1.56E-02
				Antimony	1.33E+00	mg/kg	3.61E-08	mg/kg-day	--	mg/kg-day	--	1.26E-06	mg/kg-day	4.00E-04	mg/kg-day	3.16E-03
				Cadmium	2.81E+00	mg/kg	7.63E-08	mg/kg-day	--	mg/kg-day	--	2.67E-06	mg/kg-day	1.00E-03	mg/kg-day	2.67E-03
				Chromium	2.14E+01	mg/kg	5.81E-07	mg/kg-day	5.00E-01	mg/kg-day	8.71E-07	2.03E-05	mg/kg-day	3.00E-03	mg/kg-day	6.78E-03
				Cobalt	8.76E+00	mg/kg	2.38E-07	mg/kg-day	--	mg/kg-day	--	8.32E-06	mg/kg-day	3.00E-04	mg/kg-day	2.77E-02
				Iron	2.17E+04	mg/kg	5.89E-04	mg/kg-day	--	mg/kg-day	--	2.06E-02	mg/kg-day	7.00E-01	mg/kg-day	2.94E-02
				Vanadium	3.16E+01	mg/kg	8.58E-07	mg/kg-day	--	mg/kg-day	--	3.00E-05	mg/kg-day	5.00E-03	mg/kg-day	6.00E-03
				Dieldrin	1.38E+02	ug/kg	3.74E-09	mg/kg-day	1.60E+01	mg/kg-day	5.99E-08	1.31E-07	mg/kg-day	5.00E-05	mg/kg-day	2.62E-03
				Benz(a)anthracene	5.60E+03	ug/kg	1.52E-07	mg/kg-day	7.30E-01	mg/kg-day	3.33E-07	5.32E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.14E-07	mg/kg-day	7.30E+00	mg/kg-day	2.50E-06	4.00E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.26E-07	mg/kg-day	7.30E-01	mg/kg-day	2.76E-07	4.41E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	8.20E-08	mg/kg-day	7.30E-02	mg/kg-day	1.79E-08	2.87E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.27E-07	mg/kg-day	7.30E-03	mg/kg-day	2.79E-09	4.45E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	7.33E-09	mg/kg-day	7.30E+00	mg/kg-day	1.60E-07	2.56E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	5.16E-08	mg/kg-day	7.30E-01	mg/kg-day	1.13E-07	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	1.51E-08	mg/kg-day	--	mg/kg-day	--	5.29E-07	mg/kg-day	2.00E-02	mg/kg-day	2.65E-05
				Phenanthrene	1.79E+04	ug/kg	4.86E-07	mg/kg-day	--	mg/kg-day	--	1.70E-05	mg/kg-day	3.00E-02	mg/kg-day	5.67E-04
			Exp. Route Total								4.38E-06					1.07E-01
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.15E-14	mg/kg-day	1.30E+05	mg/kg-day	1.49E-09	4.02E-13	mg/kg-day	1.00E-09	mg/kg-day	4.02E-04
				Aluminum	1.64E+04	mg/kg	4.98E-06	mg/kg-day	--	mg/kg-day	--	1.74E-04	mg/kg-day	1.00E+00	mg/kg-day	1.74E-04
				Antimony	1.33E+00	mg/kg	4.04E-10	mg/kg-day	--	mg/kg-day	--	1.41E-08	mg/kg-day	6.00E-05	mg/kg-day	2.36E-04
				Cadmium	2.81E+00	mg/kg	8.54E-11	mg/kg-day	--	mg/kg-day	--	2.99E-09	mg/kg-day	2.50E-05	mg/kg-day	1.20E-04
				Chromium	2.14E+01	mg/kg	6.50E-09	mg/kg-day	2.00E+01	mg/kg-day	3.90E-07	2.28E-07	mg/kg-day	7.50E-05	mg/kg-day	3.04E-03
				Cobalt	8.76E+00	mg/kg	2.66E-09	mg/kg-day	--	mg/kg-day	--	9.32E-08	mg/kg-day	3.00E-04	mg/kg-day	3.11E-04
				Iron	2.17E+04	mg/kg	6.60E-06	mg/kg-day	--	mg/kg-day	--	2.31E-04	mg/kg-day	7.00E-01	mg/kg-day	3.30E-04
				Vanadium	3.16E+01	mg/kg	9.60E-09	mg/kg-day	--	mg/kg-day	--	3.36E-07	mg/kg-day	1.30E-04	mg/kg-day	2.59E-03
				Dieldrin	1.38E+02	ug/kg	4.19E-10	mg/kg-day	1.60E+01	mg/kg-day	6.71E-09	1.47E-08	mg/kg-day	5.00E-05	mg/kg-day	2.94E-04
				Benz(a)anthracene	5.60E+03	ug/kg	2.21E-08	mg/kg-day	7.30E-01	mg/kg-day	4.85E-08	7.74E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	1.66E-08	mg/kg-day	7.30E+00	mg/kg-day	3.64E-07	5.82E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.83E-08	mg/kg-day	7.30E-01	mg/kg-day	4.01E-08	6.42E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.19E-08	mg/kg-day	7.30E-02	mg/kg-day	2.61E-09	4.18E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	1.85E-08	mg/kg-day	7.30E-03	mg/kg-day	4.06E-10	6.49E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.07E-09	mg/kg-day	7.30E+00	mg/kg-day	2.34E-08	3.73E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	7.51E-09	mg/kg-day	7.30E-01	mg/kg-day	1.64E-08	2.63E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	2.20E-09	mg/kg-day	--	mg/kg-day	--	7.70E-08	mg/kg-day	2.00E-02	mg/kg-day	3.85E-06
				Phenanthrene	1.79E+04	ug/kg	7.07E-08	mg/kg-day	--	mg/kg-day	--	2.48E-06	mg/kg-day	3.00E-02	mg/kg-day	8.25E-05
			Exp. Route Total								8.94E-07					7.57E-03
		Exposure Point Total									5.27E-06					1.14E-01
	Exposure Medium Total										5.27E-06					1.14E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	3.99E-08	mg/m3	3.40E-02	1/(mg/m3)	1.36E-09	1.40E-06	mg/m3	3.00E-03	mg/m3	4.66E-04
			Exp. Route Total								1.36E-09					4.66E-04
		Exposure Point Total									1.36E-09					4.66E-04
	Exposure Medium Total										1.36E-09					4.66E-04
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	2.24E-12	mg/m3	1.20E+01	1/(mg/m3)	8.08E-11	7.85E-11	mg/m3	1.00E-04	mg/m3	7.85E-07
			Exp. Route Total								8.08E-11					7.85E-07
		Exposure Point Total									8.08E-11					7.85E-07
	Exposure Medium Total										8.08E-11					7.85E-07
Medium Total											5.28E-06					1.15E-01
										Total of Receptor Risks Across All Media	5.28E-06				Total of Receptor Hazards Across All Media	1.15E-01

TABLE 7.11.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.28E-13	mg/kg-day	1.30E+05	mg/kg-day	1.67E-08	1.28E-12	mg/kg-day	1.00E-09	mg/kg-day	1.28E-03
				Aluminum	1.64E+04	mg/kg	1.67E-04	mg/kg-day	--	mg/kg-day	--	1.67E-03	mg/kg-day	1.00E+00	mg/kg-day	1.67E-03
				Antimony	1.33E+00	mg/kg	1.35E-08	mg/kg-day	--	mg/kg-day	--	1.35E-07	mg/kg-day	4.00E-04	mg/kg-day	3.38E-04
				Arsenic	5.35E+00	mg/kg	5.44E-08	mg/kg-day	1.50E+00	mg/kg-day	8.17E-08	5.44E-07	mg/kg-day	3.00E-04	mg/kg-day	1.81E-03
				Cadmium	2.81E+00	mg/kg	2.86E-08	mg/kg-day	--	mg/kg-day	--	2.86E-07	mg/kg-day	1.00E-03	mg/kg-day	2.86E-04
				Chromium	2.14E+01	mg/kg	2.18E-07	mg/kg-day	5.00E-01	mg/kg-day	1.09E-07	2.18E-06	mg/kg-day	3.00E-03	mg/kg-day	7.26E-04
				Cobalt	8.76E+00	mg/kg	8.91E-08	mg/kg-day	--	mg/kg-day	--	8.91E-07	mg/kg-day	3.00E-04	mg/kg-day	2.97E-03
				Iron	2.17E+04	mg/kg	2.21E-04	mg/kg-day	--	mg/kg-day	--	2.21E-03	mg/kg-day	7.00E-01	mg/kg-day	3.15E-03
				Manganese	6.78E+02	mg/kg	6.90E-06	mg/kg-day	--	mg/kg-day	--	6.90E-05	mg/kg-day	2.40E-02	mg/kg-day	2.87E-03
				Vanadium	3.16E+01	mg/kg	3.22E-07	mg/kg-day	--	mg/kg-day	--	3.22E-06	mg/kg-day	5.00E-03	mg/kg-day	6.43E-04
				Dieldrin	1.38E+02	ug/kg	1.40E-09	mg/kg-day	1.60E+01	mg/kg-day	2.25E-08	1.40E-08	mg/kg-day	5.00E-05	mg/kg-day	2.81E-04
				Benz(a)anthracene	5.60E+03	ug/kg	5.70E-08	mg/kg-day	7.30E-01	mg/kg-day	4.16E-08	5.70E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	4.28E-08	mg/kg-day	7.30E+00	mg/kg-day	3.13E-07	4.28E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	4.72E-08	mg/kg-day	7.30E-01	mg/kg-day	3.45E-08	4.72E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	3.07E-08	mg/kg-day	7.30E-02	mg/kg-day	2.24E-09	3.07E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	4.77E-08	mg/kg-day	7.30E-03	mg/kg-day	3.48E-10	4.77E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	2.75E-09	mg/kg-day	7.30E+00	mg/kg-day	2.01E-08	2.75E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.93E-08	mg/kg-day	7.30E-01	mg/kg-day	1.41E-08	1.93E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	5.67E-09	mg/kg-day	--	mg/kg-day	--	5.67E-08	mg/kg-day	2.00E-02	mg/kg-day	2.83E-06
				Phenanthrene	1.79E+04	ug/kg	1.82E-07	mg/kg-day	--	mg/kg-day	--	1.82E-06	mg/kg-day	3.00E-02	mg/kg-day	6.07E-05
			Exp. Route Total								6.55E-07					1.61E-02
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	4.39E-15	mg/kg-day	1.30E+05	mg/kg-day	5.70E-10	4.39E-14	mg/kg-day	1.00E-09	mg/kg-day	4.39E-05
				Aluminum	1.64E+04	mg/kg	1.90E-06	mg/kg-day	--	mg/kg-day	--	1.90E-05	mg/kg-day	1.00E+00	mg/kg-day	1.90E-05
				Antimony	1.33E+00	mg/kg	1.54E-10	mg/kg-day	--	mg/kg-day	--	1.54E-09	mg/kg-day	6.00E-05	mg/kg-day	2.57E-05
				Arsenic	5.35E+00	mg/kg	1.86E-09	mg/kg-day	1.50E+00	mg/kg-day	2.79E-09	1.86E-08	mg/kg-day	3.00E-04	mg/kg-day	6.21E-05
				Cadmium	2.81E+00	mg/kg	3.26E-11	mg/kg-day	--	mg/kg-day	--	3.26E-10	mg/kg-day	2.50E-05	mg/kg-day	1.30E-05
				Chromium	2.14E+01	mg/kg	2.48E-09	mg/kg-day	2.00E+01	mg/kg-day	4.97E-08	2.48E-08	mg/kg-day	7.50E-05	mg/kg-day	3.31E-04
				Cobalt	8.76E+00	mg/kg	1.02E-09	mg/kg-day	--	mg/kg-day	--	1.02E-08	mg/kg-day	3.00E-04	mg/kg-day	3.39E-05
				Iron	2.17E+04	mg/kg	2.52E-06	mg/kg-day	--	mg/kg-day	--	2.52E-05	mg/kg-day	7.00E-01	mg/kg-day	3.60E-05
				Manganese	6.78E+02	mg/kg	7.87E-08	mg/kg-day	--	mg/kg-day	--	7.87E-07	mg/kg-day	9.60E-04	mg/kg-day	8.19E-04
				Vanadium	3.16E+01	mg/kg	3.67E-09	mg/kg-day	--	mg/kg-day	--	3.67E-08	mg/kg-day	1.30E-04	mg/kg-day	2.82E-04
				Dieldrin	1.38E+02	ug/kg	1.60E-10	mg/kg-day	1.60E+01	mg/kg-day	2.56E-09	1.60E-09	mg/kg-day	5.00E-05	mg/kg-day	3.20E-05
				Benz(a)anthracene	5.60E+03	ug/kg	8.45E-09	mg/kg-day	7.30E-01	mg/kg-day	6.17E-09	8.45E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	6.35E-09	mg/kg-day	7.30E+00	mg/kg-day	4.63E-08	6.35E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	7.00E-09	mg/kg-day	7.30E-01	mg/kg-day	5.11E-09	7.00E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	4.55E-09	mg/kg-day	7.30E-02	mg/kg-day	3.32E-10	4.55E-08	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	7.07E-09	mg/kg-day	7.30E-03	mg/kg-day	5.16E-11	7.07E-08	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	4.07E-10	mg/kg-day	7.30E+00	mg/kg-day	2.97E-09	4.07E-09	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.87E-09	mg/kg-day	7.30E-01	mg/kg-day	2.09E-09	2.87E-08	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	8.40E-10	mg/kg-day	--	mg/kg-day	--	8.40E-09	mg/kg-day	2.00E-02	mg/kg-day	4.20E-07
				Phenanthrene	1.79E+04	ug/kg	2.70E-08	mg/kg-day	--	mg/kg-day	--	2.70E-07	mg/kg-day	3.00E-02	mg/kg-day	9.00E-06
			Exp. Route Total								1.19E-07					1.71E-03
		Exposure Point Total									7.74E-07					1.78E-02
	Exposure Medium Total										7.74E-07					1.78E-02
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.40E-07	mg/m3	3.40E-02	1/(mg/m3)	4.75E-09	1.40E-06	mg/m3	3.00E-03	mg/m3	4.66E-04
			Exp. Route Total								4.75E-09					4.66E-04
		Exposure Point Total									4.75E-09					4.66E-04
	Exposure Medium Total										4.75E-09					4.66E-04
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	7.85E-12	mg/m3	1.20E+01	1/(mg/m3)	9.42E-11	7.85E-11	mg/m3	1.00E-04	mg/m3	7.85E-07
			Exp. Route Total								9.42E-11					7.85E-07
		Exposure Point Total									9.42E-11					7.85E-07
	Exposure Medium Total										9.42E-11					7.85E-07
Medium Total											7.79E-07					1.83E-02
											Total of Receptor Risks Across All Media	7.79E-07				Total of Receptor Hazards Across All Media	1.83E-02

TABLE 7.11a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.28E-13	mg/kg-day	1.30E+05	mg/kg-day	1.67E-08	1.28E-12	mg/kg-day	1.00E-09	mg/kg-day	1.28E-03
				Aluminum	1.64E+04	mg/kg	1.67E-04	mg/kg-day	--	mg/kg-day	--	1.67E-03	mg/kg-day	1.00E+00	mg/kg-day	1.67E-03
				Antimony	1.33E+00	mg/kg	1.35E-08	mg/kg-day	--	mg/kg-day	--	1.35E-07	mg/kg-day	4.00E-04	mg/kg-day	3.38E-04
				Cadmium	2.81E+00	mg/kg	2.86E-08	mg/kg-day	--	mg/kg-day	--	2.86E-07	mg/kg-day	1.00E-03	mg/kg-day	2.86E-04
				Chromium	2.14E+01	mg/kg	2.18E-07	mg/kg-day	5.00E-01	mg/kg-day	1.09E-07	2.18E-06	mg/kg-day	3.00E-03	mg/kg-day	7.26E-04
				Cobalt	8.76E+00	mg/kg	8.91E-08	mg/kg-day	--	mg/kg-day	--	8.91E-07	mg/kg-day	3.00E-04	mg/kg-day	2.97E-03
				Iron	2.17E+04	mg/kg	2.21E-04	mg/kg-day	--	mg/kg-day	--	2.21E-03	mg/kg-day	7.00E-01	mg/kg-day	3.15E-03
				Vanadium	3.16E+01	mg/kg	3.22E-07	mg/kg-day	--	mg/kg-day	--	3.22E-06	mg/kg-day	5.00E-03	mg/kg-day	6.43E-04
				Dieldrin	1.38E+02	ug/kg	1.40E-09	mg/kg-day	1.60E+01	mg/kg-day	2.25E-08	1.40E-08	mg/kg-day	5.00E-05	mg/kg-day	2.81E-04
				Benz(a)anthracene	5.60E+03	ug/kg	5.70E-08	mg/kg-day	7.30E-01	mg/kg-day	4.16E-08	5.70E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	4.28E-08	mg/kg-day	7.30E+00	mg/kg-day	3.13E-07	4.28E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	4.72E-08	mg/kg-day	7.30E-01	mg/kg-day	3.45E-08	4.72E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	3.07E-08	mg/kg-day	7.30E-02	mg/kg-day	2.24E-09	3.07E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	4.77E-08	mg/kg-day	7.30E-03	mg/kg-day	3.48E-10	4.77E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	2.75E-09	mg/kg-day	7.30E+00	mg/kg-day	2.01E-08	2.75E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.93E-08	mg/kg-day	7.30E-01	mg/kg-day	1.41E-08	1.93E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	5.67E-09	mg/kg-day	--	mg/kg-day	--	5.67E-08	mg/kg-day	2.00E-02	mg/kg-day	2.83E-06
				Phenanthrene	1.79E+04	ug/kg	1.82E-07	mg/kg-day	--	mg/kg-day	--	1.82E-06	mg/kg-day	3.00E-02	mg/kg-day	6.07E-05
			Exp. Route Total								5.74E-07					1.14E-02
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	4.39E-15	mg/kg-day	1.30E+05	mg/kg-day	5.70E-10	4.39E-14	mg/kg-day	1.00E-09	mg/kg-day	4.39E-05
				Aluminum	1.64E+04	mg/kg	1.90E-06	mg/kg-day	--	mg/kg-day	--	1.90E-05	mg/kg-day	1.00E+00	mg/kg-day	1.90E-05
				Antimony	1.33E+00	mg/kg	1.54E-10	mg/kg-day	--	mg/kg-day	--	1.54E-09	mg/kg-day	6.00E-05	mg/kg-day	2.57E-05
				Cadmium	2.81E+00	mg/kg	3.26E-11	mg/kg-day	--	mg/kg-day	--	3.26E-10	mg/kg-day	2.50E-05	mg/kg-day	1.30E-05
				Chromium	2.14E+01	mg/kg	2.48E-09	mg/kg-day	2.00E+01	mg/kg-day	4.97E-08	2.48E-08	mg/kg-day	7.50E-05	mg/kg-day	3.31E-04
				Cobalt	8.76E+00	mg/kg	1.02E-09	mg/kg-day	--	mg/kg-day	--	1.02E-08	mg/kg-day	3.00E-04	mg/kg-day	3.39E-05
				Iron	2.17E+04	mg/kg	2.52E-06	mg/kg-day	--	mg/kg-day	--	2.52E-05	mg/kg-day	7.00E-01	mg/kg-day	3.60E-05
				Vanadium	3.16E+01	mg/kg	3.67E-09	mg/kg-day	--	mg/kg-day	--	3.67E-08	mg/kg-day	1.30E-04	mg/kg-day	2.82E-04
				Dieldrin	1.38E+02	ug/kg	1.60E-10	mg/kg-day	1.60E+01	mg/kg-day	2.56E-09	1.60E-09	mg/kg-day	5.00E-05	mg/kg-day	3.20E-05
				Benz(a)anthracene	5.60E+03	ug/kg	8.45E-09	mg/kg-day	7.30E-01	mg/kg-day	6.17E-09	8.45E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	4.21E+03	ug/kg	6.35E-09	mg/kg-day	7.30E+00	mg/kg-day	4.63E-08	6.35E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	4.64E+03	ug/kg	7.00E-09	mg/kg-day	7.30E-01	mg/kg-day	5.11E-09	7.00E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	3.02E+03	ug/kg	4.55E-09	mg/kg-day	7.30E-02	mg/kg-day	3.32E-10	4.55E-08	mg/kg-day	--	mg/kg-day	--
				Chrysene	4.69E+03	ug/kg	7.07E-09	mg/kg-day	7.30E-03	mg/kg-day	5.16E-11	7.07E-08	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	4.07E-10	mg/kg-day	7.30E+00	mg/kg-day	2.97E-09	4.07E-09	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	2.87E-09	mg/kg-day	7.30E-01	mg/kg-day	2.09E-09	2.87E-08	mg/kg-day	--	mg/kg-day	--
				Naphthalene	5.57E+02	ug/kg	8.40E-10	mg/kg-day	--	mg/kg-day	--	8.40E-09	mg/kg-day	2.00E-02	mg/kg-day	4.20E-07
				Phenanthrene	1.79E+04	ug/kg	2.70E-08	mg/kg-day	--	mg/kg-day	--	2.70E-07	mg/kg-day	3.00E-02	mg/kg-day	9.00E-06
			Exp. Route Total								1.16E-07					8.26E-04
		Exposure Point Total									6.89E-07					1.22E-02
	Exposure Medium Total										6.89E-07					1.22E-02
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.40E-07	mg/m3	3.40E-02	1/(mg/m3)	4.75E-09	1.40E-06	mg/m3	3.00E-03	mg/m3	4.66E-04
			Exp. Route Total								4.75E-09					4.66E-04
		Exposure Point Total									4.75E-09					4.66E-04
	Exposure Medium Total										4.75E-09					4.66E-04
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	7.85E-12	mg/m3	1.20E+01	1/(mg/m3)	9.42E-11	7.85E-11	mg/m3	1.00E-04	mg/m3	7.85E-07
			Exp. Route Total								9.42E-11					7.85E-07
		Exposure Point Total									9.42E-11					7.85E-07
	Exposure Medium Total										9.42E-11					7.85E-07
Medium Total											6.94E-07					1.27E-02
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											6.94E-07					1.27E-02

TABLE 7.12.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	4.70E-13	mg/kg-day	1.30E+05	mg/kg-day	6.11E-08					N/A
				Aluminum	1.64E+04	mg/kg	1.67E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	1.35E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	5.35E+00	mg/kg	2.00E-07	mg/kg-day	1.50E+00	mg/kg-day	2.99E-07					N/A
				Cadmium	2.81E+00	mg/kg	2.86E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	7.98E-07	mg/kg-day	5.00E-01	mg/kg-day	9.80E-07					N/A
				Cobalt	8.76E+00	mg/kg	8.91E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	2.21E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	6.78E+02	mg/kg	6.90E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	3.22E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	5.15E-09	mg/kg-day	1.60E+01	mg/kg-day	8.24E-08					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	2.09E-07	mg/kg-day	7.30E-01	mg/kg-day	3.74E-07					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	1.57E-07	mg/kg-day	7.30E+00	mg/kg-day	2.81E-06					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.73E-07	mg/kg-day	7.30E-01	mg/kg-day	3.10E-07					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.13E-07	mg/kg-day	7.30E-02	mg/kg-day	2.02E-08					N/A
				Chrysene	4.69E+03	ug/kg	1.75E-07	mg/kg-day	7.30E-03	mg/kg-day	3.14E-09					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.01E-08	mg/kg-day	7.30E+00	mg/kg-day	1.81E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	7.09E-08	mg/kg-day	7.30E-01	mg/kg-day	1.27E-07					N/A
				Naphthalene	5.57E+02	ug/kg	5.67E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	1.82E-07	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								5.25E-06					--
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.59E-14	mg/kg-day	1.30E+05	mg/kg-day	2.06E-09					N/A
				Aluminum	1.64E+04	mg/kg	1.90E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	1.54E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	5.35E+00	mg/kg	6.74E-09	mg/kg-day	1.50E+00	mg/kg-day	1.01E-08					N/A
				Cadmium	2.81E+00	mg/kg	3.26E-11	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	8.99E-09	mg/kg-day	2.00E+01	mg/kg-day	4.40E-07					N/A
				Cobalt	8.76E+00	mg/kg	1.02E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	2.52E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	6.78E+02	mg/kg	7.87E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	3.67E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	5.80E-10	mg/kg-day	1.60E+01	mg/kg-day	9.27E-09					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	3.06E-08	mg/kg-day	7.30E-01	mg/kg-day	5.46E-08					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	2.30E-08	mg/kg-day	7.30E+00	mg/kg-day	4.11E-07					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.53E-08	mg/kg-day	7.30E-01	mg/kg-day	4.53E-08					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.65E-08	mg/kg-day	7.30E-02	mg/kg-day	2.95E-09					N/A
				Chrysene	4.69E+03	ug/kg	2.56E-08	mg/kg-day	7.30E-03	mg/kg-day	4.57E-10					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.47E-09	mg/kg-day	7.30E+00	mg/kg-day	2.63E-08					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.04E-08	mg/kg-day	7.30E-01	mg/kg-day	1.85E-08					N/A
				Naphthalene	5.57E+02	ug/kg	8.40E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	2.70E-08	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								1.02E-06					--
		Exposure Point Total									6.27E-06					--
	Exposure Medium Total										6.27E-06					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.80E-07	mg/m3	3.40E-02	1/(mg/m3)	6.11E-09					N/A
			Exp. Route Total								6.11E-09					--
		Exposure Point Total									6.11E-09					--
	Exposure Medium Total										6.11E-09					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.01E-11	mg/m3	1.20E+01	1/(mg/m3)	1.75E-10					N/A
			Exp. Route Total								1.75E-10					--
		Exposure Point Total									1.75E-10					--
	Exposure Medium Total										1.75E-10					--
Medium Total											6.28E-06					--
										Total of Receptor Risks Across All Media	6.28E-06	Total of Receptor Hazards Across All Media				--

TABLE 7.12a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Surface Soil	Site 3 Landfill Area Contact with Surface Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	4.70E-13	mg/kg-day	1.30E+05	mg/kg-day	6.11E-08					N/A
				Aluminum	1.64E+04	mg/kg	1.67E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	1.35E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	2.81E+00	mg/kg	2.86E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	7.98E-07	mg/kg-day	5.00E-01	mg/kg-day	9.80E-07					N/A
				Cobalt	8.76E+00	mg/kg	8.91E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	2.21E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	3.22E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	5.15E-09	mg/kg-day	1.60E+01	mg/kg-day	8.24E-08					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	2.09E-07	mg/kg-day	7.30E-01	mg/kg-day	3.74E-07					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	1.57E-07	mg/kg-day	7.30E+00	mg/kg-day	2.81E-06					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	1.73E-07	mg/kg-day	7.30E-01	mg/kg-day	3.10E-07					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.13E-07	mg/kg-day	7.30E-02	mg/kg-day	2.02E-08					N/A
				Chrysene	4.69E+03	ug/kg	1.75E-07	mg/kg-day	7.30E-03	mg/kg-day	3.14E-09					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.01E-08	mg/kg-day	7.30E+00	mg/kg-day	1.81E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	7.09E-08	mg/kg-day	7.30E-01	mg/kg-day	1.27E-07					N/A
				Naphthalene	5.57E+02	ug/kg	5.67E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	1.82E-07	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								4.95E-06					--
			Dermal	Total 2,3,7,8-TCDD Equiv.	1.26E-02	ug/kg	1.59E-14	mg/kg-day	1.30E+05	mg/kg-day	2.06E-09					N/A
				Aluminum	1.64E+04	mg/kg	1.90E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	1.33E+00	mg/kg	1.54E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	2.81E+00	mg/kg	3.26E-11	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	2.14E+01	mg/kg	8.99E-09	mg/kg-day	2.00E+01	mg/kg-day	4.40E-07					N/A
				Cobalt	8.76E+00	mg/kg	1.02E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	2.17E+04	mg/kg	2.52E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	3.16E+01	mg/kg	3.67E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Dieldrin	1.38E+02	ug/kg	5.80E-10	mg/kg-day	1.60E+01	mg/kg-day	9.27E-09					N/A
				Benz(a)anthracene	5.60E+03	ug/kg	3.06E-08	mg/kg-day	7.30E-01	mg/kg-day	5.46E-08					N/A
				Benzo(a)pyrene	4.21E+03	ug/kg	2.30E-08	mg/kg-day	7.30E+00	mg/kg-day	4.11E-07					N/A
				Benzo(b)fluoranthene	4.64E+03	ug/kg	2.53E-08	mg/kg-day	7.30E-01	mg/kg-day	4.53E-08					N/A
				Benzo(k)fluoranthene	3.02E+03	ug/kg	1.65E-08	mg/kg-day	7.30E-02	mg/kg-day	2.95E-09					N/A
				Chrysene	4.69E+03	ug/kg	2.56E-08	mg/kg-day	7.30E-03	mg/kg-day	4.57E-10					N/A
				Dibenz(a,h)anthracene	2.70E+02	ug/kg	1.47E-09	mg/kg-day	7.30E+00	mg/kg-day	2.63E-08					N/A
				Indeno(1,2,3-cd)pyrene	1.90E+03	ug/kg	1.04E-08	mg/kg-day	7.30E-01	mg/kg-day	1.85E-08					N/A
				Naphthalene	5.57E+02	ug/kg	8.40E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.79E+04	ug/kg	2.70E-08	mg/kg-day	--	mg/kg-day	--					N/A
			Exp. Route Total								1.01E-06					--
		Exposure Point Total									5.96E-06					--
	Exposure Medium Total										5.96E-06					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Surface Soil	Inhalation	Naphthalene	5.57E+02	ug/kg	1.80E-07	mg/m3	3.40E-02	1/(mg/m3)	6.11E-09					N/A
			Exp. Route Total								6.11E-09					--
		Exposure Point Total									6.11E-09					--
	Exposure Medium Total										6.11E-09					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Surface Soil	Inhalation	Chromium	2.14E+01	mg/kg	1.01E-11	mg/m3	1.20E+01	1/(mg/m3)	1.75E-10					N/A
			Exp. Route Total								1.75E-10					--
		Exposure Point Total									1.75E-10					--
	Exposure Medium Total										1.75E-10					--
Medium Total											5.97E-06					--
										Total of Receptor Risks Across All Media	5.97E-06			Total of Receptor Hazards Across All Media		--

TABLE 7.13.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.97E-11	mg/kg-day	1.30E+05	mg/kg-day	3.86E-06	1.04E-09	mg/kg-day	1.00E-09	mg/kg-day	1.04E+00
				Aluminum	1.98E+04	mg/kg	2.42E-03	mg/kg-day	--	mg/kg-day	--	8.46E-02	mg/kg-day	1.00E+00	mg/kg-day	8.46E-02
				Antimony	2.50E+01	mg/kg	3.05E-06	mg/kg-day	--	mg/kg-day	--	1.07E-04	mg/kg-day	4.00E-04	mg/kg-day	2.67E-01
				Arsenic	6.21E+00	mg/kg	7.58E-07	mg/kg-day	1.50E+00	mg/kg-day	1.14E-06	2.65E-05	mg/kg-day	3.00E-04	mg/kg-day	8.85E-02
				Cadmium	4.71E+01	mg/kg	5.75E-06	mg/kg-day	--	mg/kg-day	--	2.01E-04	mg/kg-day	1.00E-03	mg/kg-day	2.01E-01
				Chromium	3.94E+01	mg/kg	4.81E-06	mg/kg-day	5.00E-01	mg/kg-day	7.22E-06	1.68E-04	mg/kg-day	3.00E-03	mg/kg-day	5.61E-02
				Cobalt	1.23E+01	mg/kg	1.50E-06	mg/kg-day	--	mg/kg-day	--	5.26E-05	mg/kg-day	3.00E-04	mg/kg-day	1.75E-01
				Copper	9.67E+02	mg/kg	1.18E-04	mg/kg-day	--	mg/kg-day	--	4.13E-03	mg/kg-day	4.00E-02	mg/kg-day	1.03E-01
				Iron	3.36E+04	mg/kg	4.10E-03	mg/kg-day	--	mg/kg-day	--	1.44E-01	mg/kg-day	7.00E-01	mg/kg-day	2.05E-01
				Lead	3.22E+02	mg/kg	3.93E-05	mg/kg-day	--	mg/kg-day	--	1.38E-03	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.61E-04	mg/kg-day	--	mg/kg-day	--	5.64E-03	mg/kg-day	2.40E-02	mg/kg-day	2.35E-01
				Mercury	1.15E+00	mg/kg	1.40E-07	mg/kg-day	--	mg/kg-day	--	4.92E-06	mg/kg-day	1.00E-04	mg/kg-day	4.92E-02
				Nickel	3.74E+01	mg/kg	4.57E-06	mg/kg-day	--	mg/kg-day	--	1.60E-04	mg/kg-day	2.00E-02	mg/kg-day	7.99E-03
				Silver	1.60E+01	mg/kg	1.95E-06	mg/kg-day	--	mg/kg-day	--	6.84E-05	mg/kg-day	5.00E-03	mg/kg-day	1.37E-02
				Vanadium	4.45E+01	mg/kg	5.43E-06	mg/kg-day	--	mg/kg-day	--	1.90E-04	mg/kg-day	5.00E-03	mg/kg-day	3.80E-02
				Zinc	1.38E+03	mg/kg	1.69E-04	mg/kg-day	--	mg/kg-day	--	5.90E-03	mg/kg-day	3.00E-01	mg/kg-day	1.97E-02
				4,4'-DDD	4.63E+03	ug/kg	5.65E-07	mg/kg-day	2.40E-01	mg/kg-day	1.36E-07	1.98E-05	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	7.36E-08	mg/kg-day	3.40E-01	mg/kg-day	2.50E-08	2.58E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.11E-06	mg/kg-day	3.40E-01	mg/kg-day	7.18E-07	7.39E-05	mg/kg-day	5.00E-04	mg/kg-day	1.48E-01
				Aroclor-1248	5.60E+02	ug/kg	6.84E-08	mg/kg-day	2.00E+00	mg/kg-day	1.37E-07	2.39E-06	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.64E-08	mg/kg-day	2.00E+00	mg/kg-day	3.27E-08	5.73E-07	mg/kg-day	2.00E-05	mg/kg-day	2.86E-02
				Aroclor-1260	4.51E+01	ug/kg	5.51E-09	mg/kg-day	2.00E+00	mg/kg-day	1.10E-08	1.93E-07	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	8.56E-08	mg/kg-day	1.60E+01	mg/kg-day	1.37E-06	3.00E-06	mg/kg-day	5.00E-05	mg/kg-day	5.99E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	1.56E-09	mg/kg-day	9.10E+00	mg/kg-day	1.42E-08	5.47E-08	mg/kg-day	1.30E-05	mg/kg-day	4.21E-03
				Benz(a)anthracene	3.92E+03	ug/kg	4.79E-07	mg/kg-day	7.30E-01	mg/kg-day	1.05E-06	1.68E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	3.53E-07	mg/kg-day	7.30E+00	mg/kg-day	7.73E-06	1.24E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	3.92E-07	mg/kg-day	7.30E-01	mg/kg-day	8.58E-07	1.37E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.61E-07	mg/kg-day	7.30E-02	mg/kg-day	5.72E-08	9.15E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	4.37E-07	mg/kg-day	7.30E-03	mg/kg-day	9.57E-09	1.53E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	3.42E-08	mg/kg-day	7.30E+00	mg/kg-day	7.49E-07	1.20E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.59E-07	mg/kg-day	7.30E-01	mg/kg-day	3.48E-07	5.56E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	9.48E-08	mg/kg-day	--	mg/kg-day	--	3.32E-06	mg/kg-day	2.00E-02	mg/kg-day	1.66E-04
				Phenanthrene	1.25E+04	ug/kg	1.53E-06	mg/kg-day	--	mg/kg-day	--	5.34E-05	mg/kg-day	3.00E-02	mg/kg-day	1.78E-03
				Ethylbenzene	6.55E+02	ug/kg	8.00E-08	mg/kg-day	1.10E-02	mg/kg-day	8.80E-10	2.80E-06	mg/kg-day	1.00E-01	mg/kg-day	2.80E-05
			Exp. Route Total								2.55E-05					2.83E+00

TABLE 7.13.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	9.97E-13	mg/kg-day	1.30E+05	mg/kg-day	1.30E-07	3.49E-11	mg/kg-day	1.00E-09	mg/kg-day	3.49E-02
				Aluminum	1.98E+04	mg/kg	2.71E-05	mg/kg-day	--	mg/kg-day	--	9.48E-04	mg/kg-day	1.00E+00	mg/kg-day	9.48E-04
				Antimony	2.50E+01	mg/kg	3.42E-08	mg/kg-day	--	mg/kg-day	--	1.20E-06	mg/kg-day	6.00E-05	mg/kg-day	1.99E-02
				Arsenic	6.21E+00	mg/kg	2.55E-08	mg/kg-day	1.50E+00	mg/kg-day	3.82E-08	8.92E-07	mg/kg-day	3.00E-04	mg/kg-day	2.97E-03
				Cadmium	4.71E+01	mg/kg	6.44E-09	mg/kg-day	--	mg/kg-day	--	2.25E-07	mg/kg-day	2.50E-05	mg/kg-day	9.02E-03
				Chromium	3.94E+01	mg/kg	5.39E-08	mg/kg-day	2.00E+01	mg/kg-day	3.23E-06	1.89E-06	mg/kg-day	7.50E-05	mg/kg-day	2.51E-02
				Cobalt	1.23E+01	mg/kg	1.68E-08	mg/kg-day	--	mg/kg-day	--	5.89E-07	mg/kg-day	3.00E-04	mg/kg-day	1.96E-03
				Copper	9.67E+02	mg/kg	1.32E-06	mg/kg-day	--	mg/kg-day	--	4.63E-05	mg/kg-day	4.00E-02	mg/kg-day	1.16E-03
				Iron	3.36E+04	mg/kg	4.60E-05	mg/kg-day	--	mg/kg-day	--	1.61E-03	mg/kg-day	7.00E-01	mg/kg-day	2.30E-03
				Lead	3.22E+02	mg/kg	4.40E-07	mg/kg-day	--	mg/kg-day	--	1.54E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.81E-06	mg/kg-day	--	mg/kg-day	--	6.32E-05	mg/kg-day	9.60E-04	mg/kg-day	6.58E-02
				Mercury	1.15E+00	mg/kg	1.57E-09	mg/kg-day	--	mg/kg-day	--	5.50E-08	mg/kg-day	1.00E-04	mg/kg-day	5.50E-04
				Nickel	3.74E+01	mg/kg	5.12E-08	mg/kg-day	--	mg/kg-day	--	1.79E-06	mg/kg-day	8.00E-04	mg/kg-day	2.24E-03
				Silver	1.60E+01	mg/kg	2.19E-08	mg/kg-day	--	mg/kg-day	--	7.66E-07	mg/kg-day	2.00E-04	mg/kg-day	3.83E-03
				Vanadium	4.45E+01	mg/kg	6.09E-08	mg/kg-day	--	mg/kg-day	--	2.13E-06	mg/kg-day	1.30E-04	mg/kg-day	1.64E-02
				Zinc	1.38E+03	mg/kg	1.89E-06	mg/kg-day	--	mg/kg-day	--	6.61E-05	mg/kg-day	3.00E-01	mg/kg-day	2.20E-04
				4,4'-DDD	4.63E+03	ug/kg	1.90E-08	mg/kg-day	2.40E-01	mg/kg-day	4.56E-09	6.65E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.47E-09	mg/kg-day	3.40E-01	mg/kg-day	8.41E-10	8.66E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	7.10E-08	mg/kg-day	3.40E-01	mg/kg-day	2.41E-08	2.48E-06	mg/kg-day	5.00E-04	mg/kg-day	4.97E-03
				Aroclor-1248	5.60E+02	ug/kg	1.07E-08	mg/kg-day	2.00E+00	mg/kg-day	2.14E-08	3.75E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	2.57E-09	mg/kg-day	2.00E+00	mg/kg-day	5.13E-09	8.98E-08	mg/kg-day	2.00E-05	mg/kg-day	4.49E-03
				Aroclor-1260	4.51E+01	ug/kg	8.64E-10	mg/kg-day	2.00E+00	mg/kg-day	1.73E-09	3.02E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	9.59E-09	mg/kg-day	1.60E+01	mg/kg-day	1.53E-07	3.36E-07	mg/kg-day	5.00E-05	mg/kg-day	6.71E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	1.75E-10	mg/kg-day	9.10E+00	mg/kg-day	1.59E-09	6.13E-09	mg/kg-day	1.30E-05	mg/kg-day	4.71E-04
				Benz(a)anthracene	3.92E+03	ug/kg	6.97E-08	mg/kg-day	7.30E-01	mg/kg-day	1.53E-07	2.44E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	5.14E-08	mg/kg-day	7.30E+00	mg/kg-day	1.13E-06	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	5.71E-08	mg/kg-day	7.30E-01	mg/kg-day	1.25E-07	2.00E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	3.80E-08	mg/kg-day	7.30E-02	mg/kg-day	8.33E-09	1.33E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	6.37E-08	mg/kg-day	7.30E-03	mg/kg-day	1.39E-09	2.23E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	4.98E-09	mg/kg-day	7.30E+00	mg/kg-day	1.09E-07	1.74E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	2.31E-08	mg/kg-day	7.30E-01	mg/kg-day	5.06E-08	8.09E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.38E-08	mg/kg-day	--	mg/kg-day	--	4.83E-07	mg/kg-day	2.00E-02	mg/kg-day	2.41E-05
				Phenanthrene	1.25E+04	ug/kg	2.22E-07	mg/kg-day	--	mg/kg-day	--	7.78E-06	mg/kg-day	3.00E-02	mg/kg-day	2.59E-04
				Ethylbenzene	6.55E+02	ug/kg	2.69E-09	mg/kg-day	1.10E-02	mg/kg-day	2.96E-11	9.41E-08	mg/kg-day	1.00E-01	mg/kg-day	9.41E-07
			Exp. Route Total								5.19E-06					2.04E-01
		Exposure Point Total									3.06E-05					3.03E+00
	Exposure Medium Total										3.06E-05					3.03E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	7.51E-07	mg/m3	3.40E-02	1/(mg/m3)	2.55E-08	2.63E-05	mg/m3	3.00E-03	mg/m3	8.77E-03
				Ethylbenzene	7.00E+03	ug/kg	2.65E-05	mg/m3	2.50E-03	1/(mg/m3)	6.62E-08	9.27E-04	mg/m3	1.00E+00	mg/m3	9.27E-04
			Exp. Route Total								9.18E-08					9.69E-03
		Exposure Point Total									9.18E-08					9.69E-03
	Exposure Medium Total										9.18E-08					9.69E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	5.58E-11	mg/m3	1.20E+01	1/(mg/m3)	2.01E-09	1.95E-09	mg/m3	1.00E-04	mg/m3	1.95E-05
				Manganese	1.32E+03	mg/kg	1.87E-09	mg/m3	--	1/(mg/m3)	--	6.54E-08	mg/m3	5.00E-05	mg/m3	1.31E-03
			Exp. Route Total								2.01E-09					1.33E-03
		Exposure Point Total									2.01E-09					1.33E-03
	Exposure Medium Total										2.01E-09					1.33E-03
Medium Total											3.07E-05					3.04E+00
										Total of Receptor Risks Across All Media	3.07E-05			Total of Receptor Hazards Across All Media		3.04E+00

TABLE 7.13a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.97E-11	mg/kg-day	1.30E+05	mg/kg-day	3.86E-06	1.04E-09	mg/kg-day	1.00E-09	mg/kg-day	1.04E+00
				Aluminum	1.98E+04	mg/kg	2.42E-03	mg/kg-day	--	mg/kg-day	--	8.46E-02	mg/kg-day	1.00E+00	mg/kg-day	8.46E-02
				Antimony	2.50E+01	mg/kg	3.05E-06	mg/kg-day	--	mg/kg-day	--	1.07E-04	mg/kg-day	4.00E-04	mg/kg-day	2.67E-01
				Cadmium	4.71E+01	mg/kg	5.75E-06	mg/kg-day	--	mg/kg-day	--	2.01E-04	mg/kg-day	1.00E-03	mg/kg-day	2.01E-01
				Chromium	3.94E+01	mg/kg	4.81E-06	mg/kg-day	5.00E-01	mg/kg-day	7.22E-06	1.68E-04	mg/kg-day	3.00E-03	mg/kg-day	5.61E-02
				Cobalt	1.23E+01	mg/kg	1.50E-06	mg/kg-day	--	mg/kg-day	--	5.26E-05	mg/kg-day	3.00E-04	mg/kg-day	1.75E-01
				Copper	9.67E+02	mg/kg	1.18E-04	mg/kg-day	--	mg/kg-day	--	4.13E-03	mg/kg-day	4.00E-02	mg/kg-day	1.03E-01
				Iron	3.36E+04	mg/kg	4.10E-03	mg/kg-day	--	mg/kg-day	--	1.44E-01	mg/kg-day	7.00E-01	mg/kg-day	2.05E-01
				Lead	3.22E+02	mg/kg	3.93E-05	mg/kg-day	--	mg/kg-day	--	1.38E-03	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.61E-04	mg/kg-day	--	mg/kg-day	--	5.64E-03	mg/kg-day	2.40E-02	mg/kg-day	2.35E-01
				Mercury	1.15E+00	mg/kg	1.40E-07	mg/kg-day	--	mg/kg-day	--	4.92E-06	mg/kg-day	1.00E-04	mg/kg-day	4.92E-02
				Nickel	3.74E+01	mg/kg	4.57E-06	mg/kg-day	--	mg/kg-day	--	1.60E-04	mg/kg-day	2.00E-02	mg/kg-day	7.99E-03
				Silver	1.60E+01	mg/kg	1.95E-06	mg/kg-day	--	mg/kg-day	--	6.84E-05	mg/kg-day	5.00E-03	mg/kg-day	1.37E-02
				Vanadium	4.45E+01	mg/kg	5.43E-06	mg/kg-day	--	mg/kg-day	--	1.90E-04	mg/kg-day	5.00E-03	mg/kg-day	3.80E-02
				Zinc	1.38E+03	mg/kg	1.69E-04	mg/kg-day	--	mg/kg-day	--	5.90E-03	mg/kg-day	3.00E-01	mg/kg-day	1.97E-02
				4,4'-DDD	4.63E+03	ug/kg	5.65E-07	mg/kg-day	2.40E-01	mg/kg-day	1.36E-07	1.98E-05	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	7.36E-08	mg/kg-day	3.40E-01	mg/kg-day	2.50E-08	2.58E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.11E-06	mg/kg-day	3.40E-01	mg/kg-day	7.18E-07	7.39E-05	mg/kg-day	5.00E-04	mg/kg-day	1.48E-01
				Aroclor-1248	5.60E+02	ug/kg	6.84E-08	mg/kg-day	2.00E+00	mg/kg-day	1.37E-07	2.39E-06	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.64E-08	mg/kg-day	2.00E+00	mg/kg-day	3.27E-08	5.73E-07	mg/kg-day	2.00E-05	mg/kg-day	2.86E-02
				Aroclor-1260	4.51E+01	ug/kg	5.51E-09	mg/kg-day	2.00E+00	mg/kg-day	1.10E-08	1.93E-07	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	8.56E-08	mg/kg-day	1.60E+01	mg/kg-day	1.37E-06	3.00E-06	mg/kg-day	5.00E-05	mg/kg-day	5.99E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	1.56E-09	mg/kg-day	9.10E+00	mg/kg-day	1.42E-08	5.47E-08	mg/kg-day	1.30E-05	mg/kg-day	4.21E-03
				Benz(a)anthracene	3.92E+03	ug/kg	4.79E-07	mg/kg-day	7.30E-01	mg/kg-day	1.05E-06	1.68E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	3.53E-07	mg/kg-day	7.30E+00	mg/kg-day	7.73E-06	1.24E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	3.92E-07	mg/kg-day	7.30E-01	mg/kg-day	8.58E-07	1.37E-05	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.61E-07	mg/kg-day	7.30E-02	mg/kg-day	5.72E-08	9.15E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	4.37E-07	mg/kg-day	7.30E-03	mg/kg-day	9.57E-09	1.53E-05	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	3.42E-08	mg/kg-day	7.30E+00	mg/kg-day	7.49E-07	1.20E-06	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.59E-07	mg/kg-day	7.30E-01	mg/kg-day	3.48E-07	5.56E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	9.48E-08	mg/kg-day	--	mg/kg-day	--	3.32E-06	mg/kg-day	2.00E-02	mg/kg-day	1.66E-04
				Phenanthrene	1.25E+04	ug/kg	1.53E-06	mg/kg-day	--	mg/kg-day	--	5.34E-05	mg/kg-day	3.00E-02	mg/kg-day	1.78E-03
				Ethylbenzene	6.55E+02	ug/kg	8.00E-08	mg/kg-day	1.10E-02	mg/kg-day	8.80E-10	2.80E-06	mg/kg-day	1.00E-01	mg/kg-day	2.80E-05
			Exp. Route Total								2.43E-05					2.74E+00

TABLE 7.13a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL CHILD EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	9.97E-13	mg/kg-day	1.30E+05	mg/kg-day	1.30E-07	3.49E-11	mg/kg-day	1.00E-09	mg/kg-day	3.49E-02
				Aluminum	1.98E+04	mg/kg	2.71E-05	mg/kg-day	--	mg/kg-day	--	9.48E-04	mg/kg-day	1.00E+00	mg/kg-day	9.48E-04
				Antimony	2.50E+01	mg/kg	3.42E-08	mg/kg-day	--	mg/kg-day	--	1.20E-06	mg/kg-day	6.00E-05	mg/kg-day	1.99E-02
				Cadmium	4.71E+01	mg/kg	6.44E-09	mg/kg-day	--	mg/kg-day	--	2.25E-07	mg/kg-day	2.50E-05	mg/kg-day	9.02E-03
				Chromium	3.94E+01	mg/kg	5.39E-08	mg/kg-day	2.00E+01	mg/kg-day	3.23E-06	1.89E-06	mg/kg-day	7.50E-05	mg/kg-day	2.51E-02
				Cobalt	1.23E+01	mg/kg	1.68E-08	mg/kg-day	--	mg/kg-day	--	5.89E-07	mg/kg-day	3.00E-04	mg/kg-day	1.96E-03
				Copper	9.67E+02	mg/kg	1.32E-06	mg/kg-day	--	mg/kg-day	--	4.63E-05	mg/kg-day	4.00E-02	mg/kg-day	1.16E-03
				Iron	3.36E+04	mg/kg	4.60E-05	mg/kg-day	--	mg/kg-day	--	1.61E-03	mg/kg-day	7.00E-01	mg/kg-day	2.30E-03
				Lead	3.22E+02	mg/kg	4.40E-07	mg/kg-day	--	mg/kg-day	--	1.54E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.81E-06	mg/kg-day	--	mg/kg-day	--	6.32E-05	mg/kg-day	9.60E-04	mg/kg-day	6.58E-02
				Mercury	1.15E+00	mg/kg	1.57E-09	mg/kg-day	--	mg/kg-day	--	5.50E-08	mg/kg-day	1.00E-04	mg/kg-day	5.50E-04
				Nickel	3.74E+01	mg/kg	5.12E-08	mg/kg-day	--	mg/kg-day	--	1.79E-06	mg/kg-day	8.00E-04	mg/kg-day	2.24E-03
				Silver	1.60E+01	mg/kg	2.19E-08	mg/kg-day	--	mg/kg-day	--	7.66E-07	mg/kg-day	2.00E-04	mg/kg-day	3.83E-03
				Vanadium	4.45E+01	mg/kg	6.09E-08	mg/kg-day	--	mg/kg-day	--	2.13E-06	mg/kg-day	1.30E-04	mg/kg-day	1.64E-02
				Zinc	1.38E+03	mg/kg	1.89E-06	mg/kg-day	--	mg/kg-day	--	6.61E-05	mg/kg-day	3.00E-01	mg/kg-day	2.20E-04
				4,4'-DDD	4.63E+03	ug/kg	1.90E-08	mg/kg-day	2.40E-01	mg/kg-day	4.56E-09	6.65E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.47E-09	mg/kg-day	3.40E-01	mg/kg-day	8.41E-10	8.66E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	7.10E-08	mg/kg-day	3.40E-01	mg/kg-day	2.41E-08	2.48E-06	mg/kg-day	5.00E-04	mg/kg-day	4.97E-03
				Aroclor-1248	5.60E+02	ug/kg	1.07E-08	mg/kg-day	2.00E+00	mg/kg-day	2.14E-08	3.75E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	2.57E-09	mg/kg-day	2.00E+00	mg/kg-day	5.13E-09	8.98E-08	mg/kg-day	2.00E-05	mg/kg-day	4.49E-03
				Aroclor-1260	4.51E+01	ug/kg	8.64E-10	mg/kg-day	2.00E+00	mg/kg-day	1.73E-09	3.02E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	9.59E-09	mg/kg-day	1.60E+01	mg/kg-day	1.53E-07	3.36E-07	mg/kg-day	5.00E-05	mg/kg-day	6.71E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	1.75E-10	mg/kg-day	9.10E+00	mg/kg-day	1.59E-09	6.13E-09	mg/kg-day	1.30E-05	mg/kg-day	4.71E-04
				Benz(a)anthracene	3.92E+03	ug/kg	6.97E-08	mg/kg-day	7.30E-01	mg/kg-day	1.53E-07	2.44E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	5.14E-08	mg/kg-day	7.30E+00	mg/kg-day	1.13E-06	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	5.71E-08	mg/kg-day	7.30E-01	mg/kg-day	1.25E-07	2.00E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	3.80E-08	mg/kg-day	7.30E-02	mg/kg-day	8.33E-09	1.33E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	6.37E-08	mg/kg-day	7.30E-03	mg/kg-day	1.39E-09	2.23E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	4.98E-09	mg/kg-day	7.30E+00	mg/kg-day	1.09E-07	1.74E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	2.31E-08	mg/kg-day	7.30E-01	mg/kg-day	5.06E-08	8.09E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.38E-08	mg/kg-day	--	mg/kg-day	--	4.83E-07	mg/kg-day	2.00E-02	mg/kg-day	2.41E-05
				Phenanthrene	1.25E+04	ug/kg	2.22E-07	mg/kg-day	--	mg/kg-day	--	7.78E-06	mg/kg-day	3.00E-02	mg/kg-day	2.59E-04
				Ethylbenzene	6.55E+02	ug/kg	2.69E-09	mg/kg-day	1.10E-02	mg/kg-day	2.96E-11	9.41E-08	mg/kg-day	1.00E-01	mg/kg-day	9.41E-07
			Exp. Route Total								5.15E-06					2.01E-01
		Exposure Point Total									2.95E-05					2.94E+00
	Exposure Medium Total										2.95E-05					2.94E+00
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	7.51E-07	mg/m3	3.40E-02	1/(mg/m3)	2.55E-08	2.63E-05	mg/m3	3.00E-03	mg/m3	8.77E-03
				Ethylbenzene	7.00E+03	ug/kg	2.65E-05	mg/m3	2.50E-03	1/(mg/m3)	6.62E-08	9.27E-04	mg/m3	1.00E+00	mg/m3	9.27E-04
			Exp. Route Total								9.18E-08					9.69E-03
		Exposure Point Total									9.18E-08					9.69E-03
	Exposure Medium Total										9.18E-08					9.69E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	5.58E-11	mg/m3	1.20E+01	1/(mg/m3)	2.01E-09	1.95E-09	mg/m3	1.00E-04	mg/m3	1.95E-05
				Manganese	1.32E+03	mg/kg	1.87E-09	mg/m3	--	1/(mg/m3)	--	6.54E-08	mg/m3	5.00E-05	mg/m3	1.31E-03
			Exp. Route Total								2.01E-09					1.33E-03
		Exposure Point Total									2.01E-09					1.33E-03
	Exposure Medium Total										2.01E-09					1.33E-03
Medium Total											2.96E-05					2.95E+00
											Total of Receptor Risks Across All Media					2.95E+00

TABLE 7.14.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.11E-11	mg/kg-day	1.30E+05	mg/kg-day	1.45E-06	1.11E-10	mg/kg-day	1.00E-09	mg/kg-day	1.11E-01
				Aluminum	1.98E+04	mg/kg	9.07E-04	mg/kg-day	--	mg/kg-day	--	9.07E-03	mg/kg-day	1.00E+00	mg/kg-day	9.07E-03
				Antimony	2.50E+01	mg/kg	1.14E-06	mg/kg-day	--	mg/kg-day	--	1.14E-05	mg/kg-day	4.00E-04	mg/kg-day	2.86E-02
				Arsenic	6.21E+00	mg/kg	2.84E-07	mg/kg-day	1.50E+00	mg/kg-day	4.27E-07	2.84E-06	mg/kg-day	3.00E-04	mg/kg-day	9.48E-03
				Cadmium	4.71E+01	mg/kg	2.16E-06	mg/kg-day	--	mg/kg-day	--	2.16E-05	mg/kg-day	1.00E-03	mg/kg-day	2.16E-02
				Chromium	3.94E+01	mg/kg	1.80E-06	mg/kg-day	5.00E-01	mg/kg-day	9.02E-07	1.80E-05	mg/kg-day	3.00E-03	mg/kg-day	6.01E-03
				Cobalt	1.23E+01	mg/kg	5.63E-07	mg/kg-day	--	mg/kg-day	--	5.63E-06	mg/kg-day	3.00E-04	mg/kg-day	1.88E-02
				Copper	9.67E+02	mg/kg	4.43E-05	mg/kg-day	--	mg/kg-day	--	4.43E-04	mg/kg-day	4.00E-02	mg/kg-day	1.11E-02
				Iron	3.36E+04	mg/kg	1.54E-03	mg/kg-day	--	mg/kg-day	--	1.54E-02	mg/kg-day	7.00E-01	mg/kg-day	2.20E-02
				Lead	3.22E+02	mg/kg	1.47E-05	mg/kg-day	--	mg/kg-day	--	1.47E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	6.04E-05	mg/kg-day	--	mg/kg-day	--	6.04E-04	mg/kg-day	2.40E-02	mg/kg-day	2.52E-02
				Mercury	1.15E+00	mg/kg	5.27E-08	mg/kg-day	--	mg/kg-day	--	5.27E-07	mg/kg-day	1.00E-04	mg/kg-day	5.27E-03
				Nickel	3.74E+01	mg/kg	1.71E-06	mg/kg-day	--	mg/kg-day	--	1.71E-05	mg/kg-day	2.00E-02	mg/kg-day	8.56E-04
				Silver	1.60E+01	mg/kg	7.33E-07	mg/kg-day	--	mg/kg-day	--	7.33E-06	mg/kg-day	5.00E-03	mg/kg-day	1.47E-03
				Vanadium	4.45E+01	mg/kg	2.04E-06	mg/kg-day	--	mg/kg-day	--	2.04E-05	mg/kg-day	5.00E-03	mg/kg-day	4.08E-03
				Zinc	1.38E+03	mg/kg	6.32E-05	mg/kg-day	--	mg/kg-day	--	6.32E-04	mg/kg-day	3.00E-01	mg/kg-day	2.11E-03
				4,4'-DDD	4.63E+03	ug/kg	2.12E-07	mg/kg-day	2.40E-01	mg/kg-day	5.09E-08	2.12E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.76E-08	mg/kg-day	3.40E-01	mg/kg-day	9.39E-09	2.76E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	7.92E-07	mg/kg-day	3.40E-01	mg/kg-day	2.69E-07	7.92E-06	mg/kg-day	5.00E-04	mg/kg-day	1.58E-02
				Aroclor-1248	5.60E+02	ug/kg	2.56E-08	mg/kg-day	2.00E+00	mg/kg-day	5.13E-08	2.56E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	6.14E-09	mg/kg-day	2.00E+00	mg/kg-day	1.23E-08	6.14E-08	mg/kg-day	2.00E-05	mg/kg-day	3.07E-03
				Aroclor-1260	4.51E+01	ug/kg	2.07E-09	mg/kg-day	2.00E+00	mg/kg-day	4.13E-09	2.07E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.21E-08	mg/kg-day	1.60E+01	mg/kg-day	5.14E-07	3.21E-07	mg/kg-day	5.00E-05	mg/kg-day	6.42E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	5.86E-10	mg/kg-day	9.10E+00	mg/kg-day	5.33E-09	5.86E-09	mg/kg-day	1.30E-05	mg/kg-day	4.51E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.80E-07	mg/kg-day	7.30E-01	mg/kg-day	1.31E-07	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.32E-07	mg/kg-day	7.30E+00	mg/kg-day	9.66E-07	1.32E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.47E-07	mg/kg-day	7.30E-01	mg/kg-day	1.07E-07	1.47E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	9.80E-08	mg/kg-day	7.30E-02	mg/kg-day	7.15E-09	9.80E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.64E-07	mg/kg-day	7.30E-03	mg/kg-day	1.20E-09	1.64E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.28E-08	mg/kg-day	7.30E+00	mg/kg-day	9.36E-08	1.28E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	5.95E-08	mg/kg-day	7.30E-01	mg/kg-day	4.35E-08	5.95E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	3.55E-08	mg/kg-day	--	mg/kg-day	--	3.55E-07	mg/kg-day	2.00E-02	mg/kg-day	1.78E-05
				Phenanthrene	1.25E+04	ug/kg	5.72E-07	mg/kg-day	--	mg/kg-day	--	5.72E-06	mg/kg-day	3.00E-02	mg/kg-day	1.91E-04
				Ethylbenzene	6.55E+02	ug/kg	3.00E-08	mg/kg-day	1.10E-02	mg/kg-day	3.30E-10	3.00E-07	mg/kg-day	1.00E-01	mg/kg-day	3.00E-06
			Exp. Route Total								5.04E-06					3.03E-01

TABLE 7.14.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.81E-13	mg/kg-day	1.30E+05	mg/kg-day	4.95E-08	3.81E-12	mg/kg-day	1.00E-09	mg/kg-day	3.81E-03
				Aluminum	1.98E+04	mg/kg	1.03E-05	mg/kg-day	--	mg/kg-day	--	1.03E-04	mg/kg-day	1.00E+00	mg/kg-day	1.03E-04
				Antimony	2.50E+01	mg/kg	1.31E-08	mg/kg-day	--	mg/kg-day	--	1.31E-07	mg/kg-day	6.00E-05	mg/kg-day	2.18E-03
				Arsenic	6.21E+00	mg/kg	9.73E-09	mg/kg-day	1.50E+00	mg/kg-day	1.46E-08	9.73E-08	mg/kg-day	3.00E-04	mg/kg-day	3.24E-04
				Cadmium	4.71E+01	mg/kg	2.46E-09	mg/kg-day	--	mg/kg-day	--	2.46E-08	mg/kg-day	2.50E-05	mg/kg-day	9.84E-04
				Chromium	3.94E+01	mg/kg	2.06E-08	mg/kg-day	2.00E+01	mg/kg-day	4.11E-07	2.06E-07	mg/kg-day	7.50E-05	mg/kg-day	2.74E-03
				Cobalt	1.23E+01	mg/kg	6.42E-09	mg/kg-day	--	mg/kg-day	--	6.42E-08	mg/kg-day	3.00E-04	mg/kg-day	2.14E-04
				Copper	9.67E+02	mg/kg	5.05E-07	mg/kg-day	--	mg/kg-day	--	5.05E-06	mg/kg-day	4.00E-02	mg/kg-day	1.26E-04
				Iron	3.36E+04	mg/kg	1.75E-05	mg/kg-day	--	mg/kg-day	--	1.75E-04	mg/kg-day	7.00E-01	mg/kg-day	2.51E-04
				Lead	3.22E+02	mg/kg	1.68E-07	mg/kg-day	--	mg/kg-day	--	1.68E-06	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	6.89E-07	mg/kg-day	--	mg/kg-day	--	6.89E-06	mg/kg-day	9.60E-04	mg/kg-day	7.18E-03
				Mercury	1.15E+00	mg/kg	6.00E-10	mg/kg-day	--	mg/kg-day	--	6.00E-09	mg/kg-day	1.00E-04	mg/kg-day	6.00E-05
				Nickel	3.74E+01	mg/kg	1.95E-08	mg/kg-day	--	mg/kg-day	--	1.95E-07	mg/kg-day	8.00E-04	mg/kg-day	2.44E-04
				Silver	1.60E+01	mg/kg	8.35E-09	mg/kg-day	--	mg/kg-day	--	8.35E-08	mg/kg-day	2.00E-04	mg/kg-day	4.18E-04
				Vanadium	4.45E+01	mg/kg	2.32E-08	mg/kg-day	--	mg/kg-day	--	2.32E-07	mg/kg-day	1.30E-04	mg/kg-day	1.79E-03
				Zinc	1.38E+03	mg/kg	7.20E-07	mg/kg-day	--	mg/kg-day	--	7.20E-06	mg/kg-day	3.00E-01	mg/kg-day	2.40E-05
				4,4'-DDD	4.63E+03	ug/kg	7.25E-09	mg/kg-day	2.40E-01	mg/kg-day	1.74E-09	7.25E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	9.44E-10	mg/kg-day	3.40E-01	mg/kg-day	3.21E-10	9.44E-09	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.71E-08	mg/kg-day	3.40E-01	mg/kg-day	9.21E-09	2.71E-07	mg/kg-day	5.00E-04	mg/kg-day	5.42E-04
				Aroclor-1248	5.60E+02	ug/kg	4.09E-09	mg/kg-day	2.00E+00	mg/kg-day	8.19E-09	4.09E-08	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	9.79E-10	mg/kg-day	2.00E+00	mg/kg-day	1.96E-09	9.79E-09	mg/kg-day	2.00E-05	mg/kg-day	4.90E-04
				Aroclor-1260	4.51E+01	ug/kg	3.30E-10	mg/kg-day	2.00E+00	mg/kg-day	6.59E-10	3.30E-09	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.66E-09	mg/kg-day	1.60E+01	mg/kg-day	5.86E-08	3.66E-08	mg/kg-day	5.00E-05	mg/kg-day	7.32E-04
				Heptachlor Epoxide	1.28E+01	ug/kg	6.68E-11	mg/kg-day	9.10E+00	mg/kg-day	6.08E-10	6.68E-10	mg/kg-day	1.30E-05	mg/kg-day	5.14E-05
				Benz(a)anthracene	3.92E+03	ug/kg	2.66E-08	mg/kg-day	7.30E-01	mg/kg-day	1.94E-08	2.66E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.96E-08	mg/kg-day	7.30E+00	mg/kg-day	1.43E-07	1.96E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	2.18E-08	mg/kg-day	7.30E-01	mg/kg-day	1.59E-08	2.18E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.45E-08	mg/kg-day	7.30E-02	mg/kg-day	1.06E-09	1.45E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	2.43E-08	mg/kg-day	7.30E-03	mg/kg-day	1.77E-10	2.43E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.90E-09	mg/kg-day	7.30E+00	mg/kg-day	1.39E-08	1.90E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	8.82E-09	mg/kg-day	7.30E-01	mg/kg-day	6.44E-09	8.82E-08	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	5.27E-09	mg/kg-day	--	mg/kg-day	--	5.27E-08	mg/kg-day	2.00E-02	mg/kg-day	2.63E-06
				Phenanthrene	1.25E+04	ug/kg	8.48E-08	mg/kg-day	--	mg/kg-day	--	8.48E-07	mg/kg-day	3.00E-02	mg/kg-day	2.83E-05
				Ethylbenzene	6.55E+02	ug/kg	1.03E-09	mg/kg-day	1.10E-02	mg/kg-day	1.13E-11	1.03E-08	mg/kg-day	1.00E-01	mg/kg-day	1.03E-07
			Exp. Route Total								7.57E-07					2.23E-02
		Exposure Point Total									5.80E-06					3.25E-01
	Exposure Medium Total										5.80E-06					3.25E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.63E-06	mg/m3	3.40E-02	1/(mg/m3)	8.94E-08	2.63E-05	mg/m3	3.00E-03	mg/m3	8.77E-03
				Ethylbenzene	7.00E+03	ug/kg	9.27E-05	mg/m3	2.50E-03	1/(mg/m3)	2.32E-07	9.27E-04	mg/m3	1.00E+00	mg/m3	9.27E-04
			Exp. Route Total								3.21E-07					9.69E-03
		Exposure Point Total									3.21E-07					9.69E-03
	Exposure Medium Total										3.21E-07					9.69E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.95E-10	mg/m3	1.20E+01	1/(mg/m3)	2.34E-09	1.95E-09	mg/m3	1.00E-04	mg/m3	1.95E-05
				Manganese	1.32E+03	mg/kg	6.54E-09	mg/m3	--	1/(mg/m3)	--	6.54E-08	mg/m3	5.00E-05	mg/m3	1.31E-03
			Exp. Route Total								2.34E-09					1.33E-03
		Exposure Point Total									2.34E-09					1.33E-03
	Exposure Medium Total										2.34E-09					1.33E-03
Medium Total											6.12E-06					3.36E-01
										Total of Receptor Risks Across All Media	6.12E-06			Total of Receptor Hazards Across All Media		3.36E-01

TABLE 7.14a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.11E-11	mg/kg-day	1.30E+05	mg/kg-day	1.45E-06	1.11E-10	mg/kg-day	1.00E-09	mg/kg-day	1.11E-01
				Aluminum	1.98E+04	mg/kg	9.07E-04	mg/kg-day	--	mg/kg-day	--	9.07E-03	mg/kg-day	1.00E+00	mg/kg-day	9.07E-03
				Antimony	2.50E+01	mg/kg	1.14E-06	mg/kg-day	--	mg/kg-day	--	1.14E-05	mg/kg-day	4.00E-04	mg/kg-day	2.86E-02
				Cadmium	4.71E+01	mg/kg	2.16E-06	mg/kg-day	--	mg/kg-day	--	2.16E-05	mg/kg-day	1.00E-03	mg/kg-day	2.16E-02
				Chromium	3.94E+01	mg/kg	1.80E-06	mg/kg-day	5.00E-01	mg/kg-day	9.02E-07	1.80E-05	mg/kg-day	3.00E-03	mg/kg-day	6.01E-03
				Cobalt	1.23E+01	mg/kg	5.63E-07	mg/kg-day	--	mg/kg-day	--	5.63E-06	mg/kg-day	3.00E-04	mg/kg-day	1.88E-02
				Copper	9.67E+02	mg/kg	4.43E-05	mg/kg-day	--	mg/kg-day	--	4.43E-04	mg/kg-day	4.00E-02	mg/kg-day	1.11E-02
				Iron	3.36E+04	mg/kg	1.54E-03	mg/kg-day	--	mg/kg-day	--	1.54E-02	mg/kg-day	7.00E-01	mg/kg-day	2.20E-02
				Lead	3.22E+02	mg/kg	1.47E-05	mg/kg-day	--	mg/kg-day	--	1.47E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	6.04E-05	mg/kg-day	--	mg/kg-day	--	6.04E-04	mg/kg-day	2.40E-02	mg/kg-day	2.52E-02
				Mercury	1.15E+00	mg/kg	5.27E-08	mg/kg-day	--	mg/kg-day	--	5.27E-07	mg/kg-day	1.00E-04	mg/kg-day	5.27E-03
				Nickel	3.74E+01	mg/kg	1.71E-06	mg/kg-day	--	mg/kg-day	--	1.71E-05	mg/kg-day	2.00E-02	mg/kg-day	8.56E-04
				Silver	1.60E+01	mg/kg	7.33E-07	mg/kg-day	--	mg/kg-day	--	7.33E-06	mg/kg-day	5.00E-03	mg/kg-day	1.47E-03
				Vanadium	4.45E+01	mg/kg	2.04E-06	mg/kg-day	--	mg/kg-day	--	2.04E-05	mg/kg-day	5.00E-03	mg/kg-day	4.08E-03
				Zinc	1.38E+03	mg/kg	6.32E-05	mg/kg-day	--	mg/kg-day	--	6.32E-04	mg/kg-day	3.00E-01	mg/kg-day	2.11E-03
				4,4'-DDD	4.63E+03	ug/kg	2.12E-07	mg/kg-day	2.40E-01	mg/kg-day	5.09E-08	2.12E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.76E-08	mg/kg-day	3.40E-01	mg/kg-day	9.39E-09	2.76E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	7.92E-07	mg/kg-day	3.40E-01	mg/kg-day	2.69E-07	7.92E-06	mg/kg-day	5.00E-04	mg/kg-day	1.58E-02
				Aroclor-1248	5.60E+02	ug/kg	2.56E-08	mg/kg-day	2.00E+00	mg/kg-day	5.13E-08	2.56E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	6.14E-09	mg/kg-day	2.00E+00	mg/kg-day	1.23E-08	6.14E-08	mg/kg-day	2.00E-05	mg/kg-day	3.07E-03
				Aroclor-1260	4.51E+01	ug/kg	2.07E-09	mg/kg-day	2.00E+00	mg/kg-day	4.13E-09	2.07E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.21E-08	mg/kg-day	1.60E+01	mg/kg-day	5.14E-07	3.21E-07	mg/kg-day	5.00E-05	mg/kg-day	6.42E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	5.86E-10	mg/kg-day	9.10E+00	mg/kg-day	5.33E-09	5.86E-09	mg/kg-day	1.30E-05	mg/kg-day	4.51E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.80E-07	mg/kg-day	7.30E-01	mg/kg-day	1.31E-07	1.80E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.32E-07	mg/kg-day	7.30E+00	mg/kg-day	9.66E-07	1.32E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.47E-07	mg/kg-day	7.30E-01	mg/kg-day	1.07E-07	1.47E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	9.80E-08	mg/kg-day	7.30E-02	mg/kg-day	7.15E-09	9.80E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.64E-07	mg/kg-day	7.30E-03	mg/kg-day	1.20E-09	1.64E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.28E-08	mg/kg-day	7.30E+00	mg/kg-day	9.36E-08	1.28E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	5.95E-08	mg/kg-day	7.30E-01	mg/kg-day	4.35E-08	5.95E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	3.55E-08	mg/kg-day	--	mg/kg-day	--	3.55E-07	mg/kg-day	2.00E-02	mg/kg-day	1.78E-05
				Phenanthrene	1.25E+04	ug/kg	5.72E-07	mg/kg-day	--	mg/kg-day	--	5.72E-06	mg/kg-day	3.00E-02	mg/kg-day	1.91E-04
				Ethylbenzene	6.55E+02	ug/kg	3.00E-08	mg/kg-day	1.10E-02	mg/kg-day	3.30E-10	3.00E-07	mg/kg-day	1.00E-01	mg/kg-day	3.00E-06
			Exp. Route Total								4.62E-06					2.93E-01

TABLE 7.14a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - RESIDENTIAL ADULT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

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Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.81E-13	mg/kg-day	1.30E+05	mg/kg-day	4.95E-08	3.81E-12	mg/kg-day	1.00E-09	mg/kg-day	3.81E-03
				Aluminum	1.98E+04	mg/kg	1.03E-05	mg/kg-day	--	mg/kg-day	--	1.03E-04	mg/kg-day	1.00E+00	mg/kg-day	1.03E-04
				Antimony	2.50E+01	mg/kg	1.31E-08	mg/kg-day	--	mg/kg-day	--	1.31E-07	mg/kg-day	6.00E-05	mg/kg-day	2.18E-03
				Cadmium	4.71E+01	mg/kg	2.46E-09	mg/kg-day	--	mg/kg-day	--	2.46E-08	mg/kg-day	2.50E-05	mg/kg-day	9.84E-04
				Chromium	3.94E+01	mg/kg	2.06E-08	mg/kg-day	2.00E+01	mg/kg-day	4.11E-07	2.06E-07	mg/kg-day	7.50E-05	mg/kg-day	2.74E-03
				Cobalt	1.23E+01	mg/kg	6.42E-09	mg/kg-day	--	mg/kg-day	--	6.42E-08	mg/kg-day	3.00E-04	mg/kg-day	2.14E-04
				Copper	9.67E+02	mg/kg	5.05E-07	mg/kg-day	--	mg/kg-day	--	5.05E-06	mg/kg-day	4.00E-02	mg/kg-day	1.26E-04
				Iron	3.36E+04	mg/kg	1.75E-05	mg/kg-day	--	mg/kg-day	--	1.75E-04	mg/kg-day	7.00E-01	mg/kg-day	2.51E-04
				Lead	3.22E+02	mg/kg	1.68E-07	mg/kg-day	--	mg/kg-day	--	1.68E-06	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	6.89E-07	mg/kg-day	--	mg/kg-day	--	6.89E-06	mg/kg-day	9.60E-04	mg/kg-day	7.18E-03
				Mercury	1.15E+00	mg/kg	6.00E-10	mg/kg-day	--	mg/kg-day	--	6.00E-09	mg/kg-day	1.00E-04	mg/kg-day	6.00E-05
				Nickel	3.74E+01	mg/kg	1.95E-08	mg/kg-day	--	mg/kg-day	--	1.95E-07	mg/kg-day	8.00E-04	mg/kg-day	2.44E-04
				Silver	1.60E+01	mg/kg	8.35E-09	mg/kg-day	--	mg/kg-day	--	8.35E-08	mg/kg-day	2.00E-04	mg/kg-day	4.18E-04
				Vanadium	4.45E+01	mg/kg	2.32E-08	mg/kg-day	--	mg/kg-day	--	2.32E-07	mg/kg-day	1.30E-04	mg/kg-day	1.79E-03
				Zinc	1.38E+03	mg/kg	7.20E-07	mg/kg-day	--	mg/kg-day	--	7.20E-06	mg/kg-day	3.00E-01	mg/kg-day	2.40E-05
				4,4'-DDD	4.63E+03	ug/kg	7.25E-09	mg/kg-day	2.40E-01	mg/kg-day	1.74E-09	7.25E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	9.44E-10	mg/kg-day	3.40E-01	mg/kg-day	3.21E-10	9.44E-09	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	2.71E-08	mg/kg-day	3.40E-01	mg/kg-day	9.21E-09	2.71E-07	mg/kg-day	5.00E-04	mg/kg-day	5.42E-04
				Aroclor-1248	5.60E+02	ug/kg	4.09E-09	mg/kg-day	2.00E+00	mg/kg-day	8.19E-09	4.09E-08	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	9.79E-10	mg/kg-day	2.00E+00	mg/kg-day	1.96E-09	9.79E-09	mg/kg-day	2.00E-05	mg/kg-day	4.90E-04
				Aroclor-1260	4.51E+01	ug/kg	3.30E-10	mg/kg-day	2.00E+00	mg/kg-day	6.59E-10	3.30E-09	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	3.66E-09	mg/kg-day	1.60E+01	mg/kg-day	5.86E-08	3.66E-08	mg/kg-day	5.00E-05	mg/kg-day	7.32E-04
				Heptachlor Epoxide	1.28E+01	ug/kg	6.68E-11	mg/kg-day	9.10E+00	mg/kg-day	6.08E-10	6.68E-10	mg/kg-day	1.30E-05	mg/kg-day	5.14E-05
				Benz(a)anthracene	3.92E+03	ug/kg	2.66E-08	mg/kg-day	7.30E-01	mg/kg-day	1.94E-08	2.66E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.96E-08	mg/kg-day	7.30E+00	mg/kg-day	1.43E-07	1.96E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	2.18E-08	mg/kg-day	7.30E-01	mg/kg-day	1.59E-08	2.18E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.45E-08	mg/kg-day	7.30E-02	mg/kg-day	1.06E-09	1.45E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	2.43E-08	mg/kg-day	7.30E-03	mg/kg-day	1.77E-10	2.43E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.90E-09	mg/kg-day	7.30E+00	mg/kg-day	1.39E-08	1.90E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	8.82E-09	mg/kg-day	7.30E-01	mg/kg-day	6.44E-09	8.82E-08	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	5.27E-09	mg/kg-day	--	mg/kg-day	--	5.27E-08	mg/kg-day	2.00E-02	mg/kg-day	2.63E-06
				Phenanthrene	1.25E+04	ug/kg	8.48E-08	mg/kg-day	--	mg/kg-day	--	8.48E-07	mg/kg-day	3.00E-02	mg/kg-day	2.83E-05
				Ethylbenzene	6.55E+02	ug/kg	1.03E-09	mg/kg-day	1.10E-02	mg/kg-day	1.13E-11	1.03E-08	mg/kg-day	1.00E-01	mg/kg-day	1.03E-07
			Exp. Route Total								7.42E-07					2.20E-02
		Exposure Point Total									5.36E-06					3.15E-01
	Exposure Medium Total										5.36E-06					3.15E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.63E-06	mg/m3	3.40E-02	1/(mg/m3)	8.94E-08	2.63E-05	mg/m3	3.00E-03	mg/m3	8.77E-03
				Ethylbenzene	7.00E+03	ug/kg	9.27E-05	mg/m3	2.50E-03	1/(mg/m3)	2.32E-07	9.27E-04	mg/m3	1.00E+00	mg/m3	9.27E-04
			Exp. Route Total								3.21E-07					9.69E-03
		Exposure Point Total									3.21E-07					9.69E-03
	Exposure Medium Total										3.21E-07					9.69E-03
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.95E-10	mg/m3	1.20E+01	1/(mg/m3)	2.34E-09	1.95E-09	mg/m3	1.00E-04	mg/m3	1.95E-05
				Manganese	1.32E+03	mg/kg	6.54E-09	mg/m3	--	1/(mg/m3)	--	6.54E-08	mg/m3	5.00E-05	mg/m3	1.31E-03
			Exp. Route Total								2.34E-09					1.33E-03
		Exposure Point Total									2.34E-09					1.33E-03
	Exposure Medium Total										2.34E-09					1.33E-03
Medium Total											5.68E-06					3.26E-01
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											5.68E-06					3.26E-01

TABLE 7.15.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURES
NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	4.08E-11	mg/kg-day	1.30E+05	mg/kg-day	5.30E-06					N/A
				Aluminum	1.98E+04	mg/kg	9.07E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	1.14E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	6.21E+00	mg/kg	1.04E-06	mg/kg-day	1.50E+00	mg/kg-day	1.56E-06					N/A
				Cadmium	4.71E+01	mg/kg	2.16E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	6.62E-06	mg/kg-day	5.00E-01	mg/kg-day	8.12E-06					N/A
				Cobalt	1.23E+01	mg/kg	5.63E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	4.43E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	1.54E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	1.47E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	6.04E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	5.27E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	1.71E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	7.33E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	2.04E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	6.32E-05	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	7.77E-07	mg/kg-day	2.40E-01	mg/kg-day	1.87E-07					N/A
				4,4'-DDE	6.03E+02	ug/kg	1.01E-07	mg/kg-day	3.40E-01	mg/kg-day	3.44E-08					N/A
				4,4'-DDT	1.73E+04	ug/kg	2.90E-06	mg/kg-day	3.40E-01	mg/kg-day	9.88E-07					N/A
				Aroclor-1248	5.60E+02	ug/kg	9.40E-08	mg/kg-day	2.00E+00	mg/kg-day	1.88E-07					N/A
				Aroclor-1254	1.34E+02	ug/kg	2.25E-08	mg/kg-day	2.00E+00	mg/kg-day	4.50E-08					N/A
				Aroclor-1260	4.51E+01	ug/kg	7.57E-09	mg/kg-day	2.00E+00	mg/kg-day	1.51E-08					N/A
				Dieldrin	7.01E+02	ug/kg	1.18E-07	mg/kg-day	1.60E+01	mg/kg-day	1.88E-06					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	2.15E-09	mg/kg-day	9.10E+00	mg/kg-day	1.96E-08					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	6.58E-07	mg/kg-day	7.30E-01	mg/kg-day	1.18E-06					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	4.85E-07	mg/kg-day	7.30E+00	mg/kg-day	8.69E-06					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	5.39E-07	mg/kg-day	7.30E-01	mg/kg-day	9.66E-07					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	3.59E-07	mg/kg-day	7.30E-02	mg/kg-day	6.44E-08					N/A
				Chrysene	3.58E+03	ug/kg	6.01E-07	mg/kg-day	7.30E-03	mg/kg-day	1.08E-08					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	4.70E-08	mg/kg-day	7.30E+00	mg/kg-day	8.42E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	2.18E-07	mg/kg-day	7.30E-01	mg/kg-day	3.91E-07					N/A
				Naphthalene	7.76E+02	ug/kg	3.55E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	5.72E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	1.10E-07	mg/kg-day	1.10E-02	mg/kg-day	1.21E-09					N/A
			Exp. Route Total								3.05E-05					--

TABLE 7.15.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.38E-12	mg/kg-day	1.30E+05	mg/kg-day	1.79E-07					N/A
				Aluminum	1.98E+04	mg/kg	1.03E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	1.31E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	6.21E+00	mg/kg	3.52E-08	mg/kg-day	1.50E+00	mg/kg-day	5.28E-08					N/A
				Cadmium	4.71E+01	mg/kg	2.46E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	7.45E-08	mg/kg-day	2.00E+01	mg/kg-day	3.64E-06					N/A
				Cobalt	1.23E+01	mg/kg	6.42E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	5.05E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	1.75E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	1.68E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	6.89E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	6.00E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	1.95E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	8.35E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	2.32E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	7.20E-07	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	2.62E-08	mg/kg-day	2.40E-01	mg/kg-day	6.30E-09					N/A
				4,4'-DDE	6.03E+02	ug/kg	3.42E-09	mg/kg-day	3.40E-01	mg/kg-day	1.16E-09					N/A
				4,4'-DDT	1.73E+04	ug/kg	9.81E-08	mg/kg-day	3.40E-01	mg/kg-day	3.33E-08					N/A
				Aroclor-1248	5.60E+02	ug/kg	1.48E-08	mg/kg-day	2.00E+00	mg/kg-day	2.96E-08					N/A
				Aroclor-1254	1.34E+02	ug/kg	3.55E-09	mg/kg-day	2.00E+00	mg/kg-day	7.09E-09					N/A
				Aroclor-1260	4.51E+01	ug/kg	1.19E-09	mg/kg-day	2.00E+00	mg/kg-day	2.39E-09					N/A
				Dieldrin	7.01E+02	ug/kg	1.32E-08	mg/kg-day	1.60E+01	mg/kg-day	2.12E-07					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	2.42E-10	mg/kg-day	9.10E+00	mg/kg-day	2.20E-09					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	9.63E-08	mg/kg-day	7.30E-01	mg/kg-day	1.72E-07					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	7.10E-08	mg/kg-day	7.30E+00	mg/kg-day	1.27E-06					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	7.89E-08	mg/kg-day	7.30E-01	mg/kg-day	1.41E-07					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	5.26E-08	mg/kg-day	7.30E-02	mg/kg-day	9.39E-09					N/A
				Chrysene	3.58E+03	ug/kg	8.79E-08	mg/kg-day	7.30E-03	mg/kg-day	1.57E-09					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	6.88E-09	mg/kg-day	7.30E+00	mg/kg-day	1.23E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.19E-08	mg/kg-day	7.30E-01	mg/kg-day	5.71E-08					N/A
				Naphthalene	7.76E+02	ug/kg	5.27E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	8.48E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	3.71E-09	mg/kg-day	1.10E-02	mg/kg-day	4.08E-11					N/A
			Exp. Route Total								5.94E-06					--
		Exposure Point Total									3.64E-05					--
	Exposure Medium Total										3.64E-05					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	3.38E-06	mg/m3	3.40E-02	1/(mg/m3)	1.15E-07					N/A
				Ethylbenzene	7.00E+03	ug/kg	1.19E-04	mg/m3	2.50E-03	1/(mg/m3)	2.98E-07					N/A
			Exp. Route Total								4.13E-07					--
		Exposure Point Total									4.13E-07					--
	Exposure Medium Total										4.13E-07					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	2.51E-10	mg/m3	1.20E+01	1/(mg/m3)	4.35E-09					N/A
				Manganese	1.32E+03	mg/kg	6.54E-09	mg/m3	--	1/(mg/m3)	--					N/A
			Exp. Route Total								4.35E-09					--
		Exposure Point Total									4.35E-09					--
	Exposure Medium Total										4.35E-09					--
Medium Total											3.69E-05					--
										Total of Receptor Risks Across All Media	3.69E-05			Total of Receptor Hazards Across All Media		--

TABLE 7.15a.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION
NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	4.08E-11	mg/kg-day	1.30E+05	mg/kg-day	5.30E-06					N/A
				Aluminum	1.98E+04	mg/kg	9.07E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	1.14E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	4.71E+01	mg/kg	2.16E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	6.62E-06	mg/kg-day	5.00E-01	mg/kg-day	8.12E-06					N/A
				Cobalt	1.23E+01	mg/kg	5.63E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	4.43E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	1.54E-03	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	1.47E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	6.04E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	5.27E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	1.71E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	7.33E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	2.04E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	6.32E-05	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	7.77E-07	mg/kg-day	2.40E-01	mg/kg-day	1.87E-07					N/A
				4,4'-DDE	6.03E+02	ug/kg	1.01E-07	mg/kg-day	3.40E-01	mg/kg-day	3.44E-08					N/A
				4,4'-DDT	1.73E+04	ug/kg	2.90E-06	mg/kg-day	3.40E-01	mg/kg-day	9.88E-07					N/A
				Aroclor-1248	5.60E+02	ug/kg	9.40E-08	mg/kg-day	2.00E+00	mg/kg-day	1.88E-07					N/A
				Aroclor-1254	1.34E+02	ug/kg	2.25E-08	mg/kg-day	2.00E+00	mg/kg-day	4.50E-08					N/A
				Aroclor-1260	4.51E+01	ug/kg	7.57E-09	mg/kg-day	2.00E+00	mg/kg-day	1.51E-08					N/A
				Dieldrin	7.01E+02	ug/kg	1.18E-07	mg/kg-day	1.60E+01	mg/kg-day	1.88E-06					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	2.15E-09	mg/kg-day	9.10E+00	mg/kg-day	1.96E-08					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	6.58E-07	mg/kg-day	7.30E-01	mg/kg-day	1.18E-06					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	4.85E-07	mg/kg-day	7.30E+00	mg/kg-day	8.69E-06					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	5.39E-07	mg/kg-day	7.30E-01	mg/kg-day	9.66E-07					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	3.59E-07	mg/kg-day	7.30E-02	mg/kg-day	6.44E-08					N/A
				Chrysene	3.58E+03	ug/kg	6.01E-07	mg/kg-day	7.30E-03	mg/kg-day	1.08E-08					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	4.70E-08	mg/kg-day	7.30E+00	mg/kg-day	8.42E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	2.18E-07	mg/kg-day	7.30E-01	mg/kg-day	3.91E-07					N/A
				Naphthalene	7.76E+02	ug/kg	3.55E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	5.72E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	1.10E-07	mg/kg-day	1.10E-02	mg/kg-day	1.21E-09					N/A
			Exp. Route Total								2.89E-05					--

TABLE 7.15a.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION
NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	1.38E-12	mg/kg-day	1.30E+05	mg/kg-day	1.79E-07					N/A
				Aluminum	1.98E+04	mg/kg	1.03E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	1.31E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	4.71E+01	mg/kg	2.46E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	7.45E-08	mg/kg-day	2.00E+01	mg/kg-day	3.64E-06					N/A
				Cobalt	1.23E+01	mg/kg	6.42E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	5.05E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	1.75E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	1.68E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	6.89E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	6.00E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	1.95E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	8.35E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	2.32E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	7.20E-07	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	2.62E-08	mg/kg-day	2.40E-01	mg/kg-day	6.30E-09					N/A
				4,4'-DDE	6.03E+02	ug/kg	3.42E-09	mg/kg-day	3.40E-01	mg/kg-day	1.16E-09					N/A
				4,4'-DDT	1.73E+04	ug/kg	9.81E-08	mg/kg-day	3.40E-01	mg/kg-day	3.33E-08					N/A
				Aroclor-1248	5.60E+02	ug/kg	1.48E-08	mg/kg-day	2.00E+00	mg/kg-day	2.96E-08					N/A
				Aroclor-1254	1.34E+02	ug/kg	3.55E-09	mg/kg-day	2.00E+00	mg/kg-day	7.09E-09					N/A
				Aroclor-1260	4.51E+01	ug/kg	1.19E-09	mg/kg-day	2.00E+00	mg/kg-day	2.39E-09					N/A
				Dieldrin	7.01E+02	ug/kg	1.32E-08	mg/kg-day	1.60E+01	mg/kg-day	2.12E-07					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	2.42E-10	mg/kg-day	9.10E+00	mg/kg-day	2.20E-09					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	9.63E-08	mg/kg-day	7.30E-01	mg/kg-day	1.72E-07					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	7.10E-08	mg/kg-day	7.30E+00	mg/kg-day	1.27E-06					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	7.89E-08	mg/kg-day	7.30E-01	mg/kg-day	1.41E-07					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	5.26E-08	mg/kg-day	7.30E-02	mg/kg-day	9.39E-09					N/A
				Chrysene	3.58E+03	ug/kg	8.79E-08	mg/kg-day	7.30E-03	mg/kg-day	1.57E-09					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	6.88E-09	mg/kg-day	7.30E+00	mg/kg-day	1.23E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.19E-08	mg/kg-day	7.30E-01	mg/kg-day	5.71E-08					N/A
				Naphthalene	7.76E+02	ug/kg	5.27E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	8.48E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	3.71E-09	mg/kg-day	1.10E-02	mg/kg-day	4.08E-11					N/A
			Exp. Route Total								5.89E-06					--
		Exposure Point Total									3.48E-05					--
	Exposure Medium Total										3.48E-05					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	3.38E-06	mg/m3	3.40E-02	1/(mg/m3)	1.15E-07					N/A
				Ethylbenzene	7.00E+03	ug/kg	1.19E-04	mg/m3	2.50E-03	1/(mg/m3)	2.98E-07					N/A
			Exp. Route Total								4.13E-07					--
		Exposure Point Total									4.13E-07					--
	Exposure Medium Total										4.13E-07					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	2.51E-10	mg/m3	1.20E+01	1/(mg/m3)	4.35E-09					N/A
				Manganese	1.32E+03	mg/kg	6.54E-09	mg/m3	--	1/(mg/m3)	--					N/A
			Exp. Route Total								4.35E-09					--
		Exposure Point Total									4.35E-09					--
	Exposure Medium Total										4.35E-09					--
Medium Total											3.52E-05					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											3.52E-05					--

TABLE 7.16.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	6.59E-12	mg/kg-day	1.30E+05	mg/kg-day	8.57E-07	2.31E-10	mg/kg-day	1.00E-09	mg/kg-day	2.31E-01
				Aluminum	1.98E+04	mg/kg	5.37E-04	mg/kg-day	--	mg/kg-day	--	1.88E-02	mg/kg-day	1.00E+00	mg/kg-day	1.88E-02
				Antimony	2.50E+01	mg/kg	6.78E-07	mg/kg-day	--	mg/kg-day	--	2.37E-05	mg/kg-day	4.00E-04	mg/kg-day	5.94E-02
				Arsenic	6.21E+00	mg/kg	1.69E-07	mg/kg-day	1.50E+00	mg/kg-day	2.53E-07	5.90E-06	mg/kg-day	3.00E-04	mg/kg-day	1.97E-02
				Cadmium	4.71E+01	mg/kg	1.28E-06	mg/kg-day	--	mg/kg-day	--	4.47E-05	mg/kg-day	1.00E-03	mg/kg-day	4.47E-02
				Chromium	3.94E+01	mg/kg	1.07E-06	mg/kg-day	5.00E-01	mg/kg-day	1.60E-06	3.74E-05	mg/kg-day	3.00E-03	mg/kg-day	1.25E-02
				Cobalt	1.23E+01	mg/kg	3.34E-07	mg/kg-day	--	mg/kg-day	--	1.17E-05	mg/kg-day	3.00E-04	mg/kg-day	3.89E-02
				Copper	9.67E+02	mg/kg	2.62E-05	mg/kg-day	--	mg/kg-day	--	9.18E-04	mg/kg-day	4.00E-02	mg/kg-day	2.30E-02
				Iron	3.36E+04	mg/kg	9.12E-04	mg/kg-day	--	mg/kg-day	--	3.19E-02	mg/kg-day	7.00E-01	mg/kg-day	4.56E-02
				Lead	3.22E+02	mg/kg	8.74E-06	mg/kg-day	--	mg/kg-day	--	3.06E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	3.58E-05	mg/kg-day	--	mg/kg-day	--	1.25E-03	mg/kg-day	2.40E-02	mg/kg-day	5.22E-02
				Mercury	1.15E+00	mg/kg	3.12E-08	mg/kg-day	--	mg/kg-day	--	1.09E-06	mg/kg-day	1.00E-04	mg/kg-day	1.09E-02
				Nickel	3.74E+01	mg/kg	1.01E-06	mg/kg-day	--	mg/kg-day	--	3.55E-05	mg/kg-day	2.00E-02	mg/kg-day	1.78E-03
				Silver	1.60E+01	mg/kg	4.34E-07	mg/kg-day	--	mg/kg-day	--	1.52E-05	mg/kg-day	5.00E-03	mg/kg-day	3.04E-03
				Vanadium	4.45E+01	mg/kg	1.21E-06	mg/kg-day	--	mg/kg-day	--	4.23E-05	mg/kg-day	5.00E-03	mg/kg-day	8.45E-03
				Zinc	1.38E+03	mg/kg	3.74E-05	mg/kg-day	--	mg/kg-day	--	1.31E-03	mg/kg-day	3.00E-01	mg/kg-day	4.37E-03
				4,4'-DDD	4.63E+03	ug/kg	1.26E-07	mg/kg-day	2.40E-01	mg/kg-day	3.02E-08	4.40E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.64E-08	mg/kg-day	3.40E-01	mg/kg-day	5.56E-09	5.73E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	4.69E-07	mg/kg-day	3.40E-01	mg/kg-day	1.60E-07	1.64E-05	mg/kg-day	5.00E-04	mg/kg-day	3.29E-02
				Aroclor-1248	5.60E+02	ug/kg	1.52E-08	mg/kg-day	2.00E+00	mg/kg-day	3.04E-08	5.32E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	3.64E-09	mg/kg-day	2.00E+00	mg/kg-day	7.27E-09	1.27E-07	mg/kg-day	2.00E-05	mg/kg-day	6.36E-03
				Aroclor-1260	4.51E+01	ug/kg	1.22E-09	mg/kg-day	2.00E+00	mg/kg-day	2.45E-09	4.28E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	1.90E-08	mg/kg-day	1.60E+01	mg/kg-day	3.04E-07	6.66E-07	mg/kg-day	5.00E-05	mg/kg-day	1.33E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	3.47E-10	mg/kg-day	9.10E+00	mg/kg-day	3.16E-09	1.22E-08	mg/kg-day	1.30E-05	mg/kg-day	9.35E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.06E-07	mg/kg-day	7.30E-01	mg/kg-day	2.33E-07	3.72E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	7.84E-08	mg/kg-day	7.30E+00	mg/kg-day	1.72E-06	2.74E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	8.71E-08	mg/kg-day	7.30E-01	mg/kg-day	1.91E-07	3.05E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	5.81E-08	mg/kg-day	7.30E-02	mg/kg-day	1.27E-08	2.03E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	9.71E-08	mg/kg-day	7.30E-03	mg/kg-day	2.13E-09	3.40E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	7.60E-09	mg/kg-day	7.30E+00	mg/kg-day	1.66E-07	2.66E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.53E-08	mg/kg-day	7.30E-01	mg/kg-day	7.73E-08	1.23E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	2.11E-08	mg/kg-day	--	mg/kg-day	--	7.37E-07	mg/kg-day	2.00E-02	mg/kg-day	3.69E-05
				Phenanthrene	1.25E+04	ug/kg	3.39E-07	mg/kg-day	--	mg/kg-day	--	1.19E-05	mg/kg-day	3.00E-02	mg/kg-day	3.96E-04
				Ethylbenzene	6.55E+02	ug/kg	1.78E-08	mg/kg-day	1.10E-02	mg/kg-day	1.96E-10	6.22E-07	mg/kg-day	1.00E-01	mg/kg-day	6.22E-06
			Exp. Route Total								5.66E-06					6.28E-01

TABLE 7.16.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.22E-13	mg/kg-day	1.30E+05	mg/kg-day	2.88E-08	7.75E-12	mg/kg-day	1.00E-09	mg/kg-day	7.75E-03
				Aluminum	1.98E+04	mg/kg	6.02E-06	mg/kg-day	--	mg/kg-day	--	2.11E-04	mg/kg-day	1.00E+00	mg/kg-day	2.11E-04
				Antimony	2.50E+01	mg/kg	7.60E-09	mg/kg-day	--	mg/kg-day	--	2.66E-07	mg/kg-day	6.00E-05	mg/kg-day	4.43E-03
				Arsenic	6.21E+00	mg/kg	5.66E-09	mg/kg-day	1.50E+00	mg/kg-day	8.49E-09	1.98E-07	mg/kg-day	3.00E-04	mg/kg-day	6.61E-04
				Cadmium	4.71E+01	mg/kg	1.43E-09	mg/kg-day	--	mg/kg-day	--	5.01E-08	mg/kg-day	2.50E-05	mg/kg-day	2.00E-03
				Chromium	3.94E+01	mg/kg	1.20E-08	mg/kg-day	2.00E+01	mg/kg-day	7.18E-07	4.19E-07	mg/kg-day	7.50E-05	mg/kg-day	5.59E-03
				Cobalt	1.23E+01	mg/kg	3.74E-09	mg/kg-day	--	mg/kg-day	--	1.31E-07	mg/kg-day	3.00E-04	mg/kg-day	4.36E-04
				Copper	9.67E+02	mg/kg	2.94E-07	mg/kg-day	--	mg/kg-day	--	1.03E-05	mg/kg-day	4.00E-02	mg/kg-day	2.57E-04
				Iron	3.36E+04	mg/kg	1.02E-05	mg/kg-day	--	mg/kg-day	--	3.57E-04	mg/kg-day	7.00E-01	mg/kg-day	5.11E-04
				Lead	3.22E+02	mg/kg	9.79E-08	mg/kg-day	--	mg/kg-day	--	3.43E-06	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	4.01E-07	mg/kg-day	--	mg/kg-day	--	1.40E-05	mg/kg-day	9.60E-04	mg/kg-day	1.46E-02
				Mercury	1.15E+00	mg/kg	3.50E-10	mg/kg-day	--	mg/kg-day	--	1.22E-08	mg/kg-day	1.00E-04	mg/kg-day	1.22E-04
				Nickel	3.74E+01	mg/kg	1.14E-08	mg/kg-day	--	mg/kg-day	--	3.98E-07	mg/kg-day	8.00E-04	mg/kg-day	4.97E-04
				Silver	1.60E+01	mg/kg	4.86E-09	mg/kg-day	--	mg/kg-day	--	1.70E-07	mg/kg-day	2.00E-04	mg/kg-day	8.51E-04
				Vanadium	4.45E+01	mg/kg	1.35E-08	mg/kg-day	--	mg/kg-day	--	4.73E-07	mg/kg-day	1.30E-04	mg/kg-day	3.64E-03
				Zinc	1.38E+03	mg/kg	4.19E-07	mg/kg-day	--	mg/kg-day	--	1.47E-05	mg/kg-day	3.00E-01	mg/kg-day	4.89E-05
				4,4'-DDD	4.63E+03	ug/kg	4.22E-09	mg/kg-day	2.40E-01	mg/kg-day	1.01E-09	1.48E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	5.50E-10	mg/kg-day	3.40E-01	mg/kg-day	1.87E-10	1.92E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.58E-08	mg/kg-day	3.40E-01	mg/kg-day	5.36E-09	5.52E-07	mg/kg-day	5.00E-04	mg/kg-day	1.10E-03
				Aroclor-1248	5.60E+02	ug/kg	2.38E-09	mg/kg-day	2.00E+00	mg/kg-day	4.77E-09	8.34E-08	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	5.70E-10	mg/kg-day	2.00E+00	mg/kg-day	1.14E-09	2.00E-08	mg/kg-day	2.00E-05	mg/kg-day	9.98E-04
				Aroclor-1260	4.51E+01	ug/kg	1.92E-10	mg/kg-day	2.00E+00	mg/kg-day	3.84E-10	6.72E-09	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	2.13E-09	mg/kg-day	1.60E+01	mg/kg-day	3.41E-08	7.46E-08	mg/kg-day	5.00E-05	mg/kg-day	1.49E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	3.89E-11	mg/kg-day	9.10E+00	mg/kg-day	3.54E-10	1.36E-09	mg/kg-day	1.30E-05	mg/kg-day	1.05E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.55E-08	mg/kg-day	7.30E-01	mg/kg-day	3.39E-08	5.42E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.14E-08	mg/kg-day	7.30E+00	mg/kg-day	2.50E-07	4.00E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.27E-08	mg/kg-day	7.30E-01	mg/kg-day	2.78E-08	4.44E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	8.46E-09	mg/kg-day	7.30E-02	mg/kg-day	1.85E-09	2.96E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.41E-08	mg/kg-day	7.30E-03	mg/kg-day	3.10E-10	4.95E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.11E-09	mg/kg-day	7.30E+00	mg/kg-day	2.42E-08	3.87E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	5.14E-09	mg/kg-day	7.30E-01	mg/kg-day	1.12E-08	1.80E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	3.07E-09	mg/kg-day	--	mg/kg-day	--	1.07E-07	mg/kg-day	2.00E-02	mg/kg-day	5.37E-06
				Phenanthrene	1.25E+04	ug/kg	4.94E-08	mg/kg-day	--	mg/kg-day	--	1.73E-06	mg/kg-day	3.00E-02	mg/kg-day	5.76E-05
				Ethylbenzene	6.55E+02	ug/kg	5.97E-10	mg/kg-day	1.10E-02	mg/kg-day	6.57E-12	2.09E-08	mg/kg-day	1.00E-01	mg/kg-day	2.09E-07
			Exp. Route Total								1.15E-06					4.54E-02
		Exposure Point Total									6.81E-06					6.73E-01
	Exposure Medium Total										6.81E-06					6.73E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	5.57E-08	mg/m3	3.40E-02	1/(mg/m3)	1.89E-09	1.95E-06	mg/m3	3.00E-03	mg/m3	6.49E-04
				Ethylbenzene	7.00E+03	ug/kg	1.96E-06	mg/m3	2.50E-03	1/(mg/m3)	4.91E-09	6.87E-05	mg/m3	1.00E+00	mg/m3	6.87E-05
			Exp. Route Total								6.80E-09					7.18E-04
		Exposure Point Total									6.80E-09					7.18E-04
	Exposure Medium Total										6.80E-09					7.18E-04
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	4.13E-12	mg/m3	1.20E+01	1/(mg/m3)	1.49E-10	1.45E-10	mg/m3	1.00E-04	mg/m3	1.45E-06
				Manganese	1.32E+03	mg/kg	1.38E-10	mg/m3	--	1/(mg/m3)	--	4.84E-09	mg/m3	5.00E-05	mg/m3	9.69E-05
			Exp. Route Total								1.49E-10					9.83E-05
		Exposure Point Total									1.49E-10					9.83E-05
	Exposure Medium Total										1.49E-10					9.83E-05
Medium Total											6.82E-06					6.74E-01
										Total of Receptor Risks Across All Media	6.82E-06			Total of Receptor Hazards Across All Media		6.74E-01

TABLE 7.16a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	6.59E-12	mg/kg-day	1.30E+05	mg/kg-day	8.57E-07	2.31E-10	mg/kg-day	1.00E-09	mg/kg-day	2.31E-01
				Aluminum	1.98E+04	mg/kg	5.37E-04	mg/kg-day	--	mg/kg-day	--	1.88E-02	mg/kg-day	1.00E+00	mg/kg-day	1.88E-02
				Antimony	2.50E+01	mg/kg	6.78E-07	mg/kg-day	--	mg/kg-day	--	2.37E-05	mg/kg-day	4.00E-04	mg/kg-day	5.94E-02
				Cadmium	4.71E+01	mg/kg	1.28E-06	mg/kg-day	--	mg/kg-day	--	4.47E-05	mg/kg-day	1.00E-03	mg/kg-day	4.47E-02
				Chromium	3.94E+01	mg/kg	1.07E-06	mg/kg-day	5.00E-01	mg/kg-day	1.60E-06	3.74E-05	mg/kg-day	3.00E-03	mg/kg-day	1.25E-02
				Cobalt	1.23E+01	mg/kg	3.34E-07	mg/kg-day	--	mg/kg-day	--	1.17E-05	mg/kg-day	3.00E-04	mg/kg-day	3.89E-02
				Copper	9.67E+02	mg/kg	2.62E-05	mg/kg-day	--	mg/kg-day	--	9.18E-04	mg/kg-day	4.00E-02	mg/kg-day	2.30E-02
				Iron	3.36E+04	mg/kg	9.12E-04	mg/kg-day	--	mg/kg-day	--	3.19E-02	mg/kg-day	7.00E-01	mg/kg-day	4.56E-02
				Lead	3.22E+02	mg/kg	8.74E-06	mg/kg-day	--	mg/kg-day	--	3.06E-04	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	3.58E-05	mg/kg-day	--	mg/kg-day	--	1.25E-03	mg/kg-day	2.40E-02	mg/kg-day	5.22E-02
				Mercury	1.15E+00	mg/kg	3.12E-08	mg/kg-day	--	mg/kg-day	--	1.09E-06	mg/kg-day	1.00E-04	mg/kg-day	1.09E-02
				Nickel	3.74E+01	mg/kg	1.01E-06	mg/kg-day	--	mg/kg-day	--	3.55E-05	mg/kg-day	2.00E-02	mg/kg-day	1.78E-03
				Silver	1.60E+01	mg/kg	4.34E-07	mg/kg-day	--	mg/kg-day	--	1.52E-05	mg/kg-day	5.00E-03	mg/kg-day	3.04E-03
				Vanadium	4.45E+01	mg/kg	1.21E-06	mg/kg-day	--	mg/kg-day	--	4.23E-05	mg/kg-day	5.00E-03	mg/kg-day	8.45E-03
				Zinc	1.38E+03	mg/kg	3.74E-05	mg/kg-day	--	mg/kg-day	--	1.31E-03	mg/kg-day	3.00E-01	mg/kg-day	4.37E-03
				4,4'-DDD	4.63E+03	ug/kg	1.26E-07	mg/kg-day	2.40E-01	mg/kg-day	3.02E-08	4.40E-06	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	1.64E-08	mg/kg-day	3.40E-01	mg/kg-day	5.56E-09	5.73E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	4.69E-07	mg/kg-day	3.40E-01	mg/kg-day	1.60E-07	1.64E-05	mg/kg-day	5.00E-04	mg/kg-day	3.29E-02
				Aroclor-1248	5.60E+02	ug/kg	1.52E-08	mg/kg-day	2.00E+00	mg/kg-day	3.04E-08	5.32E-07	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	3.64E-09	mg/kg-day	2.00E+00	mg/kg-day	7.27E-09	1.27E-07	mg/kg-day	2.00E-05	mg/kg-day	6.36E-03
				Aroclor-1260	4.51E+01	ug/kg	1.22E-09	mg/kg-day	2.00E+00	mg/kg-day	2.45E-09	4.28E-08	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	1.90E-08	mg/kg-day	1.60E+01	mg/kg-day	3.04E-07	6.66E-07	mg/kg-day	5.00E-05	mg/kg-day	1.33E-02
				Heptachlor Epoxide	1.28E+01	ug/kg	3.47E-10	mg/kg-day	9.10E+00	mg/kg-day	3.16E-09	1.22E-08	mg/kg-day	1.30E-05	mg/kg-day	9.35E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.06E-07	mg/kg-day	7.30E-01	mg/kg-day	2.33E-07	3.72E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	7.84E-08	mg/kg-day	7.30E+00	mg/kg-day	1.72E-06	2.74E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	8.71E-08	mg/kg-day	7.30E-01	mg/kg-day	1.91E-07	3.05E-06	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	5.81E-08	mg/kg-day	7.30E-02	mg/kg-day	1.27E-08	2.03E-06	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	9.71E-08	mg/kg-day	7.30E-03	mg/kg-day	2.13E-09	3.40E-06	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	7.60E-09	mg/kg-day	7.30E+00	mg/kg-day	1.66E-07	2.66E-07	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	3.53E-08	mg/kg-day	7.30E-01	mg/kg-day	7.73E-08	1.23E-06	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	2.11E-08	mg/kg-day	--	mg/kg-day	--	7.37E-07	mg/kg-day	2.00E-02	mg/kg-day	3.69E-05
				Phenanthrene	1.25E+04	ug/kg	3.39E-07	mg/kg-day	--	mg/kg-day	--	1.19E-05	mg/kg-day	3.00E-02	mg/kg-day	3.96E-04
				Ethylbenzene	6.55E+02	ug/kg	1.78E-08	mg/kg-day	1.10E-02	mg/kg-day	1.96E-10	6.22E-07	mg/kg-day	1.00E-01	mg/kg-day	6.22E-06
			Exp. Route Total								5.40E-06					6.08E-01

TABLE 7.16a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.22E-13	mg/kg-day	1.30E+05	mg/kg-day	2.88E-08	7.75E-12	mg/kg-day	1.00E-09	mg/kg-day	7.75E-03
				Aluminum	1.98E+04	mg/kg	6.02E-06	mg/kg-day	--	mg/kg-day	--	2.11E-04	mg/kg-day	1.00E+00	mg/kg-day	2.11E-04
				Antimony	2.50E+01	mg/kg	7.60E-09	mg/kg-day	--	mg/kg-day	--	2.66E-07	mg/kg-day	6.00E-05	mg/kg-day	4.43E-03
				Cadmium	4.71E+01	mg/kg	1.43E-09	mg/kg-day	--	mg/kg-day	--	5.01E-08	mg/kg-day	2.50E-05	mg/kg-day	2.00E-03
				Chromium	3.94E+01	mg/kg	1.20E-08	mg/kg-day	2.00E+01	mg/kg-day	7.18E-07	4.19E-07	mg/kg-day	7.50E-05	mg/kg-day	5.59E-03
				Cobalt	1.23E+01	mg/kg	3.74E-09	mg/kg-day	--	mg/kg-day	--	1.31E-07	mg/kg-day	3.00E-04	mg/kg-day	4.36E-04
				Copper	9.67E+02	mg/kg	2.94E-07	mg/kg-day	--	mg/kg-day	--	1.03E-05	mg/kg-day	4.00E-02	mg/kg-day	2.57E-04
				Iron	3.36E+04	mg/kg	1.02E-05	mg/kg-day	--	mg/kg-day	--	3.57E-04	mg/kg-day	7.00E-01	mg/kg-day	5.11E-04
				Lead	3.22E+02	mg/kg	9.79E-08	mg/kg-day	--	mg/kg-day	--	3.43E-06	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	4.01E-07	mg/kg-day	--	mg/kg-day	--	1.40E-05	mg/kg-day	9.60E-04	mg/kg-day	1.46E-02
				Mercury	1.15E+00	mg/kg	3.50E-10	mg/kg-day	--	mg/kg-day	--	1.22E-08	mg/kg-day	1.00E-04	mg/kg-day	1.22E-04
				Nickel	3.74E+01	mg/kg	1.14E-08	mg/kg-day	--	mg/kg-day	--	3.98E-07	mg/kg-day	8.00E-04	mg/kg-day	4.97E-04
				Silver	1.60E+01	mg/kg	4.86E-09	mg/kg-day	--	mg/kg-day	--	1.70E-07	mg/kg-day	2.00E-04	mg/kg-day	8.51E-04
				Vanadium	4.45E+01	mg/kg	1.35E-08	mg/kg-day	--	mg/kg-day	--	4.73E-07	mg/kg-day	1.30E-04	mg/kg-day	3.64E-03
				Zinc	1.38E+03	mg/kg	4.19E-07	mg/kg-day	--	mg/kg-day	--	1.47E-05	mg/kg-day	3.00E-01	mg/kg-day	4.89E-05
				4,4'-DDD	4.63E+03	ug/kg	4.22E-09	mg/kg-day	2.40E-01	mg/kg-day	1.01E-09	1.48E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	5.50E-10	mg/kg-day	3.40E-01	mg/kg-day	1.87E-10	1.92E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.58E-08	mg/kg-day	3.40E-01	mg/kg-day	5.36E-09	5.52E-07	mg/kg-day	5.00E-04	mg/kg-day	1.10E-03
				Aroclor-1248	5.60E+02	ug/kg	2.38E-09	mg/kg-day	2.00E+00	mg/kg-day	4.77E-09	8.34E-08	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	5.70E-10	mg/kg-day	2.00E+00	mg/kg-day	1.14E-09	2.00E-08	mg/kg-day	2.00E-05	mg/kg-day	9.98E-04
				Aroclor-1260	4.51E+01	ug/kg	1.92E-10	mg/kg-day	2.00E+00	mg/kg-day	3.84E-10	6.72E-09	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	2.13E-09	mg/kg-day	1.60E+01	mg/kg-day	3.41E-08	7.46E-08	mg/kg-day	5.00E-05	mg/kg-day	1.49E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	3.89E-11	mg/kg-day	9.10E+00	mg/kg-day	3.54E-10	1.36E-09	mg/kg-day	1.30E-05	mg/kg-day	1.05E-04
				Benz(a)anthracene	3.92E+03	ug/kg	1.55E-08	mg/kg-day	7.30E-01	mg/kg-day	3.39E-08	5.42E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	1.14E-08	mg/kg-day	7.30E+00	mg/kg-day	2.50E-07	4.00E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.27E-08	mg/kg-day	7.30E-01	mg/kg-day	2.78E-08	4.44E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	8.46E-09	mg/kg-day	7.30E-02	mg/kg-day	1.85E-09	2.96E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	1.41E-08	mg/kg-day	7.30E-03	mg/kg-day	3.10E-10	4.95E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.11E-09	mg/kg-day	7.30E+00	mg/kg-day	2.42E-08	3.87E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	5.14E-09	mg/kg-day	7.30E-01	mg/kg-day	1.12E-08	1.80E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	3.07E-09	mg/kg-day	--	mg/kg-day	--	1.07E-07	mg/kg-day	2.00E-02	mg/kg-day	5.37E-06
				Phenanthrene	1.25E+04	ug/kg	4.94E-08	mg/kg-day	--	mg/kg-day	--	1.73E-06	mg/kg-day	3.00E-02	mg/kg-day	5.76E-05
				Ethylbenzene	6.55E+02	ug/kg	5.97E-10	mg/kg-day	1.10E-02	mg/kg-day	6.57E-12	2.09E-08	mg/kg-day	1.00E-01	mg/kg-day	2.09E-07
			Exp. Route Total								1.14E-06					4.47E-02
		Exposure Point Total									6.55E-06					6.53E-01
	Exposure Medium Total										6.55E-06					6.53E-01
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	5.57E-08	mg/m3	3.40E-02	1/(mg/m3)	1.89E-09	1.95E-06	mg/m3	3.00E-03	mg/m3	6.49E-04
				Ethylbenzene	7.00E+03	ug/kg	1.96E-06	mg/m3	2.50E-03	1/(mg/m3)	4.91E-09	6.87E-05	mg/m3	1.00E+00	mg/m3	6.87E-05
			Exp. Route Total								6.80E-09					7.18E-04
		Exposure Point Total									6.80E-09					7.18E-04
	Exposure Medium Total										6.80E-09					7.18E-04
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	4.13E-12	mg/m3	1.20E+01	1/(mg/m3)	1.49E-10	1.45E-10	mg/m3	1.00E-04	mg/m3	1.45E-06
				Manganese	1.32E+03	mg/kg	1.38E-10	mg/m3	--	1/(mg/m3)	--	4.84E-09	mg/m3	5.00E-05	mg/m3	9.69E-05
			Exp. Route Total								1.49E-10					9.83E-05
		Exposure Point Total									1.49E-10					9.83E-05
	Exposure Medium Total										1.49E-10					9.83E-05
Medium Total											6.55E-06					6.54E-01
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											6.55E-06					6.54E-01

TABLE 7.17.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.47E-12	mg/kg-day	1.30E+05	mg/kg-day	3.21E-07	2.47E-11	mg/kg-day	1.00E-09	mg/kg-day	2.47E-02
				Aluminum	1.98E+04	mg/kg	2.01E-04	mg/kg-day	--	mg/kg-day	--	2.01E-03	mg/kg-day	1.00E+00	mg/kg-day	2.01E-03
				Antimony	2.50E+01	mg/kg	2.54E-07	mg/kg-day	--	mg/kg-day	--	2.54E-06	mg/kg-day	4.00E-04	mg/kg-day	6.36E-03
				Arsenic	6.21E+00	mg/kg	6.32E-08	mg/kg-day	1.50E+00	mg/kg-day	9.48E-08	6.32E-07	mg/kg-day	3.00E-04	mg/kg-day	2.11E-03
				Cadmium	4.71E+01	mg/kg	4.79E-07	mg/kg-day	--	mg/kg-day	--	4.79E-06	mg/kg-day	1.00E-03	mg/kg-day	4.79E-03
				Chromium	3.94E+01	mg/kg	4.01E-07	mg/kg-day	5.00E-01	mg/kg-day	2.00E-07	4.01E-06	mg/kg-day	3.00E-03	mg/kg-day	1.34E-03
				Cobalt	1.23E+01	mg/kg	1.25E-07	mg/kg-day	--	mg/kg-day	--	1.25E-06	mg/kg-day	3.00E-04	mg/kg-day	4.17E-03
				Copper	9.67E+02	mg/kg	9.84E-06	mg/kg-day	--	mg/kg-day	--	9.84E-05	mg/kg-day	4.00E-02	mg/kg-day	2.46E-03
				Iron	3.36E+04	mg/kg	3.42E-04	mg/kg-day	--	mg/kg-day	--	3.42E-03	mg/kg-day	7.00E-01	mg/kg-day	4.88E-03
				Lead	3.22E+02	mg/kg	3.28E-06	mg/kg-day	--	mg/kg-day	--	3.28E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.34E-05	mg/kg-day	--	mg/kg-day	--	1.34E-04	mg/kg-day	2.40E-02	mg/kg-day	5.60E-03
				Mercury	1.15E+00	mg/kg	1.17E-08	mg/kg-day	--	mg/kg-day	--	1.17E-07	mg/kg-day	1.00E-04	mg/kg-day	1.17E-03
				Nickel	3.74E+01	mg/kg	3.81E-07	mg/kg-day	--	mg/kg-day	--	3.81E-06	mg/kg-day	2.00E-02	mg/kg-day	1.90E-04
				Silver	1.60E+01	mg/kg	1.63E-07	mg/kg-day	--	mg/kg-day	--	1.63E-06	mg/kg-day	5.00E-03	mg/kg-day	3.26E-04
				Vanadium	4.45E+01	mg/kg	4.53E-07	mg/kg-day	--	mg/kg-day	--	4.53E-06	mg/kg-day	5.00E-03	mg/kg-day	9.06E-04
				Zinc	1.38E+03	mg/kg	1.40E-05	mg/kg-day	--	mg/kg-day	--	1.40E-04	mg/kg-day	3.00E-01	mg/kg-day	4.68E-04
				4,4'-DDD	4.63E+03	ug/kg	4.71E-08	mg/kg-day	2.40E-01	mg/kg-day	1.13E-08	4.71E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	6.14E-09	mg/kg-day	3.40E-01	mg/kg-day	2.09E-09	6.14E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.76E-07	mg/kg-day	3.40E-01	mg/kg-day	5.99E-08	1.76E-06	mg/kg-day	5.00E-04	mg/kg-day	3.52E-03
				Aroclor-1248	5.60E+02	ug/kg	5.70E-09	mg/kg-day	2.00E+00	mg/kg-day	1.14E-08	5.70E-08	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.36E-09	mg/kg-day	2.00E+00	mg/kg-day	2.73E-09	1.36E-08	mg/kg-day	2.00E-05	mg/kg-day	6.82E-04
				Aroclor-1260	4.51E+01	ug/kg	4.59E-10	mg/kg-day	2.00E+00	mg/kg-day	9.18E-10	4.59E-09	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	7.13E-09	mg/kg-day	1.60E+01	mg/kg-day	1.14E-07	7.13E-08	mg/kg-day	5.00E-05	mg/kg-day	1.43E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	1.30E-10	mg/kg-day	9.10E+00	mg/kg-day	1.19E-09	1.30E-09	mg/kg-day	1.30E-05	mg/kg-day	1.00E-04
				Benz(a)anthracene	3.92E+03	ug/kg	3.99E-08	mg/kg-day	7.30E-01	mg/kg-day	2.91E-08	3.99E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	2.94E-08	mg/kg-day	7.30E+00	mg/kg-day	2.15E-07	2.94E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	3.27E-08	mg/kg-day	7.30E-01	mg/kg-day	2.38E-08	3.27E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.18E-08	mg/kg-day	7.30E-02	mg/kg-day	1.59E-09	2.18E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	3.64E-08	mg/kg-day	7.30E-03	mg/kg-day	2.66E-10	3.64E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	2.85E-09	mg/kg-day	7.30E+00	mg/kg-day	2.08E-08	2.85E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.32E-08	mg/kg-day	7.30E-01	mg/kg-day	9.66E-09	1.32E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	7.90E-09	mg/kg-day	--	mg/kg-day	--	7.90E-08	mg/kg-day	2.00E-02	mg/kg-day	3.95E-06
				Phenanthrene	1.25E+04	ug/kg	1.27E-07	mg/kg-day	--	mg/kg-day	--	1.27E-06	mg/kg-day	3.00E-02	mg/kg-day	4.24E-05
				Ethylbenzene	6.55E+02	ug/kg	6.67E-09	mg/kg-day	1.10E-02	mg/kg-day	7.33E-11	6.67E-08	mg/kg-day	1.00E-01	mg/kg-day	6.67E-07
			Exp. Route Total								1.12E-06					6.73E-02

TABLE 7.17.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	8.46E-14	mg/kg-day	1.30E+05	mg/kg-day	1.10E-08	8.46E-13	mg/kg-day	1.00E-09	mg/kg-day	8.46E-04
				Aluminum	1.98E+04	mg/kg	2.30E-06	mg/kg-day	--	mg/kg-day	--	2.30E-05	mg/kg-day	1.00E+00	mg/kg-day	2.30E-05
				Antimony	2.50E+01	mg/kg	2.90E-09	mg/kg-day	--	mg/kg-day	--	2.90E-08	mg/kg-day	6.00E-05	mg/kg-day	4.83E-04
				Arsenic	6.21E+00	mg/kg	2.16E-09	mg/kg-day	1.50E+00	mg/kg-day	3.24E-09	2.16E-08	mg/kg-day	3.00E-04	mg/kg-day	7.20E-05
				Cadmium	4.71E+01	mg/kg	5.46E-10	mg/kg-day	--	mg/kg-day	--	5.46E-09	mg/kg-day	2.50E-05	mg/kg-day	2.19E-04
				Chromium	3.94E+01	mg/kg	4.57E-09	mg/kg-day	2.00E+01	mg/kg-day	9.14E-08	4.57E-08	mg/kg-day	7.50E-05	mg/kg-day	6.09E-04
				Cobalt	1.23E+01	mg/kg	1.43E-09	mg/kg-day	--	mg/kg-day	--	1.43E-08	mg/kg-day	3.00E-04	mg/kg-day	4.76E-05
				Copper	9.67E+02	mg/kg	1.12E-07	mg/kg-day	--	mg/kg-day	--	1.12E-06	mg/kg-day	4.00E-02	mg/kg-day	2.80E-05
				Iron	3.36E+04	mg/kg	3.90E-06	mg/kg-day	--	mg/kg-day	--	3.90E-05	mg/kg-day	7.00E-01	mg/kg-day	5.57E-05
				Lead	3.22E+02	mg/kg	3.74E-08	mg/kg-day	--	mg/kg-day	--	3.74E-07	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.53E-07	mg/kg-day	--	mg/kg-day	--	1.53E-06	mg/kg-day	9.60E-04	mg/kg-day	1.60E-03
				Mercury	1.15E+00	mg/kg	1.33E-10	mg/kg-day	--	mg/kg-day	--	1.33E-09	mg/kg-day	1.00E-04	mg/kg-day	1.33E-05
				Nickel	3.74E+01	mg/kg	4.34E-09	mg/kg-day	--	mg/kg-day	--	4.34E-08	mg/kg-day	8.00E-04	mg/kg-day	5.42E-05
				Silver	1.60E+01	mg/kg	1.86E-09	mg/kg-day	--	mg/kg-day	--	1.86E-08	mg/kg-day	2.00E-04	mg/kg-day	9.28E-05
				Vanadium	4.45E+01	mg/kg	5.16E-09	mg/kg-day	--	mg/kg-day	--	5.16E-08	mg/kg-day	1.30E-04	mg/kg-day	3.97E-04
				Zinc	1.38E+03	mg/kg	1.60E-07	mg/kg-day	--	mg/kg-day	--	1.60E-06	mg/kg-day	3.00E-01	mg/kg-day	5.34E-06
				4,4'-DDD	4.63E+03	ug/kg	1.61E-09	mg/kg-day	2.40E-01	mg/kg-day	3.87E-10	1.61E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.10E-10	mg/kg-day	3.40E-01	mg/kg-day	7.14E-11	2.10E-09	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	6.02E-09	mg/kg-day	3.40E-01	mg/kg-day	2.05E-09	6.02E-08	mg/kg-day	5.00E-04	mg/kg-day	1.20E-04
				Aroclor-1248	5.60E+02	ug/kg	9.10E-10	mg/kg-day	2.00E+00	mg/kg-day	1.82E-09	9.10E-09	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	2.18E-10	mg/kg-day	2.00E+00	mg/kg-day	4.35E-10	2.18E-09	mg/kg-day	2.00E-05	mg/kg-day	1.09E-04
				Aroclor-1260	4.51E+01	ug/kg	7.32E-11	mg/kg-day	2.00E+00	mg/kg-day	1.46E-10	7.32E-10	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	8.13E-10	mg/kg-day	1.60E+01	mg/kg-day	1.30E-08	8.13E-09	mg/kg-day	5.00E-05	mg/kg-day	1.63E-04
				Heptachlor Epoxide	1.28E+01	ug/kg	1.48E-11	mg/kg-day	9.10E+00	mg/kg-day	1.35E-10	1.48E-10	mg/kg-day	1.30E-05	mg/kg-day	1.14E-05
				Benz(a)anthracene	3.92E+03	ug/kg	5.91E-09	mg/kg-day	7.30E-01	mg/kg-day	4.32E-09	5.91E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	4.36E-09	mg/kg-day	7.30E+00	mg/kg-day	3.18E-08	4.36E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	4.84E-09	mg/kg-day	7.30E-01	mg/kg-day	3.53E-09	4.84E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	3.23E-09	mg/kg-day	7.30E-02	mg/kg-day	2.36E-10	3.23E-08	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	5.40E-09	mg/kg-day	7.30E-03	mg/kg-day	3.94E-11	5.40E-08	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	4.22E-10	mg/kg-day	7.30E+00	mg/kg-day	3.08E-09	4.22E-09	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.96E-09	mg/kg-day	7.30E-01	mg/kg-day	1.43E-09	1.96E-08	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.17E-09	mg/kg-day	--	mg/kg-day	--	1.17E-08	mg/kg-day	2.00E-02	mg/kg-day	5.85E-07
				Phenanthrene	1.25E+04	ug/kg	1.89E-08	mg/kg-day	--	mg/kg-day	--	1.89E-07	mg/kg-day	3.00E-02	mg/kg-day	6.28E-06
				Ethylbenzene	6.55E+02	ug/kg	2.28E-10	mg/kg-day	1.10E-02	mg/kg-day	2.51E-12	2.28E-09	mg/kg-day	1.00E-01	mg/kg-day	2.28E-08
			Exp. Route Total								1.68E-07					4.95E-03
		Exposure Point Total									1.29E-06					7.22E-02
	Exposure Medium Total										1.29E-06					7.22E-02
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	1.95E-07	mg/m3	3.40E-02	1/(mg/m3)	6.62E-09	1.95E-06	mg/m3	3.00E-03	mg/m3	6.49E-04
				Ethylbenzene	7.00E+03	ug/kg	6.87E-06	mg/m3	2.50E-03	1/(mg/m3)	1.72E-08	6.87E-05	mg/m3	1.00E+00	mg/m3	6.87E-05
			Exp. Route Total								2.38E-08					7.18E-04
		Exposure Point Total									2.38E-08					7.18E-04
	Exposure Medium Total										2.38E-08					7.18E-04
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.45E-11	mg/m3	1.20E+01	1/(mg/m3)	1.73E-10	1.45E-10	mg/m3	1.00E-04	mg/m3	1.45E-06
				Manganese	1.32E+03	mg/kg	4.84E-10	mg/m3	--	1/(mg/m3)	--	4.84E-09	mg/m3	5.00E-05	mg/m3	9.69E-05
			Exp. Route Total								1.73E-10					9.83E-05
		Exposure Point Total									1.73E-10					9.83E-05
	Exposure Medium Total										1.73E-10					9.83E-05
Medium Total											1.31E-06					7.31E-02
										Total of Receptor Risks Across All Media	1.31E-06			Total of Receptor Hazards Across All Media		7.31E-02

TABLE 7.17a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	2.47E-12	mg/kg-day	1.30E+05	mg/kg-day	3.21E-07	2.47E-11	mg/kg-day	1.00E-09	mg/kg-day	2.47E-02
				Aluminum	1.98E+04	mg/kg	2.01E-04	mg/kg-day	--	mg/kg-day	--	2.01E-03	mg/kg-day	1.00E+00	mg/kg-day	2.01E-03
				Antimony	2.50E+01	mg/kg	2.54E-07	mg/kg-day	--	mg/kg-day	--	2.54E-06	mg/kg-day	4.00E-04	mg/kg-day	6.36E-03
				Cadmium	4.71E+01	mg/kg	4.79E-07	mg/kg-day	--	mg/kg-day	--	4.79E-06	mg/kg-day	1.00E-03	mg/kg-day	4.79E-03
				Chromium	3.94E+01	mg/kg	4.01E-07	mg/kg-day	5.00E-01	mg/kg-day	2.00E-07	4.01E-06	mg/kg-day	3.00E-03	mg/kg-day	1.34E-03
				Cobalt	1.23E+01	mg/kg	1.25E-07	mg/kg-day	--	mg/kg-day	--	1.25E-06	mg/kg-day	3.00E-04	mg/kg-day	4.17E-03
				Copper	9.67E+02	mg/kg	9.84E-06	mg/kg-day	--	mg/kg-day	--	9.84E-05	mg/kg-day	4.00E-02	mg/kg-day	2.46E-03
				Iron	3.36E+04	mg/kg	3.42E-04	mg/kg-day	--	mg/kg-day	--	3.42E-03	mg/kg-day	7.00E-01	mg/kg-day	4.88E-03
				Lead	3.22E+02	mg/kg	3.28E-06	mg/kg-day	--	mg/kg-day	--	3.28E-05	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.34E-05	mg/kg-day	--	mg/kg-day	--	1.34E-04	mg/kg-day	2.40E-02	mg/kg-day	5.60E-03
				Mercury	1.15E+00	mg/kg	1.17E-08	mg/kg-day	--	mg/kg-day	--	1.17E-07	mg/kg-day	1.00E-04	mg/kg-day	1.17E-03
				Nickel	3.74E+01	mg/kg	3.81E-07	mg/kg-day	--	mg/kg-day	--	3.81E-06	mg/kg-day	2.00E-02	mg/kg-day	1.90E-04
				Silver	1.60E+01	mg/kg	1.63E-07	mg/kg-day	--	mg/kg-day	--	1.63E-06	mg/kg-day	5.00E-03	mg/kg-day	3.26E-04
				Vanadium	4.45E+01	mg/kg	4.53E-07	mg/kg-day	--	mg/kg-day	--	4.53E-06	mg/kg-day	5.00E-03	mg/kg-day	9.06E-04
				Zinc	1.38E+03	mg/kg	1.40E-05	mg/kg-day	--	mg/kg-day	--	1.40E-04	mg/kg-day	3.00E-01	mg/kg-day	4.68E-04
				4,4'-DDD	4.63E+03	ug/kg	4.71E-08	mg/kg-day	2.40E-01	mg/kg-day	1.13E-08	4.71E-07	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	6.14E-09	mg/kg-day	3.40E-01	mg/kg-day	2.09E-09	6.14E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	1.76E-07	mg/kg-day	3.40E-01	mg/kg-day	5.99E-08	1.76E-06	mg/kg-day	5.00E-04	mg/kg-day	3.52E-03
				Aroclor-1248	5.60E+02	ug/kg	5.70E-09	mg/kg-day	2.00E+00	mg/kg-day	1.14E-08	5.70E-08	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	1.36E-09	mg/kg-day	2.00E+00	mg/kg-day	2.73E-09	1.36E-08	mg/kg-day	2.00E-05	mg/kg-day	6.82E-04
				Aroclor-1260	4.51E+01	ug/kg	4.59E-10	mg/kg-day	2.00E+00	mg/kg-day	9.18E-10	4.59E-09	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	7.13E-09	mg/kg-day	1.60E+01	mg/kg-day	1.14E-07	7.13E-08	mg/kg-day	5.00E-05	mg/kg-day	1.43E-03
				Heptachlor Epoxide	1.28E+01	ug/kg	1.30E-10	mg/kg-day	9.10E+00	mg/kg-day	1.19E-09	1.30E-09	mg/kg-day	1.30E-05	mg/kg-day	1.00E-04
				Benz(a)anthracene	3.92E+03	ug/kg	3.99E-08	mg/kg-day	7.30E-01	mg/kg-day	2.91E-08	3.99E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	2.94E-08	mg/kg-day	7.30E+00	mg/kg-day	2.15E-07	2.94E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	3.27E-08	mg/kg-day	7.30E-01	mg/kg-day	2.38E-08	3.27E-07	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	2.18E-08	mg/kg-day	7.30E-02	mg/kg-day	1.59E-09	2.18E-07	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	3.64E-08	mg/kg-day	7.30E-03	mg/kg-day	2.66E-10	3.64E-07	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	2.85E-09	mg/kg-day	7.30E+00	mg/kg-day	2.08E-08	2.85E-08	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.32E-08	mg/kg-day	7.30E-01	mg/kg-day	9.66E-09	1.32E-07	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	7.90E-09	mg/kg-day	--	mg/kg-day	--	7.90E-08	mg/kg-day	2.00E-02	mg/kg-day	3.95E-06
				Phenanthrene	1.25E+04	ug/kg	1.27E-07	mg/kg-day	--	mg/kg-day	--	1.27E-06	mg/kg-day	3.00E-02	mg/kg-day	4.24E-05
				Ethylbenzene	6.55E+02	ug/kg	6.67E-09	mg/kg-day	1.10E-02	mg/kg-day	7.33E-11	6.67E-08	mg/kg-day	1.00E-01	mg/kg-day	6.67E-07
			Exp. Route Total								1.03E-06					6.52E-02

TABLE 7.17a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	8.46E-14	mg/kg-day	1.30E+05	mg/kg-day	1.10E-08	8.46E-13	mg/kg-day	1.00E-09	mg/kg-day	8.46E-04
				Aluminum	1.98E+04	mg/kg	2.30E-06	mg/kg-day	--	mg/kg-day	--	2.30E-05	mg/kg-day	1.00E+00	mg/kg-day	2.30E-05
				Antimony	2.50E+01	mg/kg	2.90E-09	mg/kg-day	--	mg/kg-day	--	2.90E-08	mg/kg-day	6.00E-05	mg/kg-day	4.83E-04
				Cadmium	4.71E+01	mg/kg	5.46E-10	mg/kg-day	--	mg/kg-day	--	5.46E-09	mg/kg-day	2.50E-05	mg/kg-day	2.19E-04
				Chromium	3.94E+01	mg/kg	4.57E-09	mg/kg-day	2.00E+01	mg/kg-day	9.14E-08	4.57E-08	mg/kg-day	7.50E-05	mg/kg-day	6.09E-04
				Cobalt	1.23E+01	mg/kg	1.43E-09	mg/kg-day	--	mg/kg-day	--	1.43E-08	mg/kg-day	3.00E-04	mg/kg-day	4.76E-05
				Copper	9.67E+02	mg/kg	1.12E-07	mg/kg-day	--	mg/kg-day	--	1.12E-06	mg/kg-day	4.00E-02	mg/kg-day	2.80E-05
				Iron	3.36E+04	mg/kg	3.90E-06	mg/kg-day	--	mg/kg-day	--	3.90E-05	mg/kg-day	7.00E-01	mg/kg-day	5.57E-05
				Lead	3.22E+02	mg/kg	3.74E-08	mg/kg-day	--	mg/kg-day	--	3.74E-07	mg/kg-day	--	mg/kg-day	--
				Manganese	1.32E+03	mg/kg	1.53E-07	mg/kg-day	--	mg/kg-day	--	1.53E-06	mg/kg-day	9.60E-04	mg/kg-day	1.60E-03
				Mercury	1.15E+00	mg/kg	1.33E-10	mg/kg-day	--	mg/kg-day	--	1.33E-09	mg/kg-day	1.00E-04	mg/kg-day	1.33E-05
				Nickel	3.74E+01	mg/kg	4.34E-09	mg/kg-day	--	mg/kg-day	--	4.34E-08	mg/kg-day	8.00E-04	mg/kg-day	5.42E-05
				Silver	1.60E+01	mg/kg	1.86E-09	mg/kg-day	--	mg/kg-day	--	1.86E-08	mg/kg-day	2.00E-04	mg/kg-day	9.28E-05
				Vanadium	4.45E+01	mg/kg	5.16E-09	mg/kg-day	--	mg/kg-day	--	5.16E-08	mg/kg-day	1.30E-04	mg/kg-day	3.97E-04
				Zinc	1.38E+03	mg/kg	1.60E-07	mg/kg-day	--	mg/kg-day	--	1.60E-06	mg/kg-day	3.00E-01	mg/kg-day	5.34E-06
				4,4'-DDD	4.63E+03	ug/kg	1.61E-09	mg/kg-day	2.40E-01	mg/kg-day	3.87E-10	1.61E-08	mg/kg-day	--	mg/kg-day	--
				4,4'-DDE	6.03E+02	ug/kg	2.10E-10	mg/kg-day	3.40E-01	mg/kg-day	7.14E-11	2.10E-09	mg/kg-day	--	mg/kg-day	--
				4,4'-DDT	1.73E+04	ug/kg	6.02E-09	mg/kg-day	3.40E-01	mg/kg-day	2.05E-09	6.02E-08	mg/kg-day	5.00E-04	mg/kg-day	1.20E-04
				Aroclor-1248	5.60E+02	ug/kg	9.10E-10	mg/kg-day	2.00E+00	mg/kg-day	1.82E-09	9.10E-09	mg/kg-day	--	mg/kg-day	--
				Aroclor-1254	1.34E+02	ug/kg	2.18E-10	mg/kg-day	2.00E+00	mg/kg-day	4.35E-10	2.18E-09	mg/kg-day	2.00E-05	mg/kg-day	1.09E-04
				Aroclor-1260	4.51E+01	ug/kg	7.32E-11	mg/kg-day	2.00E+00	mg/kg-day	1.46E-10	7.32E-10	mg/kg-day	--	mg/kg-day	--
				Dieldrin	7.01E+02	ug/kg	8.13E-10	mg/kg-day	1.60E+01	mg/kg-day	1.30E-08	8.13E-09	mg/kg-day	5.00E-05	mg/kg-day	1.63E-04
				Heptachlor Epoxide	1.28E+01	ug/kg	1.48E-11	mg/kg-day	9.10E+00	mg/kg-day	1.35E-10	1.48E-10	mg/kg-day	1.30E-05	mg/kg-day	1.14E-05
				Benz(a)anthracene	3.92E+03	ug/kg	5.91E-09	mg/kg-day	7.30E-01	mg/kg-day	4.32E-09	5.91E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(a)pyrene	2.89E+03	ug/kg	4.36E-09	mg/kg-day	7.30E+00	mg/kg-day	3.18E-08	4.36E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(b)fluoranthene	3.21E+03	ug/kg	4.84E-09	mg/kg-day	7.30E-01	mg/kg-day	3.53E-09	4.84E-08	mg/kg-day	--	mg/kg-day	--
				Benzo(k)fluoranthene	2.14E+03	ug/kg	3.23E-09	mg/kg-day	7.30E-02	mg/kg-day	2.36E-10	3.23E-08	mg/kg-day	--	mg/kg-day	--
				Chrysene	3.58E+03	ug/kg	5.40E-09	mg/kg-day	7.30E-03	mg/kg-day	3.94E-11	5.40E-08	mg/kg-day	--	mg/kg-day	--
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	4.22E-10	mg/kg-day	7.30E+00	mg/kg-day	3.08E-09	4.22E-09	mg/kg-day	--	mg/kg-day	--
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	1.96E-09	mg/kg-day	7.30E-01	mg/kg-day	1.43E-09	1.96E-08	mg/kg-day	--	mg/kg-day	--
				Naphthalene	7.76E+02	ug/kg	1.17E-09	mg/kg-day	--	mg/kg-day	--	1.17E-08	mg/kg-day	2.00E-02	mg/kg-day	5.85E-07
				Phenanthrene	1.25E+04	ug/kg	1.89E-08	mg/kg-day	--	mg/kg-day	--	1.89E-07	mg/kg-day	3.00E-02	mg/kg-day	6.28E-06
				Ethylbenzene	6.55E+02	ug/kg	2.28E-10	mg/kg-day	1.10E-02	mg/kg-day	2.51E-12	2.28E-09	mg/kg-day	1.00E-01	mg/kg-day	2.28E-08
			Exp. Route Total								1.65E-07					4.88E-03
		Exposure Point Total									1.19E-06					7.01E-02
	Exposure Medium Total										1.19E-06					7.01E-02
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	1.95E-07	mg/m3	3.40E-02	1/(mg/m3)	6.62E-09	1.95E-06	mg/m3	3.00E-03	mg/m3	6.49E-04
				Ethylbenzene	7.00E+03	ug/kg	6.87E-06	mg/m3	2.50E-03	1/(mg/m3)	1.72E-08	6.87E-05	mg/m3	1.00E+00	mg/m3	6.87E-05
			Exp. Route Total								2.38E-08					7.18E-04
		Exposure Point Total									2.38E-08					7.18E-04
	Exposure Medium Total										2.38E-08					7.18E-04
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.45E-11	mg/m3	1.20E+01	1/(mg/m3)	1.73E-10	1.45E-10	mg/m3	1.00E-04	mg/m3	1.45E-06
				Manganese	1.32E+03	mg/kg	4.84E-10	mg/m3	--	1/(mg/m3)	--	4.84E-09	mg/m3	5.00E-05	mg/m3	9.69E-05
			Exp. Route Total								1.73E-10					9.83E-05
		Exposure Point Total									1.73E-10					9.83E-05
	Exposure Medium Total										1.73E-10					9.83E-05
Medium Total											1.21E-06					7.09E-02
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											1.21E-06					7.09E-02

TABLE 7.18.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soil	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	9.07E-12	mg/kg-day	1.30E+05	mg/kg-day	1.18E-06					N/A
				Aluminum	1.98E+04	mg/kg	2.01E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	2.54E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	6.21E+00	mg/kg	2.32E-07	mg/kg-day	1.50E+00	mg/kg-day	3.48E-07					N/A
				Cadmium	4.71E+01	mg/kg	4.79E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	1.47E-06	mg/kg-day	5.00E-01	mg/kg-day	1.80E-06					N/A
				Cobalt	1.23E+01	mg/kg	1.25E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	9.84E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	3.42E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	3.28E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	1.34E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	1.17E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	3.81E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	1.63E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	4.53E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	1.40E-05	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	1.73E-07	mg/kg-day	2.40E-01	mg/kg-day	4.15E-08					N/A
				4,4'-DDE	6.03E+02	ug/kg	2.25E-08	mg/kg-day	3.40E-01	mg/kg-day	7.65E-09					N/A
				4,4'-DDT	1.73E+04	ug/kg	6.46E-07	mg/kg-day	3.40E-01	mg/kg-day	2.19E-07					N/A
				Aroclor-1248	5.60E+02	ug/kg	2.09E-08	mg/kg-day	2.00E+00	mg/kg-day	4.18E-08					N/A
				Aroclor-1254	1.34E+02	ug/kg	5.00E-09	mg/kg-day	2.00E+00	mg/kg-day	1.00E-08					N/A
				Aroclor-1260	4.51E+01	ug/kg	1.68E-09	mg/kg-day	2.00E+00	mg/kg-day	3.37E-09					N/A
				Dieldrin	7.01E+02	ug/kg	2.62E-08	mg/kg-day	1.60E+01	mg/kg-day	4.18E-07					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	4.78E-10	mg/kg-day	9.10E+00	mg/kg-day	4.35E-09					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	1.46E-07	mg/kg-day	7.30E-01	mg/kg-day	2.62E-07					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	1.08E-07	mg/kg-day	7.30E+00	mg/kg-day	1.93E-06					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.20E-07	mg/kg-day	7.30E-01	mg/kg-day	2.15E-07					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	7.98E-08	mg/kg-day	7.30E-02	mg/kg-day	1.43E-08					N/A
				Chrysene	3.58E+03	ug/kg	1.34E-07	mg/kg-day	7.30E-03	mg/kg-day	2.39E-09					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.04E-08	mg/kg-day	7.30E+00	mg/kg-day	1.87E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	4.85E-08	mg/kg-day	7.30E-01	mg/kg-day	8.69E-08					N/A
				Naphthalene	7.76E+02	ug/kg	7.90E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	1.27E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	2.44E-08	mg/kg-day	1.10E-02	mg/kg-day	2.69E-10					N/A
			Exp. Route Total								6.78E-06					--

TABLE 7.18.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.06E-13	mg/kg-day	1.30E+05	mg/kg-day	3.98E-08					N/A
				Aluminum	1.98E+04	mg/kg	2.30E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	2.90E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Arsenic	6.21E+00	mg/kg	7.82E-09	mg/kg-day	1.50E+00	mg/kg-day	1.17E-08					N/A
				Cadmium	4.71E+01	mg/kg	5.46E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	1.65E-08	mg/kg-day	2.00E+01	mg/kg-day	8.10E-07					N/A
				Cobalt	1.23E+01	mg/kg	1.43E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	1.12E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	3.90E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	3.74E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	1.53E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	1.33E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	4.34E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	1.86E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	5.16E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	1.60E-07	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	5.83E-09	mg/kg-day	2.40E-01	mg/kg-day	1.40E-09					N/A
				4,4'-DDE	6.03E+02	ug/kg	7.60E-10	mg/kg-day	3.40E-01	mg/kg-day	2.58E-10					N/A
				4,4'-DDT	1.73E+04	ug/kg	2.18E-08	mg/kg-day	3.40E-01	mg/kg-day	7.41E-09					N/A
				Aroclor-1248	5.60E+02	ug/kg	3.29E-09	mg/kg-day	2.00E+00	mg/kg-day	6.58E-09					N/A
				Aroclor-1254	1.34E+02	ug/kg	7.88E-10	mg/kg-day	2.00E+00	mg/kg-day	1.58E-09					N/A
				Aroclor-1260	4.51E+01	ug/kg	2.65E-10	mg/kg-day	2.00E+00	mg/kg-day	5.30E-10					N/A
				Dieldrin	7.01E+02	ug/kg	2.94E-09	mg/kg-day	1.60E+01	mg/kg-day	4.71E-08					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	5.38E-11	mg/kg-day	9.10E+00	mg/kg-day	4.89E-10					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	2.14E-08	mg/kg-day	7.30E-01	mg/kg-day	3.82E-08					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	1.58E-08	mg/kg-day	7.30E+00	mg/kg-day	2.82E-07					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.75E-08	mg/kg-day	7.30E-01	mg/kg-day	3.13E-08					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.17E-08	mg/kg-day	7.30E-02	mg/kg-day	2.09E-09					N/A
				Chrysene	3.58E+03	ug/kg	1.95E-08	mg/kg-day	7.30E-03	mg/kg-day	3.49E-10					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.53E-09	mg/kg-day	7.30E+00	mg/kg-day	2.73E-08					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	7.10E-09	mg/kg-day	7.30E-01	mg/kg-day	1.27E-08					N/A
				Naphthalene	7.76E+02	ug/kg	1.17E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	1.89E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	8.25E-10	mg/kg-day	1.10E-02	mg/kg-day	9.08E-12					N/A
			Exp. Route Total								1.32E-06					--
		Exposure Point Total									8.10E-06					--
	Exposure Medium Total										8.10E-06					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.50E-07	mg/m3	3.40E-02	1/(mg/m3)	8.52E-09					N/A
				Ethylbenzene	7.00E+03	ug/kg	8.83E-06	mg/m3	2.50E-03	1/(mg/m3)	2.21E-08					N/A
			Exp. Route Total								3.06E-08					--
		Exposure Point Total									3.06E-08					--
	Exposure Medium Total										3.06E-08					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.86E-11	mg/m3	1.20E+01	1/(mg/m3)	3.22E-10					N/A
				Manganese	1.32E+03	mg/kg	4.84E-10	mg/m3	--	1/(mg/m3)	--					N/A
			Exp. Route Total								3.22E-10					--
		Exposure Point Total									3.22E-10					--
	Exposure Medium Total										3.22E-10					--
Medium Total											8.13E-06					--
										Total of Receptor Risks Across All Media	8.13E-06			Total of Receptor Hazards Across All Media		--

TABLE 7.18a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Site 3 Landfill Area Contact with Soi	Ingestion	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	9.07E-12	mg/kg-day	1.30E+05	mg/kg-day	1.18E-06					N/A
				Aluminum	1.98E+04	mg/kg	2.01E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	2.54E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	4.71E+01	mg/kg	4.79E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	1.47E-06	mg/kg-day	5.00E-01	mg/kg-day	1.80E-06					N/A
				Cobalt	1.23E+01	mg/kg	1.25E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	9.84E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	3.42E-04	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	3.28E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	1.34E-05	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	1.17E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	3.81E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	1.63E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	4.53E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	1.40E-05	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	1.73E-07	mg/kg-day	2.40E-01	mg/kg-day	4.15E-08					N/A
				4,4'-DDE	6.03E+02	ug/kg	2.25E-08	mg/kg-day	3.40E-01	mg/kg-day	7.65E-09					N/A
				4,4'-DDT	1.73E+04	ug/kg	6.46E-07	mg/kg-day	3.40E-01	mg/kg-day	2.19E-07					N/A
				Aroclor-1248	5.60E+02	ug/kg	2.09E-08	mg/kg-day	2.00E+00	mg/kg-day	4.18E-08					N/A
				Aroclor-1254	1.34E+02	ug/kg	5.00E-09	mg/kg-day	2.00E+00	mg/kg-day	1.00E-08					N/A
				Aroclor-1260	4.51E+01	ug/kg	1.68E-09	mg/kg-day	2.00E+00	mg/kg-day	3.37E-09					N/A
				Dieldrin	7.01E+02	ug/kg	2.62E-08	mg/kg-day	1.60E+01	mg/kg-day	4.18E-07					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	4.78E-10	mg/kg-day	9.10E+00	mg/kg-day	4.35E-09					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	1.46E-07	mg/kg-day	7.30E-01	mg/kg-day	2.62E-07					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	1.08E-07	mg/kg-day	7.30E+00	mg/kg-day	1.93E-06					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.20E-07	mg/kg-day	7.30E-01	mg/kg-day	2.15E-07					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	7.98E-08	mg/kg-day	7.30E-02	mg/kg-day	1.43E-08					N/A
				Chrysene	3.58E+03	ug/kg	1.34E-07	mg/kg-day	7.30E-03	mg/kg-day	2.39E-09					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.04E-08	mg/kg-day	7.30E+00	mg/kg-day	1.87E-07					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	4.85E-08	mg/kg-day	7.30E-01	mg/kg-day	8.69E-08					N/A
				Naphthalene	7.76E+02	ug/kg	7.90E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	1.27E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	2.44E-08	mg/kg-day	1.10E-02	mg/kg-day	2.69E-10					N/A
			Exp. Route Total								6.43E-06					--

TABLE 7.18a.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL

CENTRAL TENDENCY EXPOSURES, BACKGROUND ELIMINATION

NAS JRB WILLOW GROVE

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Dermal	Total 2,3,7,8-TCDD Equiv.	2.43E-01	ug/kg	3.06E-13	mg/kg-day	1.30E+05	mg/kg-day	3.98E-08					N/A
				Aluminum	1.98E+04	mg/kg	2.30E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Antimony	2.50E+01	mg/kg	2.90E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Cadmium	4.71E+01	mg/kg	5.46E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Chromium	3.94E+01	mg/kg	1.65E-08	mg/kg-day	2.00E+01	mg/kg-day	8.10E-07					N/A
				Cobalt	1.23E+01	mg/kg	1.43E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Copper	9.67E+02	mg/kg	1.12E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Iron	3.36E+04	mg/kg	3.90E-06	mg/kg-day	--	mg/kg-day	--					N/A
				Lead	3.22E+02	mg/kg	3.74E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Manganese	1.32E+03	mg/kg	1.53E-07	mg/kg-day	--	mg/kg-day	--					N/A
				Mercury	1.15E+00	mg/kg	1.33E-10	mg/kg-day	--	mg/kg-day	--					N/A
				Nickel	3.74E+01	mg/kg	4.34E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Silver	1.60E+01	mg/kg	1.86E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Vanadium	4.45E+01	mg/kg	5.16E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Zinc	1.38E+03	mg/kg	1.60E-07	mg/kg-day	--	mg/kg-day	--					N/A
				4,4'-DDD	4.63E+03	ug/kg	5.83E-09	mg/kg-day	2.40E-01	mg/kg-day	1.40E-09					N/A
				4,4'-DDE	6.03E+02	ug/kg	7.60E-10	mg/kg-day	3.40E-01	mg/kg-day	2.58E-10					N/A
				4,4'-DDT	1.73E+04	ug/kg	2.18E-08	mg/kg-day	3.40E-01	mg/kg-day	7.41E-09					N/A
				Aroclor-1248	5.60E+02	ug/kg	3.29E-09	mg/kg-day	2.00E+00	mg/kg-day	6.58E-09					N/A
				Aroclor-1254	1.34E+02	ug/kg	7.88E-10	mg/kg-day	2.00E+00	mg/kg-day	1.58E-09					N/A
				Aroclor-1260	4.51E+01	ug/kg	2.65E-10	mg/kg-day	2.00E+00	mg/kg-day	5.30E-10					N/A
				Dieldrin	7.01E+02	ug/kg	2.94E-09	mg/kg-day	1.60E+01	mg/kg-day	4.71E-08					N/A
				Heptachlor Epoxide	1.28E+01	ug/kg	5.38E-11	mg/kg-day	9.10E+00	mg/kg-day	4.89E-10					N/A
				Benz(a)anthracene	3.92E+03	ug/kg	2.14E-08	mg/kg-day	7.30E-01	mg/kg-day	3.82E-08					N/A
				Benzo(a)pyrene	2.89E+03	ug/kg	1.58E-08	mg/kg-day	7.30E+00	mg/kg-day	2.82E-07					N/A
				Benzo(b)fluoranthene	3.21E+03	ug/kg	1.75E-08	mg/kg-day	7.30E-01	mg/kg-day	3.13E-08					N/A
				Benzo(k)fluoranthene	2.14E+03	ug/kg	1.17E-08	mg/kg-day	7.30E-02	mg/kg-day	2.09E-09					N/A
				Chrysene	3.58E+03	ug/kg	1.95E-08	mg/kg-day	7.30E-03	mg/kg-day	3.49E-10					N/A
				Dibenz(a,h)anthracene	2.80E+02	ug/kg	1.53E-09	mg/kg-day	7.30E+00	mg/kg-day	2.73E-08					N/A
				Indeno(1,2,3-cd)pyrene	1.30E+03	ug/kg	7.10E-09	mg/kg-day	7.30E-01	mg/kg-day	1.27E-08					N/A
				Naphthalene	7.76E+02	ug/kg	1.17E-09	mg/kg-day	--	mg/kg-day	--					N/A
				Phenanthrene	1.25E+04	ug/kg	1.89E-08	mg/kg-day	--	mg/kg-day	--					N/A
				Ethylbenzene	6.55E+02	ug/kg	8.25E-10	mg/kg-day	1.10E-02	mg/kg-day	9.08E-12					N/A
			Exp. Route Total								1.31E-06					--
		Exposure Point Total									7.74E-06					--
	Exposure Medium Total										7.74E-06					--
	Air	Site 3 Landfill Area Outdoor Air, Volatilization from Soil	Inhalation	Naphthalene	7.76E+02	ug/kg	2.50E-07	mg/m3	3.40E-02	1/(mg/m3)	8.52E-09					N/A
				Ethylbenzene	7.00E+03	ug/kg	8.83E-06	mg/m3	2.50E-03	1/(mg/m3)	2.21E-08					N/A
			Exp. Route Total								3.06E-08					--
		Exposure Point Total									3.06E-08					--
	Exposure Medium Total										3.06E-08					--
	Particulates	Site 3 Landfill Area Airborne Particulates, Emitted from Soil	Inhalation	Chromium	3.94E+01	mg/kg	1.86E-11	mg/m3	1.20E+01	1/(mg/m3)	3.22E-10					N/A
				Manganese	1.32E+03	mg/kg	4.84E-10	mg/m3	--	1/(mg/m3)	--					N/A
			Exp. Route Total								3.22E-10					--
		Exposure Point Total									3.22E-10					--
	Exposure Medium Total										3.22E-10					--
Medium Total											7.77E-06					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											7.77E-06					--

LIST OF TABLES
RAGS PART D TABLE 9
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

TABLE NO.	REASONABLE MAXIMUM EXPOSURES
9.01.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 GROUNDWATER
9.02.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER
9.03.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT CONTACT WITH SITE 3 GROUNDWATER
9.04.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER CONTACT WITH SITE 3 GROUNDWATER
9.05.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
9.06.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
9.07.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
9.08.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - INDUSTRIAL WORKER CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
9.09.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
9.10.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
9.11.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA SURFACE SOIL
9.12.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
9.13.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
9.14.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
9.15.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
9.16.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
9.17.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
9.18.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
9.19.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
9.20.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
9.20a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
9.21.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
9.21a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
9.22.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
9.22a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
9.23.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
9.23a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
9.24.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
9.24a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
9.25.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
9.25a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
9.26.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
9.26a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
9.27.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.27a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.28.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.28a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.29.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.29a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.30.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.30a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.31.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.31a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.32.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.32a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.33.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.33a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.34.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.34a.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.35.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER CONTACT WITH SITE 3 SURFACE WATER
9.36.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
9.37.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
9.38.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 SURFACE WATER
9.39.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER CONTACT WITH SITE 3 SEDIMENT
9.40.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT
9.41.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT
9.42.RME	SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 SEDIMENT

TABLE 9.01.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water Contact With Site 3 Groundwater												
			Arsenic	4.79E-05	--	2.45E-07	--	4.82E-05	**Arsenic**	**Skin/Vascular**	**1.24E+00**	**--**	**6.36E-03**	**1.25E+00**
			Cobalt	--	--	--	--	--	Cobalt		6.60E-01	--	1.35E-03	6.61E-01
			Manganese	--	--	--	--	--	Manganese	CNS	1.49E-01	--	1.90E-02	1.68E-01
			Bis(2-ethylhexyl) Phthalate	1.09E-06	--	1.26E-06	--	2.34E-06	Bis(2-ethylhexyl) Phthalat	Liver	4.54E-02	--	5.23E-02	9.77E-02
			1,1-Dichloroethane	3.30E-07	--	1.99E-08	--	3.50E-07	1,1-Dichloroethane	NOEL	3.38E-03	--	2.04E-04	3.59E-03
			Bromodichloromethane	4.82E-07	--	2.94E-08	--	5.11E-07	Bromodichloromethane	Kidney	4.54E-03	--	2.77E-04	4.81E-03
			Carbon Tetrachloride	1.88E-07	--	3.76E-08	--	2.26E-07	Carbon Tetrachloride	Liver	7.83E-03	--	1.57E-03	9.40E-03
			Chloroform	1.15E-07	--	7.79E-09	--	1.22E-07	Chloroform	Liver	4.31E-03	--	2.93E-04	4.61E-03
			Dibromochloromethane	8.91E-07	--	5.05E-08	--	9.41E-07	Dibromochloromethane	Liver	6.18E-03	--	3.51E-04	6.54E-03
			Tetrachloroethene	1.93E-06	--	8.61E-07	--	2.79E-06	Tetrachloroethene	Liver	4.34E-02	--	1.93E-02	6.27E-02
			Trichloroethene	2.41E-07	--	3.12E-08	--	2.72E-07	Trichloroethene	N/A	--	--	--	--
			(Total)	5.32E-05	--	2.54E-06		5.57E-05	(Total)		2.17E+00	--	1.01E-01	2.27E+00
			Radionuclide Total											
		Exposure Point Total						5.57E-05						2.27E+00
	Exposure Medium Total							5.57E-05						2.27E+00
Groundwater Total								5.57E-05						2.27E+00
Receptor Total								5.57E-05						2.27E+00

Total Risk Across All Media: 5.57E-05

Total Hazard Index Across All Media: 2.27E+00

For reporting of non-cancer hazards, COPCs that are risk drivers are shown in bold if they contribute at least a HQ of 0.2 towards a target organ HI that exceeds 1.0.
COPCs that are cancer risk drivers of importance to the residential receptor are highlighted on a separate table for the lifetime resident.

Total CNS HI =	1.68E-01
Total Kidney HI =	4.81E-03
Total Liver HI =	1.81E-01
Total Skin HI =	**1.25E+00**
Total Vascular HI =	**1.25E+00**

TABLE 9.02.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water Contact With Site 3 Groundwater											
			Arsenic	6.37E-05	--	2.87E-07	--	6.40E-05	Skin/Vascular	4.13E-01	--	1.86E-03	4.15E-01
			Cobalt	--	--	--	--	--		2.19E-01	--	3.95E-04	2.20E-01
			Manganese	--	--	--	--	--	CNS	4.94E-02	--	5.56E-03	5.50E-02
			Bis(2-ethylhexyl) Phthalate	1.45E-06	--	2.08E-06	--	3.52E-06	Liver	1.51E-02	--	2.16E-02	3.67E-02
			1,1-Dichloroethane	4.39E-07	--	2.75E-08	--	4.67E-07	NOEL	1.12E-03	--	7.04E-05	1.19E-03
			Bromodichloromethane	6.41E-07	--	4.36E-08	--	6.84E-07	Kidney	1.51E-03	--	1.03E-04	1.61E-03
			Carbon Tetrachloride	2.50E-07	--	5.51E-08	--	3.05E-07	Liver	2.60E-03	--	5.74E-04	3.18E-03
			Chloroform	1.52E-07	--	1.13E-08	--	1.64E-07	Liver	1.43E-03	--	1.06E-04	1.54E-03
			Dibromochloromethane	1.18E-06	--	7.61E-08	--	1.26E-06	Liver	2.05E-03	--	1.32E-04	2.19E-03
			Tetrachloroethene	2.57E-06	--	1.27E-06	--	3.84E-06	Liver	1.44E-02	--	7.11E-03	2.15E-02
			Trichloroethene	3.20E-07	--	4.53E-08	--	3.66E-07	N/A	--	--	--	--
			(Total)	7.07E-05	--	3.89E-06		7.46E-05		7.20E-01	--	3.75E-02	7.57E-01
			Radionuclide Total										
		Exposure Point Total						7.46E-05					7.57E-01
	Exposure Medium Total							7.46E-05					7.57E-01
	Air	Inhalation of Site 3 Groundwater Vapors During Showering											
			1,1-Dichloroethane	--	3.21E-07	--	--	3.21E-07	N/A	--	--	--	--
			Bromodichloromethane	--	7.56E-07	--	--	7.56E-07	N/A	--	--	--	--
			Carbon Tetrachloride	--	4.61E-08	--	--	4.61E-08	Liver	--	2.24E-04	--	2.24E-04
			Chloroform	--	2.67E-07	--	--	2.67E-07	Liver	--	3.46E-04	--	3.46E-04
			Dibromochloromethane	--	6.39E-07	--	--	6.39E-07	N/A	--	--	--	--
			Tetrachloroethene	--	2.98E-07	--	--	2.98E-07	CNS/Kidney	--	1.11E-03	--	1.11E-03
			Trichloroethene	--	1.14E-07	--	--	1.14E-07	N/A	--	--	--	--
			(Total)	--	2.44E-06	--		2.44E-06		--	1.68E-03	--	1.68E-03
			Radionuclide Total										
		Exposure Point Total						2.44E-06					1.68E-03
	Exposure Medium Total							2.44E-06					1.68E-03
Groundwater Total								7.70E-05					7.59E-01
Receptor Total								7.70E-05					7.59E-01

Total Risk Across All Media: 7.70E-05

Total Hazard Index Across All Media: 7.59E-01

COPCs that are cancer risk drivers of importance to the residential receptor are highlighted on a separate table for the lifetime resident.

COPCs that are non-cancer risk drivers of importance to residential receptors are highlighted on a separate table for the child resident.

Total CNS HI =	5.61E-02
Total Kidney HI =	2.72E-03
Total Liver HI =	6.57E-02
Total Skin HI =	4.15E-01
Total Vascular HI =	4.15E-01

TABLE 9.03.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water Contact With Site 3 Groundwater											
			Arsenic	**1.12E-04**	**--**	**5.32E-07**	**--**	**1.12E-04**	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Bis(2-ethylhexyl) Phthalate	**2.54E-06**	**--**	**3.33E-06**	**--**	**5.87E-06**	N/A	N/A	--	N/A	--
			1,1-Dichloroethane	**7.69E-07**	**--**	**4.75E-08**	**--**	**8.17E-07**	N/A	N/A	--	N/A	--
			Bromodichloromethane	**1.12E-06**	**--**	**7.30E-08**	**--**	**1.20E-06**	N/A	N/A	--	N/A	--
			Carbon Tetrachloride	4.38E-07	--	9.27E-08	--	5.31E-07	N/A	N/A	--	N/A	--
			Chloroform	2.67E-07	--	1.91E-08	--	2.86E-07	N/A	N/A	--	N/A	--
			Dibromochloromethane	**2.07E-06**	**--**	**1.27E-07**	**--**	**2.20E-06**	N/A	N/A	--	N/A	--
			Tetrachloroethene	**4.50E-06**	**--**	**2.13E-06**	**--**	**6.63E-06**	N/A	N/A	--	N/A	--
			Trichloroethene	5.61E-07	--	7.64E-08	--	6.38E-07	N/A	N/A	--	N/A	--
			(Total)	1.24E-04	--	6.43E-06		1.30E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.30E-04					--
	Exposure Medium Total							1.30E-04					--
	Air	Inhalation of Site 3 Groundwater Vapors During Showering											
			1,1-Dichloroethane	**--**	**3.21E-07**	**--**	**--**	**3.21E-07**	N/A	--	N/A	--	--
			Bromodichloromethane	**--**	**7.56E-07**	**--**	**--**	**7.56E-07**	N/A	--	N/A	--	--
			Carbon Tetrachloride	--	4.61E-08	--	--	4.61E-08	N/A	--	N/A	--	--
			Chloroform	--	2.67E-07	--	--	2.67E-07	N/A	--	N/A	--	--
			Dibromochloromethane	**--**	**6.39E-07**	**--**	**--**	**6.39E-07**	N/A	--	N/A	--	--
			Tetrachloroethene	**--**	**2.98E-07**	**--**	**--**	**2.98E-07**	N/A	--	N/A	--	--
			Trichloroethene	--	1.14E-07	--	--	1.14E-07	N/A	--	N/A	--	--
			(Total)	--	2.44E-06	--		2.44E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						2.44E-06					--
	Exposure Medium Total							2.44E-06					--
Groundwater Total								1.32E-04					--
Receptor Total								1.32E-04					--

Total Risk Across All Media: 1.32E-04

Total Hazard Index Across All Media: --

For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04
COPCs that are non-cancer risk drivers of importance to residential receptors are highlighted on a separate table for the child resident.

TABLE 9.04.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER EXPOSURE TO SITE 3 GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Contact With Site 3 Groundwater During Excavation											
			Arsenic	--	--	2.05E-09	--	2.05E-09	Skin/Vascular	--	--	3.18E-04	3.18E-04
			Cobalt	--	--	--	--	--		--	--	6.76E-05	6.76E-05
			Manganese	--	--	--	--	--	CNS	--	--	9.53E-04	9.53E-04
			Bis(2-ethylhexyl) Phthalate	--	--	7.41E-09	--	7.41E-09	Liver	--	--	1.85E-03	1.85E-03
			1,1-Dichloroethane	--	--	1.30E-10	--	1.30E-10	NOEL	--	--	8.01E-06	8.01E-06
			Bromodichloromethane	--	--	1.74E-10	--	1.74E-10	Kidney	--	--	9.80E-06	9.80E-06
			Carbon Tetrachloride	--	--	2.27E-10	--	2.27E-10	Liver	--	--	5.67E-05	5.67E-05
			Chloroform	--	--	4.99E-11	--	4.99E-11	Liver	--	--	1.13E-05	1.13E-05
			Dibromochloromethane	--	--	2.98E-10	--	2.98E-10	Liver	--	--	1.24E-05	1.24E-05
			Tetrachloroethene	--	--	5.08E-09	--	5.08E-09	Liver	--	--	6.84E-04	6.84E-04
			Trichloroethene	--	--	1.91E-10	--	1.91E-10	N/A	--	--	--	--
			(Total)	--	--	1.56E-08		1.56E-08		--	--	3.98E-03	3.98E-03
			Radionuclide Total										
		Exposure Point Total						1.56E-08					3.98E-03
	Exposure Medium Total							1.56E-08					3.98E-03
	Air	Ambient VOC Inhalation from Site 3 Groundwater											
			1,1-Dichloroethane	--	6.05E-11	--	--	6.05E-11	N/A	--	--	--	--
			Bromodichloromethane	--	1.03E-10	--	--	1.03E-10	N/A	--	--	--	--
			Carbon Tetrachloride	--	3.53E-11	--	--	3.53E-11	Liver	--	4.12E-06	--	4.12E-06
			Chloroform	--	5.18E-11	--	--	5.18E-11	Liver	--	1.61E-06	--	1.61E-06
			Dibromochloromethane	--	9.46E-11	--	--	9.46E-11	N/A	--	--	--	--
			Tetrachloroethene	--	1.42E-10	--	--	1.42E-10	CNS/Kidney	--	1.27E-05	--	1.27E-05
			Trichloroethene	--	3.47E-11	--	--	3.47E-11	N/A	--	--	--	--
			(Total)	--	5.22E-10	--		5.22E-10		--	1.84E-05	--	1.84E-05
			Radionuclide Total										
		Exposure Point Total						5.22E-10					1.84E-05
	Exposure Medium Total							5.22E-10					1.84E-05
Groundwater Total								1.61E-08					4.00E-03
Receptor Total								1.61E-08					4.00E-03

Total Risk Across All Media: 1.61E-08

Total Hazard Index Across All Media: 4.00E-03

Total CNS HI = 9.66E-04
Total Kidney HI = 2.25E-05
Total Liver HI = 2.62E-03
Total Skin HI = 3.18E-04
Total Vascular HI = 3.18E-04

TABLE 9.05.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Hangar Area Surface Soil											
			Benz(a)anthracene	3.33E-06	--	1.21E-06	--	4.54E-06	N/A	--	--	--	--
			Benzo(a)pyrene	3.67E-05	--	1.34E-05	--	5.00E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	4.69E-06	--	1.71E-06	--	6.40E-06	N/A	--	--	--	--
			Dibenz(a,h)anthracene	7.68E-06	--	2.80E-06	--	1.05E-05	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.90E-06	--	1.06E-06	--	3.96E-06	N/A	--	--	--	--
			(Total)	5.53E-05	--	2.01E-05		7.54E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						7.54E-05					--
	Exposure Medium Total							7.54E-05					--
Surface Soil Total								7.54E-05					--
Receptor Total								7.54E-05					--

Total Risk Across All Media 7.54E-05

Total Hazard Index Across All Media --

TABLE 9.06.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Hangar Area Surface Soil											
			Benz(a)anthracene	4.90E-07	--	2.54E-07	--	7.45E-07	N/A	--	--	--	--
			Benzo(a)pyrene	5.41E-06	--	2.80E-06	--	8.21E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	6.91E-07	--	3.59E-07	--	1.05E-06	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.13E-06	--	5.87E-07	--	1.72E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	4.27E-07	--	2.22E-07	--	6.49E-07	N/A	--	--	--	--
			(Total)	8.15E-06	--	4.23E-06		1.24E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.24E-05					--
	Exposure Medium Total							1.24E-05					--
Surface Soil Total								1.24E-05					--
Receptor Total								1.24E-05					--

Total Risk Across All Media 1.24E-05

Total Hazard Index Across All Media --

TABLE 9.07.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Hangar Area Surface Soil											
			Benz(a)anthracene	3.82E-06	--	1.47E-06	--	5.28E-06	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	4.21E-05	--	1.62E-05	--	5.83E-05	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	5.38E-06	--	2.07E-06	--	7.45E-06	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	8.81E-06	--	3.38E-06	--	1.22E-05	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	3.33E-06	--	1.28E-06	--	4.61E-06	N/A	N/A	--	N/A	--
			(Total)	6.34E-05	--	2.44E-05		8.78E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						8.78E-05					--
	Exposure Medium Total							8.78E-05					--
Surface Soil Total								8.78E-05					--
Receptor Total								8.78E-05					--

Total Risk Across All Media 8.78E-05

Total Hazard Index Across All Media --

TABLE 9.08.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Hangar Area Surface Soil											
			Benz(a)anthracene	1.99E-07	--	1.71E-07	--	3.70E-07	N/A	--	--	--	--
			Benzo(a)pyrene	2.19E-06	--	1.88E-06	--	4.08E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.81E-07	--	2.41E-07	--	5.21E-07	N/A	--	--	--	--
			Dibenz(a,h)anthracene	4.59E-07	--	3.94E-07	--	8.53E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.73E-07	--	1.49E-07	--	3.22E-07	N/A	--	--	--	--
			(Total)	3.31E-06	--	2.84E-06		6.14E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						6.14E-06					--
	Exposure Medium Total							6.14E-06					--
Surface Soil Total								6.14E-06					--
Receptor Total								6.14E-06					--

Total Risk Across All Media 6.14E-06

Total Hazard Index Across All Media --

TABLE 9.09.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Hangar Area Surface Soil											
			Benz(a)anthracene	9.89E-07	--	3.60E-07	--	1.35E-06	N/A	--	--	--	--
			Benzo(a)pyrene	1.09E-05	--	3.97E-06	--	1.49E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.39E-06	--	5.08E-07	--	1.90E-06	N/A	--	--	--	--
			Dibenz(a,h)anthracene	2.28E-06	--	8.31E-07	--	3.11E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8.62E-07	--	3.14E-07	--	1.18E-06	N/A	--	--	--	--
			(Total)	1.64E-05	--	5.98E-06		2.24E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						2.24E-05					--
	Exposure Medium Total							2.24E-05					--
Surface Soil Total								2.24E-05					--
Receptor Total								2.24E-05					--

Total Risk Across All Media 2.24E-05

Total Hazard Index Across All Media --

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Hangar Area Surface Soil											
			Benz(a)anthracene	1.46E-07	--	7.56E-08	--	2.21E-07	N/A	--	--	--	--
			Benzo(a)pyrene	1.61E-06	--	8.33E-07	--	2.44E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.05E-07	--	1.07E-07	--	3.12E-07	N/A	--	--	--	--
			Dibenz(a,h)anthracene	3.36E-07	--	1.74E-07	--	5.11E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.27E-07	--	6.59E-08	--	1.93E-07	N/A	--	--	--	--
			(Total)	2.42E-06	--	1.26E-06		3.68E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.68E-06					--
	Exposure Medium Total							3.68E-06					--
Surface Soil Total								3.68E-06					--
Receptor Total								3.68E-06					--

Total Risk Across All Media 3.68E-06

Total Hazard Index Across All Media --

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Hangar Area Surface Soil											
			Benz(a)anthracene	1.13E-06	--	4.36E-07	--	1.57E-06	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	1.25E-05	--	4.80E-06	--	1.73E-05	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	1.60E-06	--	6.14E-07	--	2.21E-06	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	2.62E-06	--	1.01E-06	--	3.62E-06	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	9.89E-07	--	3.80E-07	--	1.37E-06	N/A	N/A	--	N/A	--
			(Total)	1.89E-05	--	7.24E-06		2.61E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						2.61E-05					--
	Exposure Medium Total							2.61E-05					--
Surface Soil Total								2.61E-05					--
Receptor Total								2.61E-05					--

Total Risk Across All Media 2.61E-05

Total Hazard Index Across All Media --

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	1.79E-05	--	6.52E-06	--	2.44E-05	N/A	--	--	--	--
			Benzo(a)pyrene	1.37E-04	--	4.97E-05	--	1.86E-04	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.79E-05	--	6.52E-06	--	2.44E-05	N/A	--	--	--	--
			Dibenz(a,h)anthracene	2.47E-05	--	9.01E-06	--	3.38E-05	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8.53E-06	--	3.11E-06	--	1.16E-05	N/A	--	--	--	--
			(Total)	2.06E-04	--	7.49E-05		2.81E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						2.81E-04					--
	Exposure Medium Total							2.81E-04					--
Soil Total								2.81E-04					--
Receptor Total								2.81E-04					--

Total Risk Across All Media: 2.81E-04

Total Hazard Index Across All Media: --

TABLE 9.13.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	2.64E-06	--	1.37E-06	--	4.01E-06	N/A	--	--	--	--
			Benzo(a)pyrene	2.01E-05	--	1.04E-05	--	3.05E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.64E-06	--	1.37E-06	--	4.01E-06	N/A	--	--	--	--
			Dibenz(a,h)anthracene	3.65E-06	--	1.89E-06	--	5.54E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.26E-06	--	6.52E-07	--	1.91E-06	N/A	--	--	--	--
			(Total)	3.03E-05	--	1.57E-05		4.60E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						4.60E-05					--
	Exposure Medium Total							4.60E-05					--
Soil Total								4.60E-05					--
Receptor Total								4.60E-05					--

Total Risk Across All Media 4.60E-05

Total Hazard Index Across All Media --

TABLE 9.14.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	**2.06E-05**	**--**	**7.89E-06**	**--**	**2.85E-05**	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	**1.57E-04**	**--**	**6.01E-05**	**--**	**2.17E-04**	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	**2.06E-05**	**--**	**7.89E-06**	**--**	**2.85E-05**	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	**2.84E-05**	**--**	**1.09E-05**	**--**	**3.93E-05**	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	**9.79E-06**	**--**	**3.76E-06**	**--**	**1.35E-05**	N/A	N/A	--	N/A	--
			(Total)	2.36E-04	--	9.06E-05		3.27E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.27E-04					--
	Exposure Medium Total							3.27E-04					--
Soil Total								3.27E-04					--
Receptor Total								3.27E-04					--

Total Risk Across All Media **3.27E-04**

Total Hazard Index Across All Media --

For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04

TABLE 9.15.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 HANGAR AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	1.07E-06	--	9.19E-07	--	1.99E-06	N/A	--	--	--	--
			Benzo(a)pyrene	8.16E-06	--	7.00E-06	--	1.52E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.07E-06	--	9.19E-07	--	1.99E-06	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.48E-06	--	1.27E-06	--	2.75E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	5.10E-07	--	4.38E-07	--	9.48E-07	N/A	--	--	--	--
			(Total)	1.23E-05	--	1.05E-05		2.28E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						2.28E-05					--
	Exposure Medium Total							2.28E-05					--
Soil Total								2.28E-05					--
Receptor Total								2.28E-05					--

Total Risk Across All Media 2.28E-05

Total Hazard Index Across All Media --

TABLE 9.16.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT CONSTRUCTION WORKER EXPOSURE TO SITE 3 HANGAR AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	7.35E-08	--	1.91E-08	--	9.27E-08	N/A	--	--	--	--
			Benzo(a)pyrene	5.60E-07	--	1.46E-07	--	7.06E-07	N/A	--	--	--	--
			Benzo(b)fluoranthene	7.35E-08	--	1.91E-08	--	9.27E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.02E-07	--	2.64E-08	--	1.28E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.50E-08	--	9.11E-09	--	4.41E-08	N/A	--	--	--	--
			(Total)	8.44E-07	--	2.19E-07		1.06E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.06E-06					--
	Exposure Medium Total							1.06E-06					--
Soil Total								1.06E-06					--
Receptor Total								1.06E-06					--

Total Risk Across All Media 1.06E-06

Total Hazard Index Across All Media --

TABLE 9.17.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	5.32E-06	--	1.94E-06	--	7.26E-06	N/A	--	--	--	--
			Benzo(a)pyrene	4.06E-05	--	1.48E-05	--	5.53E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	5.32E-06	--	1.94E-06	--	7.26E-06	N/A	--	--	--	--
			Dibenz(a,h)anthracene	7.35E-06	--	2.68E-06	--	1.00E-05	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.54E-06	--	9.23E-07	--	3.46E-06	N/A	--	--	--	--
			(Total)	6.11E-05	--	2.22E-05		8.34E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						8.34E-05					--
	Exposure Medium Total							8.34E-05					--
Soil Total								8.34E-05					--
Receptor Total								8.34E-05					--

Total Risk Across All Media 8.34E-05

Total Hazard Index Across All Media --

TABLE 9.18.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	7.84E-07	--	4.07E-07	--	1.19E-06	N/A	--	--	--	--
			Benzo(a)pyrene	5.98E-06	--	3.10E-06	--	9.08E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	7.84E-07	--	4.07E-07	--	1.19E-06	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.08E-06	--	5.62E-07	--	1.65E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.74E-07	--	1.94E-07	--	5.67E-07	N/A	--	--	--	--
			(Total)	9.00E-06	--	4.67E-06		1.37E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.37E-05					--
	Exposure Medium Total							1.37E-05					--
Soil Total								1.37E-05					--
Receptor Total								1.37E-05					--

Total Risk Across All Media 1.37E-05

Total Hazard Index Across All Media --

TABLE 9.19.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 HANGAR AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	6.11E-06	--	2.35E-06	--	8.45E-06	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	4.65E-05	--	1.79E-05	--	6.44E-05	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	6.11E-06	--	2.35E-06	--	8.45E-06	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	8.44E-06	--	3.24E-06	--	1.17E-05	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	2.91E-06	--	1.12E-06	--	4.03E-06	N/A	N/A	--	N/A	--
			(Total)	7.01E-05	--	2.69E-05		9.70E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						9.70E-05					--
	Exposure Medium Total							9.70E-05					--
Soil Total								9.70E-05					--
Receptor Total								9.70E-05					--

Total Risk Across All Media 9.70E-05

Total Hazard Index Across All Media --

TABLE 9.20.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	1.80E-06	--	1.51E-07	--	1.95E-06	CNS (Behavioral)	1.61E-01	--	1.35E-02	1.75E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	2.10E-01	--	5.87E-03	2.16E-01
			Antimony	--	--	--	--	--	Blood/Liver	4.25E-02	--	7.94E-03	5.04E-02
			Arsenic	8.79E-06	--	7.39E-07	--	9.53E-06	Skin/Vascular	2.28E-01	--	1.92E-02	2.47E-01
			Cadmium	--	--	--	--	--	Kidney	3.59E-02	--	4.02E-03	4.00E-02
			Chromium	6.25E-05	--	7.00E-05	--	1.33E-04	Fetotoxicity/GI Tract/Bone	9.12E-02	--	1.02E-01	1.93E-01
			Cobalt	--	--	--	--	--		3.73E-01	--	1.05E-02	3.84E-01
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	3.96E-01	--	1.11E-02	4.07E-01
			Manganese	--	--	--	--	--	CNS	3.61E-01	--	2.53E-01	6.14E-01
			Vanadium	--	--	--	--	--		8.08E-02	--	8.70E-02	1.68E-01
			Dieldrin	2.42E-06	--	6.78E-07	--	3.10E-06	Liver	3.53E-02	--	9.88E-03	4.52E-02
			Benz(a)anthracene	2.39E-05	--	8.70E-06	--	3.26E-05	N/A	--	--	--	--
			Benzo(a)pyrene	1.80E-04	--	6.54E-05	--	2.45E-04	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.98E-05	--	7.21E-06	--	2.70E-05	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.29E-06	--	4.69E-07	--	1.76E-06	N/A	--	--	--	--
			Chrysene	2.00E-07	--	7.28E-08	--	2.73E-07	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.15E-05	--	4.19E-06	--	1.57E-05	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8.11E-06	--	2.95E-06	--	1.11E-05	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	3.56E-04	--	1.30E-04	4.86E-04
			Phenanthrene	--	--	--	--	--	Kidney	7.63E-03	--	2.78E-03	1.04E-02
			(Total)	3.20E-04	--	1.61E-04		4.81E-04		2.02E+00	--	5.27E-01	2.55E+00
			Radionuclide Total										
		Exposure Point Total						4.81E-04					2.55E+00
	Exposure Medium Total							4.81E-04					2.55E+00
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	1.65E-07	--	--	1.65E-07	Respiratory	--	1.88E-02	--	1.88E-02
			(Total)	--	1.65E-07	--		1.65E-07		--	1.88E-02	--	1.88E-02
			Radionuclide Total										
		Exposure Point Total						1.65E-07					1.88E-02
	Exposure Medium Total							1.65E-07					1.88E-02

TABLE 9.20.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.74E-08	--	--	1.74E-08	Lung/Nasal	--	3.17E-05	--	3.17E-05
			(Total)	--	1.74E-08	--		1.74E-08		--	3.17E-05	--	3.17E-05
			Radionuclide Total										
		Exposure Point Total						1.74E-08					3.17E-05
	Exposure Medium Total							1.74E-08					3.17E-05
Surface Soil Total								4.81E-04					2.57E+00
Receptor Total								4.81E-04					2.57E+00

Total Risk Across All Media: 4.81E-04

Total Hazard Index Across All Media: 2.57E+00

Total Blood HI =	4.58E-01
Total Bone HI =	1.93E-01
Total CNS HI =	1.00E+00
Total CNS (Behavioral) HI =	1.75E-01
Total CNS (Developmental) HI =	2.16E-01
Total Decr. Wt. Gain HI =	4.86E-04
Total Fetotoxicity HI =	1.93E-01
Total GI Tract HI =	6.01E-01
Total Kidney HI =	5.04E-02
Total Liver HI =	5.03E-01
Total Lung HI =	3.17E-05
Total Nasal HI =	3.17E-05
Total Respiratory HI =	1.88E-02
Total Skin HI =	2.47E-01
Total Vascular HI =	2.47E-01

TABLE 9.20a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil	Total 2,3,7,8-TCDD Equiv.	1.80E-06	--	1.51E-07	--	1.95E-06	CNS (Behavioral)	1.61E-01	--	1.35E-02	1.75E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	2.10E-01	--	5.87E-03	2.16E-01
			Antimony	--	--	--	--	--	Blood/Liver	4.25E-02	--	7.94E-03	5.04E-02
			Cadmium	--	--	--	--	--	Kidney	3.59E-02	--	4.02E-03	4.00E-02
			Chromium	6.25E-05	--	7.00E-05	--	1.33E-04	Fetotoxicity/GI Tract/Bone	9.12E-02	--	1.02E-01	1.93E-01
			Cobalt	--	--	--	--	--		3.73E-01	--	1.05E-02	3.84E-01
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	3.96E-01	--	1.11E-02	4.07E-01
			Vanadium	--	--	--	--	--		8.08E-02	--	8.70E-02	1.68E-01
			Dieldrin	2.42E-06	--	6.78E-07	--	3.10E-06	Liver	3.53E-02	--	9.88E-03	4.52E-02
			Benz(a)anthracene	2.39E-05	--	8.70E-06	--	3.26E-05	N/A	--	--	--	--
			Benzo(a)pyrene	1.80E-04	--	6.54E-05	--	2.45E-04	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.98E-05	--	7.21E-06	--	2.70E-05	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.29E-06	--	4.69E-07	--	1.76E-06	N/A	--	--	--	--
			Chrysene	2.00E-07	--	7.28E-08	--	2.73E-07	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.15E-05	--	4.19E-06	--	1.57E-05	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8.11E-06	--	2.95E-06	--	1.11E-05	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	3.56E-04	--	1.30E-04	4.86E-04
			Phenanthrene	--	--	--	--	--	Kidney	7.63E-03	--	2.78E-03	1.04E-02
			(Total)	3.11E-04	--	1.60E-04		4.71E-04		1.43E+00	--	2.55E-01	1.69E+00
			Radionuclide Total										
		Exposure Point Total						4.71E-04					1.69E+00
	Exposure Medium Total							4.71E-04					1.69E+00
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	1.65E-07	--	--	1.65E-07	Respiratory	--	1.88E-02	--	1.88E-02
			(Total)	--	1.65E-07	--		1.65E-07		--	1.88E-02	--	1.88E-02
			Radionuclide Total										
		Exposure Point Total						1.65E-07					1.88E-02
	Exposure Medium Total							1.65E-07					1.88E-02

TABLE 9.20a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.74E-08	--	--	1.74E-08	Lung/Nasal	--	3.17E-05	--	3.17E-05
			(Total)	--	1.74E-08	--		1.74E-08		--	3.17E-05	--	3.17E-05
			Radionuclide Total										
		Exposure Point Total						1.74E-08					3.17E-05
	Exposure Medium Total							1.74E-08					3.17E-05
Surface Soil Total								4.71E-04					1.71E+00
Receptor Total								4.71E-04					1.71E+00

Total Risk Across All Media: 4.71E-04

Total Hazard Index Across All Media: 1.71E+00

Total Blood HI =	4.58E-01
Total Bone HI =	1.93E-01
Total CNS (Behavioral) HI =	1.75E-01
Total CNS (Developmental) HI =	2.16E-01
Total Decr. Wt. Gain HI =	4.86E-04
Total Fetotoxicity HI =	1.93E-01
Total GI Tract HI =	6.01E-01
Total Kidney HI =	5.04E-02
Total Liver HI =	5.03E-01
Total Lung HI =	3.17E-05
Total Nasal HI =	3.17E-05
Total Respiratory HI =	1.88E-02

TABLE 9.21.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil	Total 2,3,7,8-TCDD Equiv.	7.69E-07	--	9.21E-08	--	8.61E-07	CNS (Behavioral)	1.73E-02	--	2.07E-03	1.93E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	2.25E-02	--	8.96E-04	2.34E-02
			Antimony	--	--	--	--	--	Blood/Liver	4.55E-03	--	1.21E-03	5.77E-03
			Arsenic	3.77E-06	--	4.51E-07	--	4.22E-06	Skin/Vascular	2.44E-02	--	2.92E-03	2.74E-02
			Cadmium	--	--	--	--	--	Kidney	3.85E-03	--	6.14E-04	4.46E-03
			Chromium	9.21E-06	--	1.47E-05	--	2.39E-05	Fetotoxicity/GI Tract/Bone	9.77E-03	--	1.56E-02	2.54E-02
			Cobalt	--	--	--	--	--		4.00E-02	--	1.60E-03	4.16E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	4.25E-02	--	1.69E-03	4.42E-02
			Manganese	--	--	--	--	--	CNS	3.87E-02	--	3.86E-02	7.73E-02
			Vanadium	--	--	--	--	--		8.66E-03	--	1.33E-02	2.19E-02
			Dieldrin	1.04E-06	--	4.14E-07	--	1.45E-06	Liver	3.78E-03	--	1.51E-03	5.29E-03
			Benz(a)anthracene	3.52E-06	--	1.83E-06	--	5.35E-06	N/A	--	--	--	--
			Benzo(a)pyrene	2.65E-05	--	1.37E-05	--	4.02E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.92E-06	--	1.51E-06	--	4.43E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.90E-07	--	9.85E-08	--	2.88E-07	N/A	--	--	--	--
			Chrysene	2.95E-08	--	1.53E-08	--	4.48E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.70E-06	--	8.80E-07	--	2.58E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.19E-06	--	6.19E-07	--	1.81E-06	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	3.82E-05	--	1.98E-05	5.79E-05
			Phenanthrene	--	--	--	--	--	Kidney	8.17E-04	--	4.24E-04	1.24E-03
			(Total)	5.08E-05	--	3.43E-05		8.51E-05		2.17E-01	--	8.04E-02	2.97E-01
			Radionuclide Total										
		Exposure Point Total						8.51E-05					2.97E-01
	Exposure Medium Total							8.51E-05					2.97E-01
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	6.58E-07	--	--	6.58E-07	Respiratory	--	1.88E-02	--	1.88E-02
			(Total)	--	6.58E-07	--		6.58E-07		--	1.88E-02	--	1.88E-02
			Radionuclide Total										
		Exposure Point Total						6.58E-07					1.88E-02
	Exposure Medium Total							6.58E-07					1.88E-02

TABLE 9.21.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	2.39E-08	--	--	2.39E-08	Lung/Nasal	--	3.17E-05	--	3.17E-05
			(Total)	--	2.39E-08	--		2.39E-08		--	3.17E-05	--	3.17E-05
			Radionuclide Total										
		Exposure Point Total						2.39E-08					3.17E-05
	Exposure Medium Total							2.39E-08					3.17E-05
Surface Soil Total								8.58E-05					3.16E-01
Receptor Total								8.58E-05					3.16E-01

Total Risk Across All Media	8.58E-05
Total Hazard Index Across All Media	3.16E-01

Total Blood HI =	4.99E-02
Total Bone HI =	2.54E-02
Total CNS HI =	1.20E-01
Total CNS (Behavioral) HI =	1.93E-02
Total CNS (Developmental) HI =	2.34E-02
Total Decr. Wt. Gain HI =	5.79E-05
Total Fetotoxicity HI =	2.54E-02
Total GI Tract HI =	6.95E-02
Total Kidney HI =	5.70E-03
Total Liver HI =	5.52E-02
Total Lung HI =	3.17E-05
Total Nasal HI =	3.17E-05
Total Respiratory HI =	1.88E-02
Total Skin HI =	2.74E-02
Total Vascular HI =	2.74E-02

TABLE 9.21a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	7.69E-07	--	9.21E-08	--	8.61E-07	CNS (Behavioral)	1.73E-02	--	2.07E-03	1.93E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	2.25E-02	--	8.96E-04	2.34E-02
			Antimony	--	--	--	--	--	Blood/Liver	4.55E-03	--	1.21E-03	5.77E-03
			Cadmium	--	--	--	--	--	Kidney	3.85E-03	--	6.14E-04	4.46E-03
			Chromium	9.21E-06	--	1.47E-05	--	2.39E-05	Fetotoxicity/GI Tract/Bone	9.77E-03	--	1.56E-02	2.54E-02
			Cobalt	--	--	--	--	--		4.00E-02	--	1.60E-03	4.16E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	4.25E-02	--	1.69E-03	4.42E-02
			Vanadium	--	--	--	--	--		8.66E-03	--	1.33E-02	2.19E-02
			Dieldrin	1.04E-06	--	4.14E-07	--	1.45E-06	Liver	3.78E-03	--	1.51E-03	5.29E-03
			Benz(a)anthracene	3.52E-06	--	1.83E-06	--	5.35E-06	N/A	--	--	--	--
			Benzo(a)pyrene	2.65E-05	--	1.37E-05	--	4.02E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.92E-06	--	1.51E-06	--	4.43E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.90E-07	--	9.85E-08	--	2.88E-07	N/A	--	--	--	--
			Chrysene	2.95E-08	--	1.53E-08	--	4.48E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.70E-06	--	8.80E-07	--	2.58E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.19E-06	--	6.19E-07	--	1.81E-06	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	3.82E-05	--	1.98E-05	5.79E-05
			Phenanthrene	--	--	--	--	--	Kidney	8.17E-04	--	4.24E-04	1.24E-03
			(Total)	4.70E-05	--	3.39E-05		8.09E-05		1.54E-01	--	3.89E-02	1.93E-01
			Radionuclide Total										
		Exposure Point Total						8.09E-05					1.93E-01
	Exposure Medium Total							8.09E-05					1.93E-01
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	6.58E-07	--	--	6.58E-07	Respiratory	--	1.88E-02	--	1.88E-02
			(Total)	--	6.58E-07	--		6.58E-07		--	1.88E-02	--	1.88E-02
			Radionuclide Total										
		Exposure Point Total						6.58E-07					1.88E-02
	Exposure Medium Total							6.58E-07					1.88E-02

TABLE 9.21a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	2.39E-08	--	--	2.39E-08	Lung/Nasal	--	3.17E-05	--	3.17E-05
			(Total)	--	2.39E-08	--		2.39E-08		--	3.17E-05	--	3.17E-05
			Radionuclide Total										
		Exposure Point Total						2.39E-08					3.17E-05
	Exposure Medium Total							2.39E-08					3.17E-05
Surface Soil Total								8.16E-05					2.12E-01
Receptor Total								8.16E-05					2.12E-01

Total Risk Across All Media: 8.16E-05

Total Hazard Index Across All Media: 2.12E-01

Total Blood HI =	4.99E-02
Total Bone HI =	2.54E-02
Total CNS (Behavioral) HI =	1.93E-02
Total CNS (Developmental) HI =	2.34E-02
Total Decr. Wt. Gain HI =	5.79E-05
Total Fetotoxicity HI =	2.54E-02
Total GI Tract HI =	6.95E-02
Total Kidney HI =	5.70E-03
Total Liver HI =	5.52E-02
Total Lung HI =	3.17E-05
Total Nasal HI =	3.17E-05
Total Respiratory HI =	1.88E-02

TABLE 9.22.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	**2.56E-06**	**--**	**2.43E-07**	**--**	**2.81E-06**	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Arsenic	**1.26E-05**	**--**	**1.19E-06**	**--**	**1.38E-05**	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	**7.18E-05**	**--**	**8.47E-05**	**--**	**1.57E-04**	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Dieldrin	**3.46E-06**	**--**	**1.09E-06**	**--**	**4.55E-06**	N/A	N/A	--	N/A	--
			Benz(a)anthracene	**2.74E-05**	**--**	**1.05E-05**	**--**	**3.79E-05**	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	**2.06E-04**	**--**	**7.91E-05**	**--**	**2.85E-04**	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	**2.27E-05**	**--**	**8.72E-06**	**--**	**3.14E-05**	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	**1.48E-06**	**--**	**5.67E-07**	**--**	**2.05E-06**	N/A	N/A	--	N/A	--
			Chrysene	2.30E-07	--	8.81E-08	--	3.18E-07	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	**1.32E-05**	**--**	**5.07E-06**	**--**	**1.83E-05**	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	**9.30E-06**	**--**	**3.57E-06**	**--**	**1.29E-05**	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			(Total)	3.71E-04	--	1.95E-04		5.66E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						5.66E-04					--
	Exposure Medium Total							5.66E-04					--
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil							N/A	N/A	--	N/A	--
			Naphthalene	--	8.23E-07	--	--	8.23E-07	N/A	N/A	--	N/A	--
			(Total)	--	8.23E-07	--		8.23E-07	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						8.23E-07					--
	Exposure Medium Total							8.23E-07					--

TABLE 9.22.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	4.13E-08	--	--	4.13E-08	N/A	N/A	--	N/A	--
			(Total)	--	4.13E-08	--		4.13E-08	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						4.13E-08					--
	Exposure Medium Total							4.13E-08					--
Surface Soil Total								5.67E-04					--
Receptor Total								5.67E-04					--

Total Risk Across All Media **5.67E-04**

Total Hazard Index Across All Media --

For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04

TABLE 9.22a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	**2.56E-06**	**--**	**2.43E-07**	**--**	**2.81E-06**	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	**7.18E-05**	**--**	**8.47E-05**	**--**	**1.57E-04**	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Dieldrin	**3.46E-06**	**--**	**1.09E-06**	**--**	**4.55E-06**	N/A	N/A	--	N/A	--
			Benz(a)anthracene	**2.74E-05**	**--**	**1.05E-05**	**--**	**3.79E-05**	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	**2.06E-04**	**--**	**7.91E-05**	**--**	**2.85E-04**	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	**2.27E-05**	**--**	**8.72E-06**	**--**	**3.14E-05**	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	**1.48E-06**	**--**	**5.67E-07**	**--**	**2.05E-06**	N/A	N/A	--	N/A	--
			Chrysene	2.30E-07	--	8.81E-08	--	3.18E-07	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	**1.32E-05**	**--**	**5.07E-06**	**--**	**1.83E-05**	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	**9.30E-06**	**--**	**3.57E-06**	**--**	**1.29E-05**	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			(Total)	3.58E-04	--	1.94E-04		5.52E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						5.52E-04					--
	Exposure Medium Total							5.52E-04					--
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil							N/A	N/A	--	N/A	--
			Naphthalene	--	8.23E-07	--	--	8.23E-07	N/A	N/A	--	N/A	--
			(Total)	--	8.23E-07	--		8.23E-07	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						8.23E-07					--
	Exposure Medium Total							8.23E-07					--

TABLE 9.22a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	4.13E-08	--	--	4.13E-08	N/A	N/A	--	N/A	--
			(Total)	--	4.13E-08	--		4.13E-08	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						4.13E-08					--
	Exposure Medium Total							4.13E-08					--
Surface Soil Total								5.53E-04					--
Receptor Total								5.53E-04					--

Total Risk Across All Media **5.53E-04**

Total Hazard Index Across All Media --

For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04

TABLE 9.23.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil	Total 2,3,7,8-TCDD Equiv.	5.72E-07	--	1.13E-07	--	6.86E-07	CNS (Behavioral)	1.23E-02	--	2.44E-03	1.48E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	1.60E-02	--	1.06E-03	1.71E-02
			Antimony	--	--	--	--	--	Blood/Liver	3.25E-03	--	1.43E-03	4.68E-03
			Arsenic	2.80E-06	--	5.55E-07	--	3.36E-06	Skin/Vascular	1.74E-02	--	3.45E-03	2.09E-02
			Cadmium	--	--	--	--	--	Kidney	2.75E-03	--	7.26E-04	3.48E-03
			Chromium	3.74E-06	--	9.87E-06	--	1.36E-05	Fetotoxicity/GI Tract/Bone	6.98E-03	--	1.84E-02	2.54E-02
			Cobalt	--	--	--	--	--		2.86E-02	--	1.89E-03	3.05E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	3.03E-02	--	2.00E-03	3.23E-02
			Manganese	--	--	--	--	--	CNS	2.76E-02	--	4.56E-02	7.33E-02
			Vanadium	--	--	--	--	--		6.18E-03	--	1.57E-02	2.19E-02
			Dieldrin	7.72E-07	--	5.09E-07	--	1.28E-06	Liver	2.70E-03	--	1.78E-03	4.48E-03
			Benz(a)anthracene	1.43E-06	--	1.23E-06	--	2.65E-06	N/A	--	--	--	--
			Benzo(a)pyrene	1.07E-05	--	9.21E-06	--	2.00E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.18E-06	--	1.02E-06	--	2.20E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	7.70E-08	--	6.61E-08	--	1.43E-07	N/A	--	--	--	--
			Chrysene	1.20E-08	--	1.03E-08	--	2.22E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	6.89E-07	--	5.91E-07	--	1.28E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	4.85E-07	--	4.16E-07	--	9.01E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	2.73E-05	--	2.34E-05	5.06E-05
			Phenanthrene	--	--	--	--	--	Kidney	5.84E-04	--	5.01E-04	1.08E-03
			(Total)	2.25E-05	--	2.36E-05		4.61E-05		1.55E-01	--	9.50E-02	2.50E-01
			Radionuclide Total										
		Exposure Point Total						4.61E-05					2.50E-01
	Exposure Medium Total							4.61E-05					2.50E-01
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	3.26E-07	--	--	3.26E-07	Respiratory	--	8.96E-03	--	8.96E-03
			(Total)	--	3.26E-07	--		3.26E-07		--	8.96E-03	--	8.96E-03
			Radionuclide Total										
		Exposure Point Total						3.26E-07					8.96E-03
	Exposure Medium Total							3.26E-07					8.96E-03

TABLE 9.23.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	6.47E-09	--	--	6.47E-09	Lung/Nasal	--	1.51E-05	--	1.51E-05
			(Total)	--	6.47E-09	--		6.47E-09		--	1.51E-05	--	1.51E-05
			Radionuclide Total										
		Exposure Point Total						6.47E-09					1.51E-05
	Exposure Medium Total							6.47E-09					1.51E-05
Surface Soil Total								4.64E-05					2.59E-01
Receptor Total								4.64E-05					2.59E-01

Total Risk Across All Media: 4.64E-05

Total Hazard Index Across All Media: 2.59E-01

Total Blood HI =	3.70E-02
Total Bone HI =	2.54E-02
Total CNS HI =	1.05E-01
Total CNS (Behavioral) HI =	1.48E-02
Total CNS (Developmental) HI =	1.71E-02
Total Decr. Wt. Gain HI =	5.06E-05
Total Fetotoxicity HI =	2.54E-02
Total GI Tract HI =	5.77E-02
Total Kidney HI =	4.56E-03
Total Liver HI =	4.15E-02
Total Lung HI =	1.51E-05
Total Nasal HI =	1.51E-05
Total Respiratory HI =	8.96E-03
Total Skin HI =	2.09E-02
Total Vascular HI =	2.09E-02

TABLE 9.23a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	5.72E-07	--	1.13E-07	--	6.86E-07	CNS (Behavioral)	1.23E-02	--	2.44E-03	1.48E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	1.60E-02	--	1.06E-03	1.71E-02
			Antimony	--	--	--	--	--	Blood/Liver	3.25E-03	--	1.43E-03	4.68E-03
			Cadmium	--	--	--	--	--	Kidney	2.75E-03	--	7.26E-04	3.48E-03
			Chromium	3.74E-06	--	9.87E-06	--	1.36E-05	Fetotoxicity/GI Tract/Bone	6.98E-03	--	1.84E-02	2.54E-02
			Cobalt	--	--	--	--	--		2.86E-02	--	1.89E-03	3.05E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	3.03E-02	--	2.00E-03	3.23E-02
			Vanadium	--	--	--	--	--		6.18E-03	--	1.57E-02	2.19E-02
			Dieldrin	7.72E-07	--	5.09E-07	--	1.28E-06	Liver	2.70E-03	--	1.78E-03	4.48E-03
			Benz(a)anthracene	1.43E-06	--	1.23E-06	--	2.65E-06	N/A	--	--	--	--
			Benzo(a)pyrene	1.07E-05	--	9.21E-06	--	2.00E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.18E-06	--	1.02E-06	--	2.20E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	7.70E-08	--	6.61E-08	--	1.43E-07	N/A	--	--	--	--
			Chrysene	1.20E-08	--	1.03E-08	--	2.22E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	6.89E-07	--	5.91E-07	--	1.28E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	4.85E-07	--	4.16E-07	--	9.01E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	2.73E-05	--	2.34E-05	5.06E-05
			Phenanthrene	--	--	--	--	--	Kidney	5.84E-04	--	5.01E-04	1.08E-03
			(Total)	1.97E-05	--	2.30E-05		4.27E-05		1.10E-01	--	4.60E-02	1.56E-01
			Radionuclide Total										
		Exposure Point Total						4.27E-05					1.56E-01
	Exposure Medium Total							4.27E-05					1.56E-01
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	3.26E-07	--	--	3.26E-07	Respiratory	--	8.96E-03	--	8.96E-03
			(Total)	--	3.26E-07	--		3.26E-07		--	8.96E-03	--	8.96E-03
			Radionuclide Total										
		Exposure Point Total						3.26E-07					8.96E-03
	Exposure Medium Total							3.26E-07					8.96E-03

TABLE 9.23a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	6.47E-09	--	--	6.47E-09	Lung/Nasal	--	1.51E-05	--	1.51E-05
			(Total)	--	6.47E-09	--		6.47E-09		--	1.51E-05	--	1.51E-05
			Radionuclide Total										
		Exposure Point Total						6.47E-09					1.51E-05
	Exposure Medium Total							6.47E-09					1.51E-05
Surface Soil Total								4.31E-05					1.65E-01
Receptor Total								4.31E-05					1.65E-01

Total Risk Across All Media: 4.31E-05

Total Hazard Index Across All Media: 1.65E-01

Total Blood HI =	3.70E-02
Total Bone HI =	2.54E-02
Total CNS (Behavioral) HI =	1.48E-02
Total CNS (Developmental) HI =	1.71E-02
Total Decr. Wt. Gain HI =	5.06E-05
Total Fetotoxicity HI =	2.54E-02
Total GI Tract HI =	5.77E-02
Total Kidney HI =	4.56E-03
Total Liver HI =	4.15E-02
Total Lung HI =	1.51E-05
Total Nasal HI =	1.51E-05
Total Respiratory HI =	8.96E-03

TABLE 9.24.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	5.33E-07	--	4.48E-08	--	5.78E-07	CNS (Behavioral)	4.79E-02	--	4.02E-03	5.19E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	6.23E-02	--	1.74E-03	6.40E-02
			Antimony	--	--	--	--	--	Blood/Liver	1.26E-02	--	2.36E-03	1.50E-02
			Arsenic	2.61E-06	--	2.20E-07	--	2.83E-06	Skin/Vascular	6.78E-02	--	5.69E-03	7.34E-02
			Cadmium	--	--	--	--	--	Kidney	1.07E-02	--	1.20E-03	1.19E-02
			Chromium	1.86E-05	--	2.08E-05	--	3.94E-05	Fetotoxicity/GI Tract/Bone	2.71E-02	--	3.04E-02	5.75E-02
			Cobalt	--	--	--	--	--		1.11E-01	--	3.11E-03	1.14E-01
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.18E-01	--	3.30E-03	1.21E-01
			Manganese	--	--	--	--	--	CNS	1.07E-01	--	7.51E-02	1.82E-01
			Vanadium	--	--	--	--	--		2.40E-02	--	2.59E-02	4.99E-02
			Dieldrin	7.19E-07	--	2.01E-07	--	9.20E-07	Liver	1.05E-02	--	2.94E-03	1.34E-02
			Benz(a)anthracene	7.10E-06	--	2.58E-06	--	9.68E-06	N/A	--	--	--	--
			Benzo(a)pyrene	5.34E-05	--	1.94E-05	--	7.28E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	5.88E-06	--	2.14E-06	--	8.02E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	3.83E-07	--	1.39E-07	--	5.22E-07	N/A	--	--	--	--
			Chrysene	5.95E-08	--	2.16E-08	--	8.11E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	3.42E-06	--	1.25E-06	--	4.67E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.41E-06	--	8.77E-07	--	3.29E-06	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.06E-04	--	3.85E-05	1.44E-04
			Phenanthrene	--	--	--	--	--	Kidney	2.27E-03	--	8.25E-04	3.09E-03
			(Total)	9.51E-05	--	4.77E-05		1.43E-04		6.01E-01	--	1.57E-01	7.58E-01
			Radionuclide Total										
		Exposure Point Total						1.43E-04					7.58E-01
	Exposure Medium Total							1.43E-04					7.58E-01
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	1.22E-08	--	--	1.22E-08	Respiratory	--	1.40E-03	--	1.40E-03
			(Total)	--	1.22E-08	--		1.22E-08		--	1.40E-03	--	1.40E-03
			Radionuclide Total										
		Exposure Point Total						1.22E-08					1.40E-03
	Exposure Medium Total							1.22E-08					1.40E-03

TABLE 9.24.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.29E-09	--	--	1.29E-09	Lung/Nasal	--	2.36E-06	--	2.36E-06
			(Total)	--	1.29E-09	--		1.29E-09		--	2.36E-06	--	2.36E-06
			Radionuclide Total										
		Exposure Point Total						1.29E-09					2.36E-06
	Exposure Medium Total							1.29E-09					2.36E-06
Surface Soil Total								1.43E-04					7.59E-01
Receptor Total								1.43E-04					7.59E-01

Total Risk Across All Media: 1.43E-04

Total Hazard Index Across All Media: 7.59E-01

Total Blood HI =	1.36E-01
Total Bone HI =	5.75E-02
Total CNS HI =	2.98E-01
Total CNS (Behavioral) HI =	5.19E-02
Total CNS (Developmental) HI =	6.40E-02
Total Decr. Wt. Gain HI =	1.44E-04
Total Fetotoxicity HI =	5.75E-02
Total GI Tract HI =	1.79E-01
Total Kidney HI =	1.50E-02

TABLE 9.24a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	5.33E-07	--	4.48E-08	--	5.78E-07	CNS (Behavioral)	4.79E-02	--	4.02E-03	5.19E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	6.23E-02	--	1.74E-03	6.40E-02
			Antimony	--	--	--	--	--	Blood/Liver	1.26E-02	--	2.36E-03	1.50E-02
			Cadmium	--	--	--	--	--	Kidney	1.07E-02	--	1.20E-03	1.19E-02
			Chromium	1.86E-05	--	2.08E-05	--	3.94E-05	Fetotoxicity/GI Tract/Bone	2.71E-02	--	3.04E-02	5.75E-02
			Cobalt	--	--	--	--	--		1.11E-01	--	3.11E-03	1.14E-01
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.18E-01	--	3.30E-03	1.21E-01
			Vanadium	--	--	--	--	--		2.40E-02	--	2.59E-02	4.99E-02
			Dieldrin	7.19E-07	--	2.01E-07	--	9.20E-07	Liver	1.05E-02	--	2.94E-03	1.34E-02
			Benz(a)anthracene	7.10E-06	--	2.58E-06	--	9.68E-06	N/A	--	--	--	--
			Benzo(a)pyrene	5.34E-05	--	1.94E-05	--	7.28E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	5.88E-06	--	2.14E-06	--	8.02E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	3.83E-07	--	1.39E-07	--	5.22E-07	N/A	--	--	--	--
			Chrysene	5.95E-08	--	2.16E-08	--	8.11E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	3.42E-06	--	1.25E-06	--	4.67E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.41E-06	--	8.77E-07	--	3.29E-06	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.06E-04	--	3.85E-05	1.44E-04
			Phenanthrene	--	--	--	--	--	Kidney	2.27E-03	--	8.25E-04	3.09E-03
			(Total)	9.25E-05	--	4.75E-05		1.40E-04		4.26E-01	--	7.57E-02	5.02E-01
			Radionuclide Total										
		Exposure Point Total						1.40E-04					5.02E-01
	Exposure Medium Total							1.40E-04					5.02E-01
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	1.22E-08	--	--	1.22E-08	Respiratory	--	1.40E-03	--	1.40E-03
			(Total)	--	1.22E-08	--		1.22E-08		--	1.40E-03	--	1.40E-03
			Radionuclide Total										
		Exposure Point Total						1.22E-08					1.40E-03
	Exposure Medium Total							1.22E-08					1.40E-03

TABLE 9.24a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.29E-09	--	--	1.29E-09	Lung/Nasal	--	2.36E-06	--	2.36E-06
			(Total)	--	1.29E-09	--		1.29E-09		--	2.36E-06	--	2.36E-06
			Radionuclide Total										
		Exposure Point Total						1.29E-09					2.36E-06
	Exposure Medium Total							1.29E-09					2.36E-06
Surface Soil Total								1.40E-04					5.03E-01
Receptor Total								1.40E-04					5.03E-01

Total Risk Across All Media: 1.40E-04

Total Hazard Index Across All Media: 5.03E-01

Total Blood HI =	1.36E-01
Total Bone HI =	5.75E-02
Total CNS (Behavioral) HI =	5.19E-02
Total CNS (Developmental) HI =	6.40E-02
Total Decr. Wt. Gain HI =	1.44E-04
Total Fetotoxicity HI =	5.75E-02
Total GI Tract HI =	1.79E-01
Total Kidney HI =	1.50E-02
Total Liver HI =	1.49E-01
Total Lung HI =	2.36E-06
Total Nasal HI =	2.36E-06
Total Respiratory HI =	1.40E-03

TABLE 9.25.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil	Total 2,3,7,8-TCDD Equiv.	2.29E-07	--	2.74E-08	--	2.56E-07	CNS (Behavioral)	5.13E-03	--	6.14E-04	5.74E-03
			Aluminum	--	--	--	--	--	CNS (Developmental)	6.68E-03	--	2.66E-04	6.94E-03
			Antimony	--	--	--	--	--	Blood/Liver	1.35E-03	--	3.60E-04	1.71E-03
			Arsenic	1.12E-06	--	1.34E-07	--	1.25E-06	Skin/Vascular	7.26E-03	--	8.69E-04	8.13E-03
			Cadmium	--	--	--	--	--	Kidney	1.14E-03	--	1.83E-04	1.33E-03
			Chromium	2.74E-06	--	4.37E-06	--	7.11E-06	Fetotoxicity/GI Tract/Bone	2.90E-03	--	4.63E-03	7.54E-03
			Cobalt	--	--	--	--	--		1.19E-02	--	4.74E-04	1.24E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.26E-02	--	5.03E-04	1.31E-02
			Manganese	--	--	--	--	--	CNS	1.15E-02	--	1.15E-02	2.30E-02
			Vanadium	--	--	--	--	--		2.57E-03	--	3.95E-03	6.52E-03
			Dieldrin	3.08E-07	--	1.23E-07	--	4.31E-07	Liver	1.12E-03	--	4.48E-04	1.57E-03
			Benz(a)anthracene	1.05E-06	--	5.43E-07	--	1.59E-06	N/A	--	--	--	--
			Benzo(a)pyrene	7.86E-06	--	4.08E-06	--	1.19E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	8.67E-07	--	4.50E-07	--	1.32E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	5.64E-08	--	2.93E-08	--	8.57E-08	N/A	--	--	--	--
			Chrysene	8.76E-09	--	4.54E-09	--	1.33E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	5.04E-07	--	2.62E-07	--	7.66E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.55E-07	--	1.84E-07	--	5.39E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.13E-05	--	5.88E-06	1.72E-05
			Phenanthrene	--	--	--	--	--	Kidney	2.43E-04	--	1.26E-04	3.69E-04
			(Total)	1.51E-05	--	1.02E-05		2.53E-05		6.44E-02	--	2.39E-02	8.83E-02
			Radionuclide Total										
		Exposure Point Total						2.53E-05					8.83E-02
	Exposure Medium Total							2.53E-05					8.83E-02
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	4.89E-08	--	--	4.89E-08	Respiratory	--	1.40E-03	--	1.40E-03
			(Total)	--	4.89E-08	--		4.89E-08		--	1.40E-03	--	1.40E-03
			Radionuclide Total										
		Exposure Point Total						4.89E-08					1.40E-03
	Exposure Medium Total							4.89E-08					1.40E-03

TABLE 9.25.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.78E-09	--	--	1.78E-09	Lung/Nasal	--	2.36E-06	--	2.36E-06
			(Total)	--	1.78E-09	--		1.78E-09		--	2.36E-06	--	2.36E-06
			Radionuclide Total										
		Exposure Point Total						1.78E-09					2.36E-06
	Exposure Medium Total							1.78E-09					2.36E-06
Surface Soil Total								2.54E-05					8.97E-02
Receptor Total								2.54E-05					8.97E-02

Total Risk Across All Media	2.54E-05
Total Hazard Index Across All Media	8.97E-02

Total Blood HI =	1.48E-02
Total Bone HI =	7.54E-03
Total CNS HI =	3.57E-02
Total CNS (Behavioral) HI =	5.74E-03
Total CNS (Developmental) HI =	6.94E-03
Total Decr. Wt. Gain HI =	1.72E-05
Total Fetotoxicity HI =	7.54E-03
Total GI Tract HI =	2.07E-02
Total Kidney HI =	1.70E-03
Total Liver HI =	1.64E-02
Total Lung HI =	2.36E-06
Total Nasal HI =	2.36E-06
Total Respiratory HI =	1.40E-03
Total Skin HI =	8.13E-03
Total Vascular HI =	8.13E-03

TABLE 9.25a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	2.29E-07	--	2.74E-08	--	2.56E-07	CNS (Behavioral)	5.13E-03	--	6.14E-04	5.74E-03
			Aluminum	--	--	--	--	--	CNS (Developmental)	6.68E-03	--	2.66E-04	6.94E-03
			Antimony	--	--	--	--	--	Blood/Liver	1.35E-03	--	3.60E-04	1.71E-03
			Cadmium	--	--	--	--	--	Kidney	1.14E-03	--	1.83E-04	1.33E-03
			Chromium	2.74E-06	--	4.37E-06	--	7.11E-06	Fetotoxicity/GI Tract/Bone	2.90E-03	--	4.63E-03	7.54E-03
			Cobalt	--	--	--	--	--		1.19E-02	--	4.74E-04	1.24E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.26E-02	--	5.03E-04	1.31E-02
			Vanadium	--	--	--	--	--		2.57E-03	--	3.95E-03	6.52E-03
			Dieldrin	3.08E-07	--	1.23E-07	--	4.31E-07	Liver	1.12E-03	--	4.48E-04	1.57E-03
			Benz(a)anthracene	1.05E-06	--	5.43E-07	--	1.59E-06	N/A	--	--	--	--
			Benzo(a)pyrene	7.86E-06	--	4.08E-06	--	1.19E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	8.67E-07	--	4.50E-07	--	1.32E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	5.64E-08	--	2.93E-08	--	8.57E-08	N/A	--	--	--	--
			Chrysene	8.76E-09	--	4.54E-09	--	1.33E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	5.04E-07	--	2.62E-07	--	7.66E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.55E-07	--	1.84E-07	--	5.39E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.13E-05	--	5.88E-06	1.72E-05
			Phenanthrene	--	--	--	--	--	Kidney	2.43E-04	--	1.26E-04	3.69E-04
			(Total)	1.40E-05	--	1.01E-05		2.40E-05		4.57E-02	--	1.16E-02	5.72E-02
			Radionuclide Total										
		Exposure Point Total						2.40E-05					5.72E-02
	Exposure Medium Total							2.40E-05					5.72E-02
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	4.89E-08	--	--	4.89E-08	Respiratory	--	1.40E-03	--	1.40E-03
			(Total)	--	4.89E-08	--		4.89E-08		--	1.40E-03	--	1.40E-03
			Radionuclide Total										
		Exposure Point Total						4.89E-08					1.40E-03
	Exposure Medium Total							4.89E-08					1.40E-03

TABLE 9.25a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.78E-09	--	--	1.78E-09	Lung/Nasal	--	2.36E-06	--	2.36E-06
			(Total)	--	1.78E-09	--		1.78E-09		--	2.36E-06	--	2.36E-06
			Radionuclide Total										
		Exposure Point Total						1.78E-09					2.36E-06
	Exposure Medium Total							1.78E-09					2.36E-06
Surface Soil Total								2.41E-05					5.86E-02
Receptor Total								2.41E-05					5.86E-02

Total Risk Across All Media: 2.41E-05

Total Hazard Index Across All Media: 5.86E-02

Total Blood HI =	1.48E-02
Total Bone HI =	7.54E-03
Total CNS (Behavioral) HI =	5.74E-03
Total CNS (Developmental) HI =	6.94E-03
Total Decr. Wt. Gain HI =	1.72E-05
Total Fetotoxicity HI =	7.54E-03
Total GI Tract HI =	2.07E-02
Total Kidney HI =	1.70E-03
Total Liver HI =	1.64E-02
Total Lung HI =	2.36E-06
Total Nasal HI =	2.36E-06
Total Respiratory HI =	1.40E-03

TABLE 9.26.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	7.62E-07	--	7.22E-08	--	8.34E-07	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Arsenic	**3.73E-06**	**--**	**3.54E-07**	**--**	**4.09E-06**	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	**2.13E-05**	**--**	**2.52E-05**	**--**	**4.65E-05**	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Dieldrin	**1.03E-06**	**--**	**3.24E-07**	**--**	**1.35E-06**	N/A	N/A	--	N/A	--
			Benz(a)anthracene	**8.15E-06**	**--**	**3.13E-06**	**--**	**1.13E-05**	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	**6.12E-05**	**--**	**2.35E-05**	**--**	**8.47E-05**	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	**6.75E-06**	**--**	**2.59E-06**	**--**	**9.34E-06**	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	4.39E-07	--	1.69E-07	--	6.08E-07	N/A	N/A	--	N/A	--
			Chrysene	6.82E-08	--	2.62E-08	--	9.44E-08	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	**3.93E-06**	**--**	**1.51E-06**	**--**	**5.43E-06**	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	**2.76E-06**	**--**	**1.06E-06**	**--**	**3.82E-06**	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			(Total)	1.10E-04	--	5.79E-05		1.68E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.68E-04					--
	Exposure Medium Total							1.68E-04					--
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	6.11E-08	--	--	6.11E-08	N/A	N/A	--	N/A	--
			(Total)	--	6.11E-08	--		6.11E-08	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						6.11E-08					--
	Exposure Medium Total							6.11E-08					--

TABLE 9.26.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil							N/A	N/A	--	N/A	--
			Chromium	--	3.07E-09	--	--	3.07E-09	N/A	N/A	--	N/A	--
			(Total)	--	3.07E-09	--		3.07E-09	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						3.07E-09					--
	Exposure Medium Total							3.07E-09					--
Surface Soil Total								1.68E-04					--
Receptor Total								1.68E-04					--

Total Risk Across All Media **1.68E-04**

Total Hazard Index Across All Media --

For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04

TABLE 9.26a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	7.62E-07	--	7.22E-08	--	8.34E-07	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	**2.13E-05**	**--**	**2.52E-05**	**--**	**4.65E-05**	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Dieldrin	**1.03E-06**	**--**	**3.24E-07**	**--**	**1.35E-06**	N/A	N/A	--	N/A	--
			Benz(a)anthracene	**8.15E-06**	**--**	**3.13E-06**	**--**	**1.13E-05**	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	**6.12E-05**	**--**	**2.35E-05**	**--**	**8.47E-05**	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	**6.75E-06**	**--**	**2.59E-06**	**--**	**9.34E-06**	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	4.39E-07	--	1.69E-07	--	6.08E-07	N/A	N/A	--	N/A	--
			Chrysene	6.82E-08	--	2.62E-08	--	9.44E-08	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	**3.93E-06**	**--**	**1.51E-06**	**--**	**5.43E-06**	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	**2.76E-06**	**--**	**1.06E-06**	**--**	**3.82E-06**	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			(Total)	1.06E-04	--	5.76E-05		1.64E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.64E-04					--
	Exposure Medium Total							1.64E-04					--
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil							N/A	N/A	--	N/A	--
			Naphthalene	--	6.11E-08	--	--	6.11E-08	N/A	N/A	--	N/A	--
			(Total)	--	6.11E-08	--		6.11E-08	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						6.11E-08					--
	Exposure Medium Total							6.11E-08					--

TABLE 9.26a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	3.07E-09	--	--	3.07E-09	N/A	N/A	--	N/A	--
			(Total)	--	3.07E-09	--		3.07E-09	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						3.07E-09					--
	Exposure Medium Total							3.07E-09					--
Surface Soil Total								1.64E-04					--
Receptor Total								1.64E-04					--

Total Risk Across All Media **1.64E-04**

Total Hazard Index Across All Media --

For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04

TABLE 9.27.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil												
			Total 2,3,7,8-TCDD Equiv.	3.46E-05	--	2.91E-06	--	3.75E-05	**Total 2,3,7,8-TCDD Equiv.**	**CNS (Behavioral)**	**3.11E+00**	**--**	**2.61E-01**	**3.37E+00**
			Aluminum	--	--	--	--	--	**Aluminum**	**CNS (Developmental)**	**2.53E-01**	**--**	**7.09E-03**	**2.60E-01**
			Antimony	--	--	--	--	--	**Antimony**	**Blood/Liver**	**7.99E-01**	**--**	**1.49E-01**	**9.48E-01**
			Arsenic	1.02E-05	--	8.57E-07	--	1.11E-05	Arsenic	Skin/Vascular	2.65E-01	--	2.22E-02	2.87E-01
			Cadmium	--	--	--	--	--	Cadmium	Kidney	6.02E-01	--	6.74E-02	6.70E-01
			Chromium	1.15E-04	--	1.29E-04	--	2.44E-04	**Chromium**	**Fetotoxicity/GI Tract/Bone**	**1.68E-01**	**--**	**1.88E-01**	**3.56E-01**
			Cobalt	--	--	--	--	--	Cobalt		5.24E-01	--	1.47E-02	5.39E-01
			Copper	--	--	--	--	--	**Copper**	**GI Tract**	**3.09E-01**	**--**	**8.65E-03**	**3.18E-01**
			Iron	--	--	--	--	--	**Iron**	**Liver/Blood/GI Tract**	**6.14E-01**	**--**	**1.72E-02**	**6.31E-01**
			Lead	--	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	--	**Manganese**	**CNS**	**7.03E-01**	**--**	**4.92E-01**	**1.20E+00**
			Mercury	--	--	--	--	--	Mercury	CNS	1.47E-01	--	4.12E-03	1.51E-01
			Nickel	--	--	--	--	--	Nickel	Decr. Org. Wt.	2.39E-02	--	1.67E-02	4.06E-02
			Silver	--	--	--	--	--	Silver	Skin	4.09E-02	--	2.86E-02	6.96E-02
			Vanadium	--	--	--	--	--	Vanadium		1.14E-01	--	1.23E-01	2.36E-01
			Zinc	--	--	--	--	--	Zinc	Blood	5.88E-02	--	1.65E-03	6.05E-02
			4,4'-DDD	1.22E-06	--	1.02E-07	--	1.32E-06	4,4'-DDD	N/A	--	--	--	--
			4,4'-DDE	2.25E-07	--	1.89E-08	--	2.44E-07	4,4'-DDE	N/A	--	--	--	--
			4,4'-DDT	6.45E-06	--	5.41E-07	--	6.99E-06	**4,4'-DDT**	**Liver**	**4.42E-01**	**--**	**3.72E-02**	**4.80E-01**
			Aroclor-1248	1.23E-06	--	4.81E-07	--	1.71E-06	Aroclor-1248	N/A	--	--	--	--
			Aroclor-1254	2.94E-07	--	1.15E-07	--	4.09E-07	Aroclor-1254	Skin/Eye	8.57E-02	--	3.36E-02	1.19E-01
			Aroclor-1260	9.88E-08	--	3.87E-08	--	1.38E-07	Aroclor-1260	N/A	--	--	--	--
			Dieldrin	1.23E-05	--	3.44E-06	--	1.57E-05	**Dieldrin**	**Liver**	**1.79E-01**	**--**	**5.02E-02**	**2.29E-01**
			Heptachlor Epoxide	1.28E-07	--	3.57E-08	--	1.63E-07	Heptachlor Epoxide	Liver	1.26E-02	--	3.52E-03	1.61E-02
			Benz(a)anthracene	1.67E-05	--	6.09E-06	--	2.28E-05	Benz(a)anthracene	N/A	--	--	--	--
			Benzo(a)pyrene	1.23E-04	--	4.49E-05	--	1.68E-04	Benzo(a)pyrene	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.37E-05	--	4.99E-06	--	1.87E-05	Benzo(b)fluoranthene	N/A	--	--	--	--
			Benzo(k)fluoranthene	9.13E-07	--	3.32E-07	--	1.25E-06	Benzo(k)fluoranthene	N/A	--	--	--	--
			Chrysene	1.53E-07	--	5.56E-08	--	2.08E-07	Chrysene	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.19E-05	--	4.35E-06	--	1.63E-05	Dibenz(a,h)anthracene	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	5.55E-06	--	2.02E-06	--	7.57E-06	Indeno(1,2,3-cd)pyrene	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Naphthalene	Decr. Wt. Gain	4.96E-04	--	1.81E-04	6.77E-04
			Phenanthrene	--	--	--	--	--	Phenanthrene	Kidney	5.33E-03	--	1.94E-03	7.27E-03
			Ethylbenzene	7.90E-09	--	6.63E-10	--	8.56E-09	Ethylbenzene	Liver/Kidney	8.37E-05	--	7.03E-06	9.08E-05
			(Total)	3.54E-04	--	2.00E-04		5.54E-04	(Total)		8.45E+00	--	1.53E+00	9.98E+00
			Radionuclide Total											
		Exposure Point Total						5.54E-04						9.98E+00
	Exposure Medium Total							5.54E-04						9.98E+00
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil												
			Naphthalene	--	2.29E-07	--	--	2.29E-07	Naphthalene	Respiratory	--	2.62E-02	--	2.62E-02
			Ethylbenzene	--	5.94E-07	--	--	5.94E-07	Ethylbenzene	Developmental	--	2.77E-03	--	2.77E-03
			(Total)	--	8.24E-07	--		8.24E-07	(Total)		--	2.90E-02	--	2.90E-02
			Radionuclide Total											
		Exposure Point Total						8.24E-07						2.90E-02
	Exposure Medium Total							8.24E-07						2.90E-02

TABLE 9.27.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil	Chromium	--	3.20E-08	--	--	3.20E-08	Chromium	Lung/Nasal	--	5.84E-05	--	5.84E-05
			Manganese	--	--	--	--	--	Manganese	CNS	--	3.91E-03	--	3.91E-03
			(Total)	--	3.20E-08	--		3.20E-08	(Total)		--	3.97E-03	--	3.97E-03
			Radionuclide Total											
		Exposure Point Total						3.20E-08						3.97E-03
	Exposure Medium Total							3.20E-08						3.97E-03
Soil Total								5.55E-04						1.00E+01
Receptor Total								5.55E-04						1.00E+01

Total Risk Across All Media: 5.55E-04

Total Hazard Index Across All Media: 1.00E+01

For reporting of non-cancer hazards, COPCs that are risk drivers are shown in bold if they contribute at least a HQ of 0.2 towards a target organ HI that exceeds 1.0.
COPCs that are cancer risk drivers of importance to the residential receptor are highlighted on a separate table for the lifetime resident.

Total Blood HI =	1.64E+00
Total Bone HI =	3.56E-01
Total CNS HI =	4.98E+00
Total CNS (Behavioral) HI =	3.37E+00
Total CNS (Developmental) HI =	2.60E-01
Total Decr. Org. Wt. HI =	4.06E-02
Total Decr. Wt. Gain HI =	6.77E-04
Total Developmental HI =	2.63E-01
Total Eye HI =	1.19E-01
Total Fetotoxicity HI =	3.56E-01
Total GI Tract HI =	1.30E+00
Total Kidney HI =	6.77E-01
Total Liver HI =	2.30E+00
Total Lung HI =	5.84E-05
Total Nasal HI =	5.84E-05
Total Respiratory HI =	2.62E-02
Total Skin HI =	4.76E-01
Total Vascular HI =	2.87E-01

TABLE 9.27a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil												
			Total 2,3,7,8-TCDD Equiv.	3.46E-05	--	2.91E-06	--	3.75E-05	**Total 2,3,7,8-TCDD Equiv.**	**CNS (Behavioral)**	**3.11E+00**	**--**	**2.61E-01**	**3.37E+00**
			Aluminum	--	--	--	--	--	**Aluminum**	**CNS (Developmental)**	**2.53E-01**	**--**	**7.09E-03**	**2.60E-01**
			Antimony	--	--	--	--	--	**Antimony**	**Blood/Liver**	**7.99E-01**	**--**	**1.49E-01**	**9.48E-01**
			Cadmium	--	--	--	--	--	Cadmium	Kidney	6.02E-01	--	6.74E-02	6.70E-01
			Chromium	1.15E-04	--	1.29E-04	--	2.44E-04	**Chromium**	**Fetotoxicity/GI Tract/Bone**	**1.68E-01**	**--**	**1.88E-01**	**3.56E-01**
			Cobalt	--	--	--	--	--	Cobalt		5.24E-01	--	1.47E-02	5.39E-01
			Copper	--	--	--	--	--	**Copper**	**GI Tract**	**3.09E-01**	**--**	**8.65E-03**	**3.18E-01**
			Iron	--	--	--	--	--	**Iron**	**Liver/Blood/GI Tract**	**6.14E-01**	**--**	**1.72E-02**	**6.31E-01**
			Lead	--	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	--	**Manganese**	**CNS**	**7.03E-01**	**--**	**4.92E-01**	**1.20E+00**
			Mercury	--	--	--	--	--	Mercury	CNS	1.47E-01	--	4.12E-03	1.51E-01
			Nickel	--	--	--	--	--	Nickel	Decr. Org. Wt.	2.39E-02	--	1.67E-02	4.06E-02
			Silver	--	--	--	--	--	Silver	Skin	4.09E-02	--	2.86E-02	6.96E-02
			Vanadium	--	--	--	--	--	Vanadium		1.14E-01	--	1.23E-01	2.36E-01
			Zinc	--	--	--	--	--	Zinc	Blood	5.88E-02	--	1.65E-03	6.05E-02
			4,4'-DDD	1.22E-06	--	1.02E-07	--	1.32E-06	4,4'-DDD	N/A	--	--	--	--
			4,4'-DDE	2.25E-07	--	1.89E-08	--	2.44E-07	4,4'-DDE	N/A	--	--	--	--
			4,4'-DDT	6.45E-06	--	5.41E-07	--	6.99E-06	**4,4'-DDT**	**Liver**	**4.42E-01**	**--**	**3.72E-02**	**4.80E-01**
			Aroclor-1248	1.23E-06	--	4.81E-07	--	1.71E-06	Aroclor-1248	N/A	--	--	--	--
			Aroclor-1254	2.94E-07	--	1.15E-07	--	4.09E-07	Aroclor-1254	Skin/Eye	8.57E-02	--	3.36E-02	1.19E-01
			Aroclor-1260	9.88E-08	--	3.87E-08	--	1.38E-07	Aroclor-1260	N/A	--	--	--	--
			Dieldrin	1.23E-05	--	3.44E-06	--	1.57E-05	**Dieldrin**	**Liver**	**1.79E-01**	**--**	**5.02E-02**	**2.29E-01**
			Heptachlor Epoxide	1.28E-07	--	3.57E-08	--	1.63E-07	Heptachlor Epoxide	Liver	1.26E-02	--	3.52E-03	1.61E-02
			Benz(a)anthracene	1.67E-05	--	6.09E-06	--	2.28E-05	Benz(a)anthracene	N/A	--	--	--	--
			Benzo(a)pyrene	1.23E-04	--	4.49E-05	--	1.68E-04	Benzo(a)pyrene	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.37E-05	--	4.99E-06	--	1.87E-05	Benzo(b)fluoranthene	N/A	--	--	--	--
			Benzo(k)fluoranthene	9.13E-07	--	3.32E-07	--	1.25E-06	Benzo(k)fluoranthene	N/A	--	--	--	--
			Chrysene	1.53E-07	--	5.56E-08	--	2.08E-07	Chrysene	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.19E-05	--	4.35E-06	--	1.63E-05	Dibenz(a,h)anthracene	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	5.55E-06	--	2.02E-06	--	7.57E-06	Indeno(1,2,3-cd)pyrene	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Naphthalene	Decr. Wt. Gain	4.96E-04	--	1.81E-04	6.77E-04
			Phenanthrene	--	--	--	--	--	Phenanthrene	Kidney	5.33E-03	--	1.94E-03	7.27E-03
			Ethylbenzene	7.90E-09	--	6.63E-10	--	8.56E-09	Ethylbenzene	Liver/Kidney	8.37E-05	--	7.03E-06	9.08E-05
			(Total)	3.44E-04	--	1.99E-04		5.43E-04	(Total)		8.19E+00	--	1.51E+00	9.70E+00
			Radionuclide Total											
		Exposure Point Total						5.43E-04						9.70E+00
	Exposure Medium Total							5.43E-04						9.70E+00
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil												
			Naphthalene	--	2.29E-07	--	--	2.29E-07	Naphthalene	Respiratory	--	2.62E-02	--	2.62E-02
			Ethylbenzene	--	5.94E-07	--	--	5.94E-07	Ethylbenzene	Developmental	--	2.77E-03	--	2.77E-03
			(Total)	--	8.24E-07	--		8.24E-07	(Total)		--	2.90E-02	--	2.90E-02
			Radionuclide Total											
		Exposure Point Total						8.24E-07						2.90E-02
	Exposure Medium Total							8.24E-07						2.90E-02

TABLE 9.27a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil												
			Chromium	--	3.20E-08	--	--	3.20E-08	Chromium	Lung/Nasal	--	5.84E-05	--	5.84E-05
			Manganese	--	--	--	--	--	Manganese	CNS	--	3.91E-03	--	3.91E-03
			(Total)	--	3.20E-08	--		3.20E-08	(Total)		--	3.97E-03	--	3.97E-03
			Radionuclide Total											
		Exposure Point Total						3.20E-08						3.97E-03
	Exposure Medium Total							3.20E-08						3.97E-03
Soil Total								5.44E-04						9.73E+00
Receptor Total								5.44E-04						9.73E+00

Total Risk Across All Media: 5.44E-04

Total Hazard Index Across All Media: 9.73E+00

For reporting of non-cancer hazards, COPCs that are risk drivers are shown in bold if they contribute at least a HQ of 0.2 towards a target organ HI that exceeds 1.0.
COPCs that are cancer risk drivers of importance to the residential receptor are highlighted on a separate table for the lifetime resident.

Total Blood HI =	1.64E+00
Total Bone HI =	3.56E-01
Total CNS HI =	4.98E+00
Total CNS (Behavioral) HI =	3.37E+00
Total CNS (Developmental) HI =	2.60E-01
Total Decr. Org. Wt. HI =	4.06E-02
Total Decr. Wt. Gain HI =	6.77E-04
Total Developmental HI =	2.63E-01
Total Eye HI =	1.19E-01
Total Fetotoxicity HI =	3.56E-01
Total GI Tract HI =	1.30E+00
Total Kidney HI =	6.77E-01
Total Liver HI =	2.30E+00
Total Lung HI =	5.84E-05
Total Nasal HI =	5.84E-05
Total Respiratory HI =	2.62E-02
Total Skin HI =	1.89E-01

TABLE 9.28.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	1.48E-05	--	1.78E-06	--	1.66E-05	CNS (Behavioral)	3.33E-01	--	3.98E-02	3.73E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	2.71E-02	--	1.08E-03	2.82E-02
			Antimony	--	--	--	--	--	Blood/Liver	8.56E-02	--	2.28E-02	1.08E-01
			Arsenic	4.37E-06	--	5.24E-07	--	4.90E-06	Skin/Vascular	2.84E-02	--	3.39E-03	3.18E-02
			Cadmium	--	--	--	--	--	Kidney	6.45E-02	--	1.03E-02	7.48E-02
			Chromium	1.70E-05	--	2.71E-05	--	4.40E-05	Fetotoxicity/GI Tract/Bone	1.80E-02	--	2.87E-02	4.67E-02
			Cobalt	--	--	--	--	--		5.62E-02	--	2.24E-03	5.84E-02
			Copper	--	--	--	--	--	GI Tract	3.31E-02	--	1.32E-03	3.44E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	6.58E-02	--	2.62E-03	6.84E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	7.53E-02	--	7.52E-02	1.50E-01
			Mercury	--	--	--	--	--	CNS	1.58E-02	--	6.29E-04	1.64E-02
			Nickel	--	--	--	--	--	Decr. Org. Wt.	2.56E-03	--	2.56E-03	5.12E-03
			Silver	--	--	--	--	--	Skin	4.38E-03	--	4.37E-03	8.76E-03
			Vanadium	--	--	--	--	--		1.22E-02	--	1.87E-02	3.09E-02
			Zinc	--	--	--	--	--	Blood	6.30E-03	--	2.51E-04	6.55E-03
			4,4'-DDD	5.22E-07	--	6.25E-08	--	5.84E-07	N/A	--	--	--	--
			4,4'-DDE	9.63E-08	--	1.15E-08	--	1.08E-07	N/A	--	--	--	--
			4,4'-DDT	2.76E-06	--	3.31E-07	--	3.09E-06	Liver	4.74E-02	--	5.67E-03	5.31E-02
			Aroclor-1248	5.26E-07	--	2.94E-07	--	8.20E-07	N/A	--	--	--	--
			Aroclor-1254	1.26E-07	--	7.03E-08	--	1.96E-07	Skin/Eye	9.18E-03	--	5.13E-03	1.43E-02
			Aroclor-1260	4.24E-08	--	2.37E-08	--	6.60E-08	N/A	--	--	--	--
			Dieldrin	5.27E-06	--	2.10E-06	--	7.37E-06	Liver	1.92E-02	--	7.66E-03	2.69E-02
			Heptachlor Epoxide	5.47E-08	--	2.18E-08	--	7.65E-08	Liver	1.35E-03	--	5.38E-04	1.89E-03
			Benz(a)anthracene	2.46E-06	--	1.28E-06	--	3.74E-06	N/A	--	--	--	--
			Benzo(a)pyrene	1.82E-05	--	9.42E-06	--	2.76E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.02E-06	--	1.05E-06	--	3.06E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.35E-07	--	6.98E-08	--	2.04E-07	N/A	--	--	--	--
			Chrysene	2.25E-08	--	1.17E-08	--	3.42E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.76E-06	--	9.13E-07	--	2.67E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8.17E-07	--	4.24E-07	--	1.24E-06	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	5.32E-05	--	2.76E-05	8.07E-05
			Phenanthrene	--	--	--	--	--	Kidney	5.71E-04	--	2.96E-04	8.67E-04
			Ethylbenzene	3.38E-09	--	4.05E-10	--	3.79E-09	Liver/Kidney	8.97E-06	--	1.07E-06	1.00E-05
			(Total)	7.10E-05	--	4.55E-05		1.16E-04		9.06E-01	--	2.33E-01	1.14E+00
			Radionuclide Total										
		Exposure Point Total						1.16E-04					1.14E+00
	Exposure Medium Total							1.16E-04					1.14E+00

TABLE 9.28.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	9.17E-07	--	--	9.17E-07	Respiratory	--	2.62E-02	--	2.62E-02
			Ethylbenzene	--	2.38E-06	--	--	2.38E-06	Developmental	--	2.77E-03	--	2.77E-03
			(Total)	--	3.29E-06	--		3.29E-06		--	2.90E-02	--	2.90E-02
			Radionuclide Total										
		Exposure Point Total						3.29E-06					2.90E-02
	Exposure Medium Total							3.29E-06					2.90E-02
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	4.40E-08	--	--	4.40E-08	Lung/Nasal	--	5.84E-05	--	5.84E-05
			Manganese	--	--	--	--	--	CNS	--	3.91E-03	--	3.91E-03
			(Total)	--	4.40E-08	--		4.40E-08		--	3.97E-03	--	3.97E-03
			Radionuclide Total										
		Exposure Point Total						4.40E-08					3.97E-03
	Exposure Medium Total							4.40E-08					3.97E-03
Soil Total								1.19E-04					1.17E+00
Receptor Total								1.19E-04					1.17E+00

Total Risk Across All Media: 1.19E-04

Total Hazard Index Across All Media: 1.17E+00

Total Blood HI =	1.83E-01
Total Bone HI =	4.67E-02
Total CNS HI =	5.72E-01
Total CNS (Behavioral) HI =	3.73E-01
Total CNS (Developmental) HI =	2.82E-02
Total Decr. Org. Wt. HI =	5.12E-03
Total Decr. Wt. Gain HI =	8.07E-05
Total Developmental HI =	3.10E-02
Total Eye HI =	1.43E-02
Total Fetotoxicity HI =	4.67E-02
Total GI Tract HI =	1.50E-01
Total Kidney HI =	7.57E-02
Total Liver HI =	2.59E-01
Total Lung HI =	5.84E-05
Total Nasal HI =	5.84E-05
Total Respiratory HI =	2.62E-02
Total Skin HI =	5.48E-02
Total Vascular HI =	3.18E-02

TABLE 9.28a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	1.48E-05	--	1.78E-06	--	1.66E-05	CNS (Behavioral)	3.33E-01	--	3.98E-02	3.73E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	2.71E-02	--	1.08E-03	2.82E-02
			Antimony	--	--	--	--	--	Blood/Liver	8.56E-02	--	2.28E-02	1.08E-01
			Cadmium	--	--	--	--	--	Kidney	6.45E-02	--	1.03E-02	7.48E-02
			Chromium	1.70E-05	--	2.71E-05	--	4.40E-05	Fetotoxicity/GI Tract/Bone	1.80E-02	--	2.87E-02	4.67E-02
			Cobalt	--	--	--	--	--		5.62E-02	--	2.24E-03	5.84E-02
			Copper	--	--	--	--	--	GI Tract	3.31E-02	--	1.32E-03	3.44E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	6.58E-02	--	2.62E-03	6.84E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	7.53E-02	--	7.52E-02	1.50E-01
			Mercury	--	--	--	--	--	CNS	1.58E-02	--	6.29E-04	1.64E-02
			Nickel	--	--	--	--	--	Decr. Org. Wt.	2.56E-03	--	2.56E-03	5.12E-03
			Silver	--	--	--	--	--	Skin	4.38E-03	--	4.37E-03	8.76E-03
			Vanadium	--	--	--	--	--		1.22E-02	--	1.87E-02	3.09E-02
			Zinc	--	--	--	--	--	Blood	6.30E-03	--	2.51E-04	6.55E-03
			4,4'-DDD	5.22E-07	--	6.25E-08	--	5.84E-07	N/A	--	--	--	--
			4,4'-DDE	9.63E-08	--	1.15E-08	--	1.08E-07	N/A	--	--	--	--
			4,4'-DDT	2.76E-06	--	3.31E-07	--	3.09E-06	Liver	4.74E-02	--	5.67E-03	5.31E-02
			Aroclor-1248	5.26E-07	--	2.94E-07	--	8.20E-07	N/A	--	--	--	--
			Aroclor-1254	1.26E-07	--	7.03E-08	--	1.96E-07	Skin/Eye	9.18E-03	--	5.13E-03	1.43E-02
			Aroclor-1260	4.24E-08	--	2.37E-08	--	6.60E-08	N/A	--	--	--	--
			Dieldrin	5.27E-06	--	2.10E-06	--	7.37E-06	Liver	1.92E-02	--	7.66E-03	2.69E-02
			Heptachlor Epoxide	5.47E-08	--	2.18E-08	--	7.65E-08	Liver	1.35E-03	--	5.38E-04	1.89E-03
			Benz(a)anthracene	2.46E-06	--	1.28E-06	--	3.74E-06	N/A	--	--	--	--
			Benzo(a)pyrene	1.82E-05	--	9.42E-06	--	2.76E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.02E-06	--	1.05E-06	--	3.06E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.35E-07	--	6.98E-08	--	2.04E-07	N/A	--	--	--	--
			Chrysene	2.25E-08	--	1.17E-08	--	3.42E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.76E-06	--	9.13E-07	--	2.67E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8.17E-07	--	4.24E-07	--	1.24E-06	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	5.32E-05	--	2.76E-05	8.07E-05
			Phenanthrene	--	--	--	--	--	Kidney	5.71E-04	--	2.96E-04	8.67E-04
			Ethylbenzene	3.38E-09	--	4.05E-10	--	3.79E-09	Liver/Kidney	8.97E-06	--	1.07E-06	1.00E-05
			(Total)	6.66E-05	--	4.49E-05		1.12E-04		8.77E-01	--	2.30E-01	1.11E+00
			Radionuclide Total										
		Exposure Point Total						1.12E-04					1.11E+00
	Exposure Medium Total							1.12E-04					1.11E+00

TABLE 9.28a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	9.17E-07	--	--	9.17E-07	Respiratory	--	2.62E-02	--	2.62E-02
			Ethylbenzene	--	2.38E-06	--	--	2.38E-06	Developmental	--	2.77E-03	--	2.77E-03
			(Total)	--	3.29E-06	--		3.29E-06		--	2.90E-02	--	2.90E-02
			Radionuclide Total										
		Exposure Point Total						3.29E-06					2.90E-02
	Exposure Medium Total							3.29E-06					2.90E-02
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	4.40E-08	--	--	4.40E-08	Lung/Nasal	--	5.84E-05	--	5.84E-05
			Manganese	--	--	--	--	--	CNS	--	3.91E-03	--	3.91E-03
			(Total)	--	4.40E-08	--		4.40E-08		--	3.97E-03	--	3.97E-03
			Radionuclide Total										
		Exposure Point Total						4.40E-08					3.97E-03
	Exposure Medium Total							4.40E-08					3.97E-03
Soil Total								1.15E-04					1.14E+00
Receptor Total								1.15E-04					1.14E+00

Total Risk Across All Media: 1.15E-04

Total Hazard Index Across All Media: 1.14E+00

Total Blood HI =	1.83E-01
Total Bone HI =	4.67E-02
Total CNS HI =	5.72E-01
Total CNS (Behavioral) HI =	3.73E-01
Total CNS (Developmental) HI =	2.82E-02
Total Decr. Org. Wt. HI =	5.12E-03
Total Decr. Wt. Gain HI =	8.07E-05
Total Developmental HI =	3.10E-02
Total Eye HI =	1.43E-02
Total Fetotoxicity HI =	4.67E-02
Total GI Tract HI =	1.50E-01
Total Kidney HI =	7.57E-02
Total Liver HI =	2.59E-01
Total Lung HI =	5.84E-05
Total Nasal HI =	5.84E-05
Total Respiratory HI =	2.62E-02
Total Skin HI =	2.31E-02

TABLE 9.29.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	**4.95E-05**	**--**	**4.68E-06**	**--**	**5.41E-05**	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Arsenic	**1.46E-05**	**--**	**1.38E-06**	**--**	**1.60E-05**	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	**1.32E-04**	**--**	**1.56E-04**	**--**	**2.88E-04**	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Copper	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Lead	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Mercury	--	--	--	--	--	N/A	N/A	--	N/A	--
			Nickel	--	--	--	--	--	N/A	N/A	--	N/A	--
			Silver	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Zinc	--	--	--	--	--	N/A	N/A	--	N/A	--
			4,4'-DDD	**1.74E-06**	**--**	**1.65E-07**	**--**	**1.90E-06**	N/A	N/A	--	N/A	--
			4,4'-DDE	3.21E-07	--	3.04E-08	--	3.51E-07	N/A	N/A	--	N/A	--
			4,4'-DDT	**9.21E-06**	**--**	**8.72E-07**	**--**	**1.01E-05**	N/A	N/A	--	N/A	--
			Aroclor-1248	**1.75E-06**	**--**	**7.75E-07**	**--**	**2.53E-06**	N/A	N/A	--	N/A	--
			Aroclor-1254	4.20E-07	--	1.85E-07	--	6.05E-07	N/A	N/A	--	N/A	--
			Aroclor-1260	1.41E-07	--	6.24E-08	--	2.04E-07	N/A	N/A	--	N/A	--
			Dieldrin	**1.76E-05**	**--**	**5.54E-06**	**--**	**2.31E-05**	N/A	N/A	--	N/A	--
			Heptachlor Epoxide	1.82E-07	--	5.76E-08	--	2.40E-07	N/A	N/A	--	N/A	--
			Benz(a)anthracene	**1.92E-05**	**--**	**7.37E-06**	**--**	**2.66E-05**	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	**1.41E-04**	**--**	**5.43E-05**	**--**	**1.96E-04**	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	**1.57E-05**	**--**	**6.03E-06**	**--**	**2.17E-05**	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	**1.05E-06**	**--**	**4.02E-07**	**--**	**1.45E-06**	N/A	N/A	--	N/A	--
			Chrysene	1.75E-07	--	6.73E-08	--	2.43E-07	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	**1.37E-05**	**--**	**5.26E-06**	**--**	**1.90E-05**	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	**6.36E-06**	**--**	**2.44E-06**	**--**	**8.81E-06**	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Ethylbenzene	1.13E-08	--	1.07E-09	--	1.23E-08	N/A	N/A	--	N/A	--
			(Total)	4.25E-04	--	2.46E-04		6.71E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						6.71E-04					--
	Exposure Medium Total							6.71E-04					--

TABLE 9.29.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	**--**	**1.15E-06**	**--**	**--**	**1.15E-06**	N/A	--	N/A	--	--
			Ethylbenzene	**--**	**2.97E-06**	**--**	**--**	**2.97E-06**	N/A	--	N/A	--	--
			(Total)	--	4.12E-06	--		4.12E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						4.12E-06					--
	Exposure Medium Total							4.12E-06					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	7.61E-08	--	--	7.61E-08	N/A	--	N/A	--	--
			Manganese	--	--	--	--	--	N/A	--	N/A	--	--
			(Total)	--	7.61E-08	--		7.61E-08		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						7.61E-08					--
	Exposure Medium Total							7.61E-08					--
Soil Total								6.75E-04					--
Receptor Total								6.75E-04					--

Total Risk Across All Media **6.75E-04**

Total Hazard Index Across All Media --

COPCs that are non-cancer risk drivers of importance to residential receptors are highlighted on a separate table for the child resident.
For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04

TABLE 9.29a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	**4.95E-05**	**--**	**4.68E-06**	**--**	**5.41E-05**	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	**1.32E-04**	**--**	**1.56E-04**	**--**	**2.88E-04**	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Copper	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Lead	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Mercury	--	--	--	--	--	N/A	N/A	--	N/A	--
			Nickel	--	--	--	--	--	N/A	N/A	--	N/A	--
			Silver	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Zinc	--	--	--	--	--	N/A	N/A	--	N/A	--
			4,4'-DDD	**1.74E-06**	**--**	**1.65E-07**	**--**	**1.90E-06**	N/A	N/A	--	N/A	--
			4,4'-DDE	3.21E-07	--	3.04E-08	--	3.51E-07	N/A	N/A	--	N/A	--
			4,4'-DDT	**9.21E-06**	**--**	**8.72E-07**	**--**	**1.01E-05**	N/A	N/A	--	N/A	--
			Aroclor-1248	**1.75E-06**	**--**	**7.75E-07**	**--**	**2.53E-06**	N/A	N/A	--	N/A	--
			Aroclor-1254	4.20E-07	--	1.85E-07	--	6.05E-07	N/A	N/A	--	N/A	--
			Aroclor-1260	1.41E-07	--	6.24E-08	--	2.04E-07	N/A	N/A	--	N/A	--
			Dieldrin	**1.76E-05**	**--**	**5.54E-06**	**--**	**2.31E-05**	N/A	N/A	--	N/A	--
			Heptachlor Epoxide	1.82E-07	--	5.76E-08	--	2.40E-07	N/A	N/A	--	N/A	--
			Benz(a)anthracene	**1.92E-05**	**--**	**7.37E-06**	**--**	**2.66E-05**	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	**1.41E-04**	**--**	**5.43E-05**	**--**	**1.96E-04**	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	**1.57E-05**	**--**	**6.03E-06**	**--**	**2.17E-05**	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	**1.05E-06**	**--**	**4.02E-07**	**--**	**1.45E-06**	N/A	N/A	--	N/A	--
			Chrysene	1.75E-07	--	6.73E-08	--	2.43E-07	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	**1.37E-05**	**--**	**5.26E-06**	**--**	**1.90E-05**	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	**6.36E-06**	**--**	**2.44E-06**	**--**	**8.81E-06**	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Ethylbenzene	1.13E-08	--	1.07E-09	--	1.23E-08	N/A	N/A	--	N/A	--
			(Total)	4.11E-04	--	2.44E-04		6.55E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						6.55E-04					--
	Exposure Medium Total							6.55E-04					--

TABLE 9.29a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	**--**	**1.15E-06**	**--**	**--**	**1.15E-06**	N/A	--	N/A	--	--
			Ethylbenzene	**--**	**2.97E-06**	**--**	**--**	**2.97E-06**	N/A	--	N/A	--	--
			(Total)	--	4.12E-06	--		4.12E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						4.12E-06					--
	Exposure Medium Total							4.12E-06					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	7.61E-08	--	--	7.61E-08	N/A	--	N/A	--	--
			Manganese	--	--	--	--	--	N/A	--	N/A	--	--
			(Total)	--	7.61E-08	--		7.61E-08		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						7.61E-08					--
	Exposure Medium Total							7.61E-08					--
Soil Total								6.59E-04					--
Receptor Total								6.59E-04					--

Total Risk Across All Media **6.59E-04**

Total Hazard Index Across All Media --

COPCs that are non-cancer risk drivers of importance to residential receptors are highlighted on a separate table for the child resident.
For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04

TABLE 9.30.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	1.10E-05	--	2.19E-06	--	1.32E-05	CNS (Behavioral)	2.38E-01	--	4.71E-02	2.85E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	1.94E-02	--	1.28E-03	2.07E-02
			Antimony	--	--	--	--	--	Blood/Liver	6.12E-02	--	2.69E-02	8.81E-02
			Arsenic	3.26E-06	--	6.45E-07	--	3.90E-06	Skin/Vascular	2.03E-02	--	4.01E-03	2.43E-02
			Cadmium	--	--	--	--	--	Kidney	4.61E-02	--	1.22E-02	5.83E-02
			Chromium	6.88E-06	--	1.82E-05	--	2.51E-05	Fetotoxicity/GI Tract/Bone	1.29E-02	--	3.39E-02	4.68E-02
			Cobalt	--	--	--	--	--		4.01E-02	--	2.65E-03	4.28E-02
			Copper	--	--	--	--	--	GI Tract	2.37E-02	--	1.56E-03	2.52E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	4.70E-02	--	3.10E-03	5.01E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	5.38E-02	--	8.88E-02	1.43E-01
			Mercury	--	--	--	--	--	CNS	1.13E-02	--	7.43E-04	1.20E-02
			Nickel	--	--	--	--	--	Decr. Org. Wt.	1.83E-03	--	3.02E-03	4.85E-03
			Silver	--	--	--	--	--	Skin	3.13E-03	--	5.17E-03	8.30E-03
			Vanadium	--	--	--	--	--		8.71E-03	--	2.21E-02	3.08E-02
			Zinc	--	--	--	--	--	Blood	4.50E-03	--	2.97E-04	4.80E-03
			4,4'-DDD	3.88E-07	--	7.69E-08	--	4.65E-07	N/A	--	--	--	--
			4,4'-DDE	7.16E-08	--	1.42E-08	--	8.58E-08	N/A	--	--	--	--
			4,4'-DDT	2.06E-06	--	4.07E-07	--	2.46E-06	Liver	3.39E-02	--	6.70E-03	4.06E-02
			Aroclor-1248	3.91E-07	--	3.62E-07	--	7.53E-07	N/A	--	--	--	--
			Aroclor-1254	9.37E-08	--	8.65E-08	--	1.80E-07	Skin/Eye	6.56E-03	--	6.06E-03	1.26E-02
			Aroclor-1260	3.15E-08	--	2.91E-08	--	6.06E-08	N/A	--	--	--	--
			Dieldrin	3.92E-06	--	2.59E-06	--	6.51E-06	Liver	1.37E-02	--	9.05E-03	2.28E-02
			Heptachlor Epoxide	4.07E-08	--	2.69E-08	--	6.76E-08	Liver	9.63E-04	--	6.36E-04	1.60E-03
			Benz(a)anthracene	1.00E-06	--	8.58E-07	--	1.86E-06	N/A	--	--	--	--
			Benzo(a)pyrene	7.37E-06	--	6.33E-06	--	1.37E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	8.19E-07	--	7.03E-07	--	1.52E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	5.46E-08	--	4.68E-08	--	1.01E-07	N/A	--	--	--	--
			Chrysene	9.13E-09	--	7.84E-09	--	1.70E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	7.14E-07	--	6.13E-07	--	1.33E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.32E-07	--	2.85E-07	--	6.16E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	3.80E-05	--	3.26E-05	7.05E-05
			Phenanthrene	--	--	--	--	--	Kidney	4.08E-04	--	3.50E-04	7.58E-04
			Ethylbenzene	2.52E-09	--	4.99E-10	--	3.02E-09	Liver/Kidney	6.41E-06	--	1.27E-06	7.68E-06
			(Total)	3.85E-05	--	3.34E-05		7.19E-05		6.47E-01	--	2.76E-01	9.23E-01
			Radionuclide Total										
		Exposure Point Total						7.19E-05					9.23E-01
Exposure Medium Total								7.19E-05					9.23E-01

TABLE 9.30.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	4.55E-07	--	--	4.55E-07	Respiratory	--	1.25E-02	--	1.25E-02
			Ethylbenzene	--	1.18E-06	--	--	1.18E-06	Developmental	--	1.32E-03	--	1.32E-03
			(Total)	--	1.63E-06	--		1.63E-06		--	1.38E-02	--	1.38E-02
			Radionuclide Total										
		Exposure Point Total						1.63E-06					1.38E-02
	Exposure Medium Total							1.63E-06					1.38E-02
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	1.19E-08	--	--	1.19E-08	Lung/Nasal	--	2.78E-05	--	2.78E-05
			Manganese	--	--	--	--	--	CNS	--	1.86E-03	--	1.86E-03
			(Total)	--	1.19E-08	--		1.19E-08		--	1.89E-03	--	1.89E-03
			Radionuclide Total										
		Exposure Point Total						1.19E-08					1.89E-03
	Exposure Medium Total							1.19E-08					1.89E-03
Soil Total								7.35E-05					9.39E-01
Receptor Total								7.35E-05					9.39E-01

Total Risk Across All Media: 7.35E-05

Total Hazard Index Across All Media: 9.39E-01

Total Blood HI =	1.43E-01
Total Bone HI =	4.68E-02
Total CNS HI =	4.62E-01
Total CNS (Behavioral) HI =	2.85E-01
Total CNS (Developmental) HI =	2.07E-02
Total Decr. Org. Wt. HI =	4.85E-03
Total Decr. Wt. Gain HI =	7.05E-05
Total Developmental HI =	2.20E-02
Total Eye HI =	1.26E-02
Total Fetotoxicity HI =	4.68E-02
Total GI Tract HI =	1.22E-01
Total Kidney HI =	5.90E-02
Total Liver HI =	2.03E-01
Total Lung HI =	2.78E-05
Total Nasal HI =	2.78E-05
Total Respiratory HI =	1.25E-02
Total Skin HI =	4.52E-02
Total Vascular HI =	2.43E-02

TABLE 9.30a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	1.10E-05	--	2.19E-06	--	1.32E-05	CNS (Behavioral)	2.38E-01	--	4.71E-02	2.85E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	1.94E-02	--	1.28E-03	2.07E-02
			Antimony	--	--	--	--	--	Blood/Liver	6.12E-02	--	2.69E-02	8.81E-02
			Cadmium	--	--	--	--	--	Kidney	4.61E-02	--	1.22E-02	5.83E-02
			Chromium	6.88E-06	--	1.82E-05	--	2.51E-05	Fetotoxicity/GI Tract/Bone	1.29E-02	--	3.39E-02	4.68E-02
			Cobalt	--	--	--	--	--		4.01E-02	--	2.65E-03	4.28E-02
			Copper	--	--	--	--	--	GI Tract	2.37E-02	--	1.56E-03	2.52E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	4.70E-02	--	3.10E-03	5.01E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	5.38E-02	--	8.88E-02	1.43E-01
			Mercury	--	--	--	--	--	CNS	1.13E-02	--	7.43E-04	1.20E-02
			Nickel	--	--	--	--	--	Decr. Org. Wt.	1.83E-03	--	3.02E-03	4.85E-03
			Silver	--	--	--	--	--	Skin	3.13E-03	--	5.17E-03	8.30E-03
			Vanadium	--	--	--	--	--		8.71E-03	--	2.21E-02	3.08E-02
			Zinc	--	--	--	--	--	Blood	4.50E-03	--	2.97E-04	4.80E-03
			4,4'-DDD	3.88E-07	--	7.69E-08	--	4.65E-07	N/A	--	--	--	--
			4,4'-DDE	7.16E-08	--	1.42E-08	--	8.58E-08	N/A	--	--	--	--
			4,4'-DDT	2.06E-06	--	4.07E-07	--	2.46E-06	Liver	3.39E-02	--	6.70E-03	4.06E-02
			Aroclor-1248	3.91E-07	--	3.62E-07	--	7.53E-07	N/A	--	--	--	--
			Aroclor-1254	9.37E-08	--	8.65E-08	--	1.80E-07	Skin/Eye	6.56E-03	--	6.06E-03	1.26E-02
			Aroclor-1260	3.15E-08	--	2.91E-08	--	6.06E-08	N/A	--	--	--	--
			Dieldrin	3.92E-06	--	2.59E-06	--	6.51E-06	Liver	1.37E-02	--	9.05E-03	2.28E-02
			Heptachlor Epoxide	4.07E-08	--	2.69E-08	--	6.76E-08	Liver	9.63E-04	--	6.36E-04	1.60E-03
			Benz(a)anthracene	1.00E-06	--	8.58E-07	--	1.86E-06	N/A	--	--	--	--
			Benzo(a)pyrene	7.37E-06	--	6.33E-06	--	1.37E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	8.19E-07	--	7.03E-07	--	1.52E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	5.46E-08	--	4.68E-08	--	1.01E-07	N/A	--	--	--	--
			Chrysene	9.13E-09	--	7.84E-09	--	1.70E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	7.14E-07	--	6.13E-07	--	1.33E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.32E-07	--	2.85E-07	--	6.16E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	3.80E-05	--	3.26E-05	7.05E-05
			Phenanthrene	--	--	--	--	--	Kidney	4.08E-04	--	3.50E-04	7.58E-04
			Ethylbenzene	2.52E-09	--	4.99E-10	--	3.02E-09	Liver/Kidney	6.41E-06	--	1.27E-06	7.68E-06
			(Total)	3.52E-05	--	3.28E-05		6.80E-05		6.27E-01	--	2.72E-01	8.98E-01
			Radionuclide Total										
		Exposure Point Total						6.80E-05					8.98E-01
Exposure Medium Total								6.80E-05					8.98E-01

TABLE 9.30a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT INDUSTRIAL WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	4.55E-07	--	--	4.55E-07	Respiratory	--	1.25E-02	--	1.25E-02
			Ethylbenzene	--	1.18E-06	--	--	1.18E-06	Developmental	--	1.32E-03	--	1.32E-03
			(Total)	--	1.63E-06	--		1.63E-06		--	1.38E-02	--	1.38E-02
			Radionuclide Total										
		Exposure Point Total						1.63E-06					1.38E-02
	Exposure Medium Total							1.63E-06					1.38E-02
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	1.19E-08	--	--	1.19E-08	Lung/Nasal	--	2.78E-05	--	2.78E-05
			Manganese	--	--	--	--	--	CNS	--	1.86E-03	--	1.86E-03
			(Total)	--	1.19E-08	--		1.19E-08		--	1.89E-03	--	1.89E-03
			Radionuclide Total										
		Exposure Point Total						1.19E-08					1.89E-03
	Exposure Medium Total							1.19E-08					1.89E-03
Soil Total								6.96E-05					9.14E-01
Receptor Total								6.96E-05					9.14E-01

Total Risk Across All Media: 6.96E-05

Total Hazard Index Across All Media: 9.14E-01

Total Blood HI =	1.43E-01
Total Bone HI =	4.68E-02
Total CNS HI =	4.62E-01
Total CNS (Behavioral) HI =	2.85E-01
Total CNS (Developmental) HI =	2.07E-02
Total Decr. Org. Wt. HI =	4.85E-03
Total Decr. Wt. Gain HI =	7.05E-05
Total Developmental HI =	2.20E-02
Total Eye HI =	1.26E-02
Total Fetotoxicity HI =	4.68E-02
Total GI Tract HI =	1.22E-01
Total Kidney HI =	5.90E-02
Total Liver HI =	2.03E-01
Total Lung HI =	2.78E-05
Total Nasal HI =	2.78E-05
Total Respiratory HI =	1.25E-02
Total Skin HI =	2.09E-02

TABLE 9.31.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT CONSTRUCTION WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	7.58E-07	--	4.55E-08	--	8.03E-07	CNS (Behavioral)	4.08E-01	--	2.45E-02	4.32E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	3.32E-02	--	6.65E-04	3.39E-02
			Antimony	--	--	--	--	--	Blood/Liver	1.05E-01	--	1.40E-02	1.19E-01
			Arsenic	2.23E-07	--	1.34E-08	--	2.37E-07	Skin/Vascular	3.48E-02	--	2.09E-03	3.68E-02
			Cadmium	--	--	--	--	--	Kidney	7.91E-02	--	6.33E-03	8.54E-02
			Chromium	4.73E-07	--	3.78E-07	--	8.51E-07	Fetotoxicity/GI Tract/Bone	2.21E-02	--	1.76E-02	3.97E-02
			Cobalt	--	--	--	--	--		6.88E-02	--	1.38E-03	7.02E-02
			Copper	--	--	--	--	--	GI Tract	4.06E-02	--	8.12E-04	4.14E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	8.06E-02	--	1.61E-03	8.22E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	9.23E-02	--	4.62E-02	1.39E-01
			Mercury	--	--	--	--	--	CNS	1.93E-02	--	3.86E-04	1.97E-02
			Nickel	--	--	--	--	--	Decr. Org. Wt.	3.14E-03	--	1.57E-03	4.71E-03
			Silver	--	--	--	--	--	Skin	5.37E-03	--	2.69E-03	8.06E-03
			Vanadium	--	--	--	--	--		1.49E-02	--	1.15E-02	2.64E-02
			Zinc	--	--	--	--	--	Blood	7.72E-03	--	1.54E-04	7.88E-03
			4,4'-DDD	2.67E-08	--	1.60E-09	--	2.83E-08	N/A	--	--	--	--
			4,4'-DDE	4.92E-09	--	2.95E-10	--	5.21E-09	N/A	--	--	--	--
			4,4'-DDT	1.41E-07	--	8.47E-09	--	1.50E-07	Liver	5.81E-02	--	3.49E-03	6.16E-02
			Aroclor-1248	2.69E-08	--	7.52E-09	--	3.44E-08	N/A	--	--	--	--
			Aroclor-1254	6.43E-09	--	1.80E-09	--	8.23E-09	Skin/Eye	1.12E-02	--	3.15E-03	1.44E-02
			Aroclor-1260	2.16E-09	--	6.06E-10	--	2.77E-09	N/A	--	--	--	--
			Dieldrin	2.69E-07	--	5.38E-08	--	3.23E-07	Liver	2.35E-02	--	4.71E-03	2.82E-02
			Heptachlor Epoxide	2.79E-09	--	5.59E-10	--	3.35E-09	Liver	1.65E-03	--	3.31E-04	1.98E-03
			Benz(a)anthracene	6.86E-08	--	1.78E-08	--	8.65E-08	N/A	--	--	--	--
			Benzo(a)pyrene	5.06E-07	--	1.32E-07	--	6.38E-07	N/A	--	--	--	--
			Benzo(b)fluoranthene	5.62E-08	--	1.46E-08	--	7.08E-08	N/A	--	--	--	--
			Benzo(k)fluoranthene	3.75E-09	--	9.74E-10	--	4.72E-09	N/A	--	--	--	--
			Chrysene	6.27E-10	--	1.63E-10	--	7.90E-10	N/A	--	--	--	--
			Dibenz(a,h)anthracene	4.90E-08	--	1.27E-08	--	6.18E-08	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.28E-08	--	5.92E-09	--	2.87E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	6.51E-05	--	1.69E-05	8.21E-05
			Phenanthrene	--	--	--	--	--	Kidney	7.00E-04	--	1.82E-04	8.82E-04
			Ethylbenzene	1.73E-10	--	1.04E-11	--	1.83E-10	Liver/Kidney	1.10E-05	--	6.60E-07	1.17E-05
			(Total)	2.64E-06	--	6.95E-07		3.34E-06		1.11E+00	--	1.43E-01	1.25E+00
			Radionuclide Total										
		Exposure Point Total						3.34E-06					1.25E+00
Exposure Medium Total								3.34E-06					1.25E+00

TABLE 9.31.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT CONSTRUCTION WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	9.46E-09	--	--	9.46E-09	Respiratory	--	6.49E-03	--	6.49E-03
			Ethylbenzene	--	2.45E-08	--	--	2.45E-08	Developmental	--	6.87E-04	--	6.87E-04
			(Total)	--	3.40E-08	--		3.40E-08		--	7.18E-03	--	7.18E-03
			Radionuclide Total										
		Exposure Point Total						3.40E-08					7.18E-03
	Exposure Medium Total							3.40E-08					7.18E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	2.48E-10	--	--	2.48E-10	Lung/Nasal	--	1.45E-05	--	1.45E-05
			Manganese	--	--	--	--	--	CNS	--	9.69E-04	--	9.69E-04
			(Total)	--	2.48E-10	--		2.48E-10		--	9.83E-04	--	9.83E-04
			Radionuclide Total										
		Exposure Point Total						2.48E-10					9.83E-04
	Exposure Medium Total							2.48E-10					9.83E-04
Soil Total								3.37E-06					1.26E+00
Receptor Total								3.37E-06					1.26E+00

Total Risk Across All Media: 3.37E-06

Total Hazard Index Across All Media: 1.26E+00

Total Blood HI =	2.09E-01
Total Bone HI =	3.97E-02
Total CNS HI =	6.26E-01
Total CNS (Behavioral) HI =	4.32E-01
Total CNS (Developmental) HI =	3.39E-02
Total Decr. Org. Wt. HI =	4.71E-03
Total Decr. Wt. Gain HI =	8.21E-05
Total Developmental HI =	3.46E-02
Total Eye HI =	1.44E-02
Total Fetotoxicity HI =	3.97E-02
Total GI Tract HI =	1.63E-01
Total Kidney HI =	8.63E-02
Total Liver HI =	2.93E-01
Total Lung HI =	1.45E-05
Total Nasal HI =	1.45E-05
Total Respiratory HI =	6.49E-03
Total Skin HI =	5.93E-02
Total Vascular HI =	3.68E-02

TABLE 9.31a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT CONSTRUCTION WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	7.58E-07	--	4.55E-08	--	8.03E-07	CNS (Behavioral)	4.08E-01	--	2.45E-02	4.32E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	3.32E-02	--	6.65E-04	3.39E-02
			Antimony	--	--	--	--	--	Blood/Liver	1.05E-01	--	1.40E-02	1.19E-01
			Cadmium	--	--	--	--	--	Kidney	7.91E-02	--	6.33E-03	8.54E-02
			Chromium	4.73E-07	--	3.78E-07	--	8.51E-07	Fetotoxicity/GI Tract/Bone	2.21E-02	--	1.76E-02	3.97E-02
			Cobalt	--	--	--	--	--		6.88E-02	--	1.38E-03	7.02E-02
			Copper	--	--	--	--	--	GI Tract	4.06E-02	--	8.12E-04	4.14E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	8.06E-02	--	1.61E-03	8.22E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	9.23E-02	--	4.62E-02	1.39E-01
			Mercury	--	--	--	--	--	CNS	1.93E-02	--	3.86E-04	1.97E-02
			Nickel	--	--	--	--	--	Decr. Org. Wt.	3.14E-03	--	1.57E-03	4.71E-03
			Silver	--	--	--	--	--	Skin	5.37E-03	--	2.69E-03	8.06E-03
			Vanadium	--	--	--	--	--		1.49E-02	--	1.15E-02	2.64E-02
			Zinc	--	--	--	--	--	Blood	7.72E-03	--	1.54E-04	7.88E-03
			4,4'-DDD	2.67E-08	--	1.60E-09	--	2.83E-08	N/A	--	--	--	--
			4,4'-DDE	4.92E-09	--	2.95E-10	--	5.21E-09	N/A	--	--	--	--
			4,4'-DDT	1.41E-07	--	8.47E-09	--	1.50E-07	Liver	5.81E-02	--	3.49E-03	6.16E-02
			Aroclor-1248	2.69E-08	--	7.52E-09	--	3.44E-08	N/A	--	--	--	--
			Aroclor-1254	6.43E-09	--	1.80E-09	--	8.23E-09	Skin/Eye	1.12E-02	--	3.15E-03	1.44E-02
			Aroclor-1260	2.16E-09	--	6.06E-10	--	2.77E-09	N/A	--	--	--	--
			Dieldrin	2.69E-07	--	5.38E-08	--	3.23E-07	Liver	2.35E-02	--	4.71E-03	2.82E-02
			Heptachlor Epoxide	2.79E-09	--	5.59E-10	--	3.35E-09	Liver	1.65E-03	--	3.31E-04	1.98E-03
			Benz(a)anthracene	6.86E-08	--	1.78E-08	--	8.65E-08	N/A	--	--	--	--
			Benzo(a)pyrene	5.06E-07	--	1.32E-07	--	6.38E-07	N/A	--	--	--	--
			Benzo(b)fluoranthene	5.62E-08	--	1.46E-08	--	7.08E-08	N/A	--	--	--	--
			Benzo(k)fluoranthene	3.75E-09	--	9.74E-10	--	4.72E-09	N/A	--	--	--	--
			Chrysene	6.27E-10	--	1.63E-10	--	7.90E-10	N/A	--	--	--	--
			Dibenz(a,h)anthracene	4.90E-08	--	1.27E-08	--	6.18E-08	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.28E-08	--	5.92E-09	--	2.87E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	6.51E-05	--	1.69E-05	8.21E-05
			Phenanthrene	--	--	--	--	--	Kidney	7.00E-04	--	1.82E-04	8.82E-04
			Ethylbenzene	1.73E-10	--	1.04E-11	--	1.83E-10	Liver/Kidney	1.10E-05	--	6.60E-07	1.17E-05
			(Total)	2.42E-06	--	6.82E-07		3.10E-06		1.08E+00	--	1.41E-01	1.22E+00
			Radionuclide Total										
		Exposure Point Total						3.10E-06					1.22E+00
Exposure Medium Total								3.10E-06					1.22E+00

TABLE 9.31a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT CONSTRUCTION WORKER EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	9.46E-09	--	--	9.46E-09	Respiratory	--	6.49E-03	--	6.49E-03
			Ethylbenzene	--	2.45E-08	--	--	2.45E-08	Developmental	--	6.87E-04	--	6.87E-04
			(Total)	--	3.40E-08	--		3.40E-08		--	7.18E-03	--	7.18E-03
			Radionuclide Total										
		Exposure Point Total						3.40E-08					7.18E-03
	Exposure Medium Total							3.40E-08					7.18E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	2.48E-10	--	--	2.48E-10	Lung/Nasal	--	1.45E-05	--	1.45E-05
			Manganese	--	--	--	--	--	CNS	--	9.69E-04	--	9.69E-04
			(Total)	--	2.48E-10	--		2.48E-10		--	9.83E-04	--	9.83E-04
			Radionuclide Total										
		Exposure Point Total						2.48E-10					9.83E-04
	Exposure Medium Total							2.48E-10					9.83E-04
Soil Total								3.13E-06					1.23E+00
Receptor Total								3.13E-06					1.23E+00

Total Risk Across All Media: 3.13E-06

Total Hazard Index Across All Media: 1.23E+00

Total Blood HI =	2.09E-01
Total Bone HI =	3.97E-02
Total CNS HI =	6.26E-01
Total CNS (Behavioral) HI =	4.32E-01
Total CNS (Developmental) HI =	3.39E-02
Total Decr. Org. Wt. HI =	4.71E-03
Total Decr. Wt. Gain HI =	8.21E-05
Total Developmental HI =	3.46E-02
Total Eye HI =	1.44E-02
Total Fetotoxicity HI =	3.97E-02
Total GI Tract HI =	1.63E-01
Total Kidney HI =	8.63E-02
Total Liver HI =	2.93E-01
Total Lung HI =	1.45E-05
Total Nasal HI =	1.45E-05
Total Respiratory HI =	6.49E-03
Total Skin HI =	2.25E-02

TABLE 9.32.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil												
			Total 2,3,7,8-TCDD Equiv.	1.03E-05	--	8.64E-07	--	1.12E-05	**Total 2,3,7,8-TCDD Equiv**	**CNS (Behavioral)**	**9.23E-01**	**--**	**7.75E-02**	**1.00E+00**
			Aluminum	--	--	--	--	--	Aluminum	CNS (Developmental)	7.52E-02	--	2.11E-03	7.73E-02
			Antimony	--	--	--	--	--	Antimony	Blood/Liver	2.37E-01	--	4.43E-02	2.82E-01
			Arsenic	3.03E-06	--	2.55E-07	--	3.29E-06	Arsenic	Skin/Vascular	7.86E-02	--	6.61E-03	8.52E-02
			Cadmium	--	--	--	--	--	Cadmium	Kidney	1.79E-01	--	2.00E-02	1.99E-01
			Chromium	3.42E-05	--	3.83E-05	--	7.25E-05	Chromium	Fetotoxicity/GI Tract/Bone	4.99E-02	--	5.59E-02	1.06E-01
			Cobalt	--	--	--	--	--	Cobalt		1.56E-01	--	4.36E-03	1.60E-01
			Copper	--	--	--	--	--	Copper	GI Tract	9.18E-02	--	2.57E-03	9.44E-02
			Iron	--	--	--	--	--	Iron	Liver/Blood/GI Tract	1.82E-01	--	5.11E-03	1.87E-01
			Lead	--	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	--	**Manganese**	**CNS**	**2.09E-01**	**--**	**1.46E-01**	**3.55E-01**
			Mercury	--	--	--	--	--	Mercury	CNS	4.37E-02	--	1.22E-03	4.49E-02
			Nickel	--	--	--	--	--	Nickel	Decr. Org. Wt.	7.10E-03	--	4.97E-03	1.21E-02
			Silver	--	--	--	--	--	Silver	Skin	1.22E-02	--	8.51E-03	2.07E-02
			Vanadium	--	--	--	--	--	Vanadium		3.38E-02	--	3.64E-02	7.02E-02
			Zinc	--	--	--	--	--	Zinc	Blood	1.75E-02	--	4.89E-04	1.80E-02
			4,4'-DDD	3.62E-07	--	3.04E-08	--	3.92E-07	4,4'-DDD	N/A	--	--	--	--
			4,4'-DDE	6.68E-08	--	5.61E-09	--	7.24E-08	4,4'-DDE	N/A	--	--	--	--
			4,4'-DDT	1.92E-06	--	1.61E-07	--	2.08E-06	4,4'-DDT	Liver	1.31E-01	--	1.10E-02	1.42E-01
			Aroclor-1248	3.65E-07	--	1.43E-07	--	5.08E-07	Aroclor-1248	N/A	--	--	--	--
			Aroclor-1254	8.73E-08	--	3.42E-08	--	1.21E-07	Aroclor-1254	Skin/Eye	2.55E-02	--	9.98E-03	3.54E-02
			Aroclor-1260	2.94E-08	--	1.15E-08	--	4.09E-08	Aroclor-1260	N/A	--	--	--	--
			Dieldrin	3.65E-06	--	1.02E-06	--	4.67E-06	Dieldrin	Liver	5.33E-02	--	1.49E-02	6.82E-02
			Heptachlor Epoxide	3.79E-08	--	1.06E-08	--	4.86E-08	Heptachlor Epoxide	Liver	3.74E-03	--	1.05E-03	4.79E-03
			Benz(a)anthracene	4.97E-06	--	1.81E-06	--	6.78E-06	Benz(a)anthracene	N/A	--	--	--	--
			Benzo(a)pyrene	3.66E-05	--	1.33E-05	--	5.00E-05	Benzo(a)pyrene	N/A	--	--	--	--
			Benzo(b)fluoranthene	4.07E-06	--	1.48E-06	--	5.55E-06	Benzo(b)fluoranthene	N/A	--	--	--	--
			Benzo(k)fluoranthene	2.71E-07	--	9.88E-08	--	3.70E-07	Benzo(k)fluoranthene	N/A	--	--	--	--
			Chrysene	4.54E-08	--	1.65E-08	--	6.19E-08	Chrysene	N/A	--	--	--	--
			Dibenz(a,h)anthracene	3.55E-06	--	1.29E-06	--	4.84E-06	Dibenz(a,h)anthracene	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.65E-06	--	6.00E-07	--	2.25E-06	Indeno(1,2,3-cd)pyrene	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Naphthalene	Decr. Wt. Gain	1.47E-04	--	5.37E-05	2.01E-04
			Phenanthrene	--	--	--	--	--	Phenanthrene	Kidney	1.58E-03	--	5.76E-04	2.16E-03
			Ethylbenzene	2.35E-09	--	1.97E-10	--	2.54E-09	Ethylbenzene	Liver/Kidney	2.49E-05	--	2.09E-06	2.70E-05
			(Total)	1.05E-04	--	5.95E-05		1.65E-04	(Total)		2.51E+00	--	4.54E-01	2.97E+00
			Radionuclide Total											
		Exposure Point Total						1.65E-04						2.97E+00
	Exposure Medium Total							1.65E-04						2.97E+00

TABLE 9.32.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil												
			Naphthalene	--	1.70E-08	--	--	1.70E-08	Naphthalene	Respiratory	--	1.95E-03	--	1.95E-03
			Ethylbenzene	--	4.41E-08	--	--	4.41E-08	Ethylbenzene	Developmental	--	2.06E-04	--	2.06E-04
			(Total)	--	6.12E-08	--		6.12E-08	(Total)		--	2.15E-03	--	2.15E-03
			Radionuclide Total											
		Exposure Point Total						6.12E-08						2.15E-03
	Exposure Medium Total							6.12E-08						2.15E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil												
			Chromium	--	2.38E-09	--	--	2.38E-09	Chromium	Lung/Nasal	--	4.34E-06	--	4.34E-06
			Manganese	--	--	--	--	--	Manganese	CNS	--	2.91E-04	--	2.91E-04
			(Total)	--	2.38E-09	--		2.38E-09	(Total)		--	2.95E-04	--	2.95E-04
			Radionuclide Total											
		Exposure Point Total						2.38E-09						2.95E-04
	Exposure Medium Total							2.38E-09						2.95E-04
Soil Total								1.65E-04						2.97E+00
Receptor Total								1.65E-04						2.97E+00

Total Risk Across All Media: 1.65E-04

Total Hazard Index Across All Media: 2.97E+00

For reporting of non-cancer hazards, COPCs that are risk drivers are shown in bold if they contribute at least a HQ of 0.2 towards a target organ HI that exceeds 1.0.
COPCs that are cancer risk drivers of importance to the recreational receptor are highlighted on a separate table for the lifetime recreational receptor.

Total Blood HI =	4.87E-01
Total Bone HI =	1.06E-01
Total CNS HI =	1.48E+00
Total CNS (Behavioral) HI =	1.00E+00
Total CNS (Developmental) HI =	7.73E-02
Total Decr. Org. Wt. HI =	1.21E-02
Total Decr. Wt. Gain HI =	2.01E-04
Total Developmental HI =	7.75E-02
Total Eye HI =	3.54E-02
Total Fetotoxicity HI =	1.06E-01
Total GI Tract HI =	3.88E-01
Total Kidney HI =	2.01E-01
Total Liver HI =	6.85E-01
Total Lung HI =	4.34E-06
Total Nasal HI =	4.34E-06
Total Respiratory HI =	1.95E-03
Total Skin HI =	1.41E-01
Total Vascular HI =	8.52E-02

TABLE 9.32a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil												
			Total 2,3,7,8-TCDD Equiv.	1.03E-05	--	8.64E-07	--	1.12E-05	**Total 2,3,7,8-TCDD Equiv**	**CNS (Behavioral)**	**9.23E-01**	**--**	**7.75E-02**	**1.00E+00**
			Aluminum	--	--	--	--	--	Aluminum	CNS (Developmental)	7.52E-02	--	2.11E-03	7.73E-02
			Antimony	--	--	--	--	--	Antimony	Blood/Liver	2.37E-01	--	4.43E-02	2.82E-01
			Cadmium	--	--	--	--	--	Cadmium	Kidney	1.79E-01	--	2.00E-02	1.99E-01
			Chromium	3.42E-05	--	3.83E-05	--	7.25E-05	Chromium	Fetotoxicity/GI Tract/Bone	4.99E-02	--	5.59E-02	1.06E-01
			Cobalt	--	--	--	--	--	Cobalt		1.56E-01	--	4.36E-03	1.60E-01
			Copper	--	--	--	--	--	Copper	GI Tract	9.18E-02	--	2.57E-03	9.44E-02
			Iron	--	--	--	--	--	Iron	Liver/Blood/GI Tract	1.82E-01	--	5.11E-03	1.87E-01
			Lead	--	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	--	**Manganese**	**CNS**	**2.09E-01**	**--**	**1.46E-01**	**3.55E-01**
			Mercury	--	--	--	--	--	Mercury	CNS	4.37E-02	--	1.22E-03	4.49E-02
			Nickel	--	--	--	--	--	Nickel	Decr. Org. Wt.	7.10E-03	--	4.97E-03	1.21E-02
			Silver	--	--	--	--	--	Silver	Skin	1.22E-02	--	8.51E-03	2.07E-02
			Vanadium	--	--	--	--	--	Vanadium		3.38E-02	--	3.64E-02	7.02E-02
			Zinc	--	--	--	--	--	Zinc	Blood	1.75E-02	--	4.89E-04	1.80E-02
			4,4'-DDD	3.62E-07	--	3.04E-08	--	3.92E-07	4,4'-DDD	N/A	--	--	--	--
			4,4'-DDE	6.68E-08	--	5.61E-09	--	7.24E-08	4,4'-DDE	N/A	--	--	--	--
			4,4'-DDT	1.92E-06	--	1.61E-07	--	2.08E-06	4,4'-DDT	Liver	1.31E-01	--	1.10E-02	1.42E-01
			Aroclor-1248	3.65E-07	--	1.43E-07	--	5.08E-07	Aroclor-1248	N/A	--	--	--	--
			Aroclor-1254	8.73E-08	--	3.42E-08	--	1.21E-07	Aroclor-1254	Skin/Eye	2.55E-02	--	9.98E-03	3.54E-02
			Aroclor-1260	2.94E-08	--	1.15E-08	--	4.09E-08	Aroclor-1260	N/A	--	--	--	--
			Dieldrin	3.65E-06	--	1.02E-06	--	4.67E-06	Dieldrin	Liver	5.33E-02	--	1.49E-02	6.82E-02
			Heptachlor Epoxide	3.79E-08	--	1.06E-08	--	4.86E-08	Heptachlor Epoxide	Liver	3.74E-03	--	1.05E-03	4.79E-03
			Benz(a)anthracene	4.97E-06	--	1.81E-06	--	6.78E-06	Benz(a)anthracene	N/A	--	--	--	--
			Benzo(a)pyrene	3.66E-05	--	1.33E-05	--	5.00E-05	Benzo(a)pyrene	N/A	--	--	--	--
			Benzo(b)fluoranthene	4.07E-06	--	1.48E-06	--	5.55E-06	Benzo(b)fluoranthene	N/A	--	--	--	--
			Benzo(k)fluoranthene	2.71E-07	--	9.88E-08	--	3.70E-07	Benzo(k)fluoranthene	N/A	--	--	--	--
			Chrysene	4.54E-08	--	1.65E-08	--	6.19E-08	Chrysene	N/A	--	--	--	--
			Dibenz(a,h)anthracene	3.55E-06	--	1.29E-06	--	4.84E-06	Dibenz(a,h)anthracene	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.65E-06	--	6.00E-07	--	2.25E-06	Indeno(1,2,3-cd)pyrene	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Naphthalene	Decr. Wt. Gain	1.47E-04	--	5.37E-05	2.01E-04
			Phenanthrene	--	--	--	--	--	Phenanthrene	Kidney	1.58E-03	--	5.76E-04	2.16E-03
			Ethylbenzene	2.35E-09	--	1.97E-10	--	2.54E-09	Ethylbenzene	Liver/Kidney	2.49E-05	--	2.09E-06	2.70E-05
			(Total)	1.02E-04	--	5.92E-05		1.61E-04	(Total)		2.43E+00	--	4.47E-01	2.88E+00
			Radionuclide Total											
		Exposure Point Total						1.61E-04						2.88E+00
Exposure Medium Total								1.61E-04						2.88E+00

TABLE 9.32a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil												
			Naphthalene	--	1.70E-08	--	--	1.70E-08	Naphthalene	Respiratory	--	1.95E-03	--	1.95E-03
			Ethylbenzene	--	4.41E-08	--	--	4.41E-08	Ethylbenzene	Developmental	--	2.06E-04	--	2.06E-04
			(Total)	--	6.12E-08	--		6.12E-08	(Total)		--	2.15E-03	--	2.15E-03
			Radionuclide Total											
		Exposure Point Total						6.12E-08						2.15E-03
	Exposure Medium Total							6.12E-08						2.15E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil												
			Chromium	--	2.38E-09	--	--	2.38E-09	Chromium	Lung/Nasal	--	4.34E-06	--	4.34E-06
			Manganese	--	--	--	--	--	Manganese	CNS	--	2.91E-04	--	2.91E-04
			(Total)	--	2.38E-09	--		2.38E-09	(Total)		--	2.95E-04	--	2.95E-04
			Radionuclide Total											
		Exposure Point Total						2.38E-09						2.95E-04
	Exposure Medium Total							2.38E-09						2.95E-04
Soil Total								1.61E-04						2.88E+00
Receptor Total								1.61E-04						2.88E+00

Total Risk Across All Media: 1.61E-04

Total Hazard Index Across All Media: 2.88E+00

For reporting of non-cancer hazards, COPCs that are risk drivers are shown in bold if they contribute at least a HQ of 0.2 towards a target organ HI that exceeds 1.0.
COPCs that are cancer risk drivers of importance to the recreational receptor are highlighted on a separate table for the lifetime recreational receptor.

Total Blood HI =	4.87E-01
Total Bone HI =	1.06E-01
Total CNS HI =	1.48E+00
Total CNS (Behavioral) HI =	1.00E+00
Total CNS (Developmental) HI =	7.73E-02
Total Decr. Org. Wt. HI =	1.21E-02
Total Decr. Wt. Gain HI =	2.01E-04
Total Developmental HI =	7.75E-02
Total Eye HI =	3.54E-02
Total Fetotoxicity HI =	1.06E-01
Total GI Tract HI =	3.88E-01
Total Kidney HI =	2.01E-01
Total Liver HI =	6.85E-01
Total Lung HI =	4.34E-06
Total Nasal HI =	4.34E-06
Total Respiratory HI =	1.95E-03
Total Skin HI =	5.61E-02

TABLE 9.33.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	4.41E-06	--	5.28E-07	--	4.94E-06	CNS (Behavioral)	9.89E-02	--	1.18E-02	1.11E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	8.06E-03	--	3.22E-04	8.38E-03
			Antimony	--	--	--	--	--	Blood/Liver	2.54E-02	--	6.77E-03	3.22E-02
			Arsenic	1.30E-06	--	1.56E-07	--	1.46E-06	Skin/Vascular	8.43E-03	--	1.01E-03	9.43E-03
			Cadmium	--	--	--	--	--	Kidney	1.92E-02	--	3.06E-03	2.22E-02
			Chromium	5.04E-06	--	8.04E-06	--	1.31E-05	Fetotoxicity/GI Tract/Bone	5.35E-03	--	8.53E-03	1.39E-02
			Cobalt	--	--	--	--	--		1.67E-02	--	6.66E-04	1.74E-02
			Copper	--	--	--	--	--	GI Tract	9.84E-03	--	3.93E-04	1.02E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.95E-02	--	7.80E-04	2.03E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	2.24E-02	--	2.23E-02	4.47E-02
			Mercury	--	--	--	--	--	CNS	4.68E-03	--	1.87E-04	4.87E-03
			Nickel	--	--	--	--	--	Decr. Org. Wt.	7.61E-04	--	7.59E-04	1.52E-03
			Silver	--	--	--	--	--	Skin	1.30E-03	--	1.30E-03	2.60E-03
			Vanadium	--	--	--	--	--		3.62E-03	--	5.56E-03	9.18E-03
			Zinc	--	--	--	--	--	Blood	1.87E-03	--	7.47E-05	1.95E-03
			4,4'-DDD	1.55E-07	--	1.86E-08	--	1.74E-07	N/A	--	--	--	--
			4,4'-DDE	2.86E-08	--	3.42E-09	--	3.20E-08	N/A	--	--	--	--
			4,4'-DDT	8.21E-07	--	9.83E-08	--	9.19E-07	Liver	1.41E-02	--	1.69E-03	1.58E-02
			Aroclor-1248	1.56E-07	--	8.73E-08	--	2.44E-07	N/A	--	--	--	--
			Aroclor-1254	3.74E-08	--	2.09E-08	--	5.83E-08	Skin/Eye	2.73E-03	--	1.52E-03	4.25E-03
			Aroclor-1260	1.26E-08	--	7.03E-09	--	1.96E-08	N/A	--	--	--	--
			Dieldrin	1.57E-06	--	6.25E-07	--	2.19E-06	Liver	5.71E-03	--	2.28E-03	7.98E-03
			Heptachlor Epoxide	1.63E-08	--	6.49E-09	--	2.27E-08	Liver	4.01E-04	--	1.60E-04	5.61E-04
			Benz(a)anthracene	7.32E-07	--	3.80E-07	--	1.11E-06	N/A	--	--	--	--
			Benzo(a)pyrene	5.40E-06	--	2.80E-06	--	8.20E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	6.00E-07	--	3.11E-07	--	9.11E-07	N/A	--	--	--	--
			Benzo(k)fluoranthene	4.00E-08	--	2.07E-08	--	6.07E-08	N/A	--	--	--	--
			Chrysene	6.69E-09	--	3.47E-09	--	1.02E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	5.23E-07	--	2.71E-07	--	7.94E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.43E-07	--	1.26E-07	--	3.69E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.58E-05	--	8.19E-06	2.40E-05
			Phenanthrene	--	--	--	--	--	Kidney	1.70E-04	--	8.80E-05	2.58E-04
			Ethylbenzene	1.01E-09	--	1.20E-10	--	1.13E-09	Liver/Kidney	2.67E-06	--	3.19E-07	2.99E-06
			(Total)	2.11E-05	--	1.35E-05		3.46E-05		2.69E-01	--	6.93E-02	3.38E-01
			Radionuclide Total										
		Exposure Point Total						3.46E-05					3.38E-01
Exposure Medium Total								3.46E-05					3.38E-01

TABLE 9.33.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	6.81E-08	--	--	6.81E-08	Respiratory	--	1.95E-03	--	1.95E-03
			Ethylbenzene	--	1.77E-07	--	--	1.77E-07	Developmental	--	2.06E-04	--	2.06E-04
			(Total)	--	2.45E-07	--		2.45E-07		--	2.15E-03	--	2.15E-03
			Radionuclide Total										
		Exposure Point Total						2.45E-07					2.15E-03
	Exposure Medium Total							2.45E-07					2.15E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	3.27E-09	--	--	3.27E-09	Lung/Nasal	--	4.34E-06	--	4.34E-06
			Manganese	--	--	--	--	--	CNS	--	2.91E-04	--	2.91E-04
			(Total)	--	3.27E-09	--		3.27E-09		--	2.95E-04	--	2.95E-04
			Radionuclide Total										
		Exposure Point Total						3.27E-09					2.95E-04
	Exposure Medium Total							3.27E-09					2.95E-04
Soil Total								3.48E-05					3.40E-01
Receptor Total								3.48E-05					3.40E-01

Total Risk Across All Media: 3.48E-05

Total Hazard Index Across All Media: 3.40E-01

Total Blood HI =	5.45E-02
Total Bone HI =	1.39E-02
Total CNS HI =	1.69E-01
Total CNS (Behavioral) HI =	1.11E-01
Total CNS (Developmental) HI =	8.38E-03
Total Decr. Org. Wt. HI =	1.52E-03
Total Decr. Wt. Gain HI =	2.40E-05
Total Developmental HI =	8.59E-03
Total Eye HI =	4.25E-03
Total Fetotoxicity HI =	1.39E-02
Total GI Tract HI =	4.44E-02
Total Kidney HI =	2.25E-02
Total Liver HI =	7.68E-02
Total Lung HI =	4.34E-06
Total Nasal HI =	4.34E-06
Total Respiratory HI =	1.95E-03
Total Skin HI =	1.63E-02
Total Vascular HI =	9.43E-03

TABLE 9.33a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	4.41E-06	--	5.28E-07	--	4.94E-06	CNS (Behavioral)	9.89E-02	--	1.18E-02	1.11E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	8.06E-03	--	3.22E-04	8.38E-03
			Antimony	--	--	--	--	--	Blood/Liver	2.54E-02	--	6.77E-03	3.22E-02
			Cadmium	--	--	--	--	--	Kidney	1.92E-02	--	3.06E-03	2.22E-02
			Chromium	5.04E-06	--	8.04E-06	--	1.31E-05	Fetotoxicity/GI Tract/Bone	5.35E-03	--	8.53E-03	1.39E-02
			Cobalt	--	--	--	--	--		1.67E-02	--	6.66E-04	1.74E-02
			Copper	--	--	--	--	--	GI Tract	9.84E-03	--	3.93E-04	1.02E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.95E-02	--	7.80E-04	2.03E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	2.24E-02	--	2.23E-02	4.47E-02
			Mercury	--	--	--	--	--	CNS	4.68E-03	--	1.87E-04	4.87E-03
			Nickel	--	--	--	--	--	Decr. Org. Wt.	7.61E-04	--	7.59E-04	1.52E-03
			Silver	--	--	--	--	--	Skin	1.30E-03	--	1.30E-03	2.60E-03
			Vanadium	--	--	--	--	--		3.62E-03	--	5.56E-03	9.18E-03
			Zinc	--	--	--	--	--	Blood	1.87E-03	--	7.47E-05	1.95E-03
			4,4'-DDD	1.55E-07	--	1.86E-08	--	1.74E-07	N/A	--	--	--	--
			4,4'-DDE	2.86E-08	--	3.42E-09	--	3.20E-08	N/A	--	--	--	--
			4,4'-DDT	8.21E-07	--	9.83E-08	--	9.19E-07	Liver	1.41E-02	--	1.69E-03	1.58E-02
			Aroclor-1248	1.56E-07	--	8.73E-08	--	2.44E-07	N/A	--	--	--	--
			Aroclor-1254	3.74E-08	--	2.09E-08	--	5.83E-08	Skin/Eye	2.73E-03	--	1.52E-03	4.25E-03
			Aroclor-1260	1.26E-08	--	7.03E-09	--	1.96E-08	N/A	--	--	--	--
			Dieldrin	1.57E-06	--	6.25E-07	--	2.19E-06	Liver	5.71E-03	--	2.28E-03	7.98E-03
			Heptachlor Epoxide	1.63E-08	--	6.49E-09	--	2.27E-08	Liver	4.01E-04	--	1.60E-04	5.61E-04
			Benz(a)anthracene	7.32E-07	--	3.80E-07	--	1.11E-06	N/A	--	--	--	--
			Benzo(a)pyrene	5.40E-06	--	2.80E-06	--	8.20E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	6.00E-07	--	3.11E-07	--	9.11E-07	N/A	--	--	--	--
			Benzo(k)fluoranthene	4.00E-08	--	2.07E-08	--	6.07E-08	N/A	--	--	--	--
			Chrysene	6.69E-09	--	3.47E-09	--	1.02E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	5.23E-07	--	2.71E-07	--	7.94E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	2.43E-07	--	1.26E-07	--	3.69E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.58E-05	--	8.19E-06	2.40E-05
			Phenanthrene	--	--	--	--	--	Kidney	1.70E-04	--	8.80E-05	2.58E-04
			Ethylbenzene	1.01E-09	--	1.20E-10	--	1.13E-09	Liver/Kidney	2.67E-06	--	3.19E-07	2.99E-06
			(Total)	1.98E-05	--	1.34E-05		3.31E-05		2.61E-01	--	6.83E-02	3.29E-01
			Radionuclide Total										
		Exposure Point Total						3.31E-05					3.29E-01
	Exposure Medium Total							3.31E-05					3.29E-01

TABLE 9.33a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	6.81E-08	--	--	6.81E-08	Respiratory	--	1.95E-03	--	1.95E-03
			Ethylbenzene	--	1.77E-07	--	--	1.77E-07	Developmental	--	2.06E-04	--	2.06E-04
			(Total)	--	2.45E-07	--		2.45E-07		--	2.15E-03	--	2.15E-03
			Radionuclide Total										
		Exposure Point Total						2.45E-07					2.15E-03
	Exposure Medium Total							2.45E-07					2.15E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	3.27E-09	--	--	3.27E-09	Lung/Nasal	--	4.34E-06	--	4.34E-06
			Manganese	--	--	--	--	--	CNS	--	2.91E-04	--	2.91E-04
			(Total)	--	3.27E-09	--		3.27E-09		--	2.95E-04	--	2.95E-04
			Radionuclide Total										
		Exposure Point Total						3.27E-09					2.95E-04
	Exposure Medium Total							3.27E-09					2.95E-04
Soil Total								3.33E-05					3.31E-01
Receptor Total								3.33E-05					3.31E-01

Total Risk Across All Media: 3.33E-05

Total Hazard Index Across All Media: 3.31E-01

Total Blood HI =	5.45E-02
Total Bone HI =	1.39E-02
Total CNS HI =	1.69E-01
Total CNS (Behavioral) HI =	1.11E-01
Total CNS (Developmental) HI =	8.38E-03
Total Decr. Org. Wt. HI =	1.52E-03
Total Decr. Wt. Gain HI =	2.40E-05
Total Developmental HI =	8.59E-03
Total Eye HI =	4.25E-03
Total Fetotoxicity HI =	1.39E-02
Total GI Tract HI =	4.44E-02
Total Kidney HI =	2.25E-02
Total Liver HI =	7.68E-02
Total Lung HI =	4.34E-06
Total Nasal HI =	4.34E-06
Total Respiratory HI =	1.95E-03
Total Skin HI =	6.85E-03

TABLE 9.34.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	**1.47E-05**	**--**	**1.39E-06**	**--**	**1.61E-05**	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Arsenic	**4.33E-06**	**--**	**4.10E-07**	**--**	**4.74E-06**	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	**3.93E-05**	**--**	**4.64E-05**	**--**	**8.56E-05**	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Copper	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Lead	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Mercury	--	--	--	--	--	N/A	N/A	--	N/A	--
			Nickel	--	--	--	--	--	N/A	N/A	--	N/A	--
			Silver	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Zinc	--	--	--	--	--	N/A	N/A	--	N/A	--
			4,4'-DDD	5.17E-07	--	4.90E-08	--	5.66E-07	N/A	N/A	--	N/A	--
			4,4'-DDE	9.54E-08	--	9.03E-09	--	1.04E-07	N/A	N/A	--	N/A	--
			4,4'-DDT	**2.74E-06**	**--**	**2.59E-07**	**--**	**3.00E-06**	N/A	N/A	--	N/A	--
			Aroclor-1248	5.21E-07	--	2.30E-07	--	7.51E-07	N/A	N/A	--	N/A	--
			Aroclor-1254	1.25E-07	--	5.51E-08	--	1.80E-07	N/A	N/A	--	N/A	--
			Aroclor-1260	4.20E-08	--	1.85E-08	--	6.05E-08	N/A	N/A	--	N/A	--
			Dieldrin	**5.22E-06**	**--**	**1.65E-06**	**--**	**6.86E-06**	N/A	N/A	--	N/A	--
			Heptachlor Epoxide	5.42E-08	--	1.71E-08	--	7.13E-08	N/A	N/A	--	N/A	--
			Benz(a)anthracene	**5.70E-06**	**--**	**2.19E-06**	**--**	**7.89E-06**	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	**4.20E-05**	**--**	**1.61E-05**	**--**	**5.82E-05**	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	**4.67E-06**	**--**	**1.79E-06**	**--**	**6.46E-06**	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	3.11E-07	--	1.19E-07	--	4.31E-07	N/A	N/A	--	N/A	--
			Chrysene	5.21E-08	--	2.00E-08	--	7.21E-08	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	**4.07E-06**	**--**	**1.56E-06**	**--**	**5.64E-06**	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	**1.89E-06**	**--**	**7.26E-07**	**--**	**2.62E-06**	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Ethylbenzene	3.35E-09	--	3.17E-10	--	3.67E-09	N/A	N/A	--	N/A	--
			(Total)	1.26E-04	--	7.30E-05		1.99E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.99E-04					--
Exposure Medium Total								1.99E-04					--

TABLE 9.34.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	8.52E-08	--	--	8.52E-08	N/A	--	N/A	--	--
			Ethylbenzene	--	2.21E-07	--	--	2.21E-07	N/A	--	N/A	--	--
			(Total)	--	3.06E-07	--		3.06E-07		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.06E-07					--
	Exposure Medium Total							3.06E-07					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	5.65E-09	--	--	5.65E-09	N/A	--	N/A	--	--
			Manganese	--	--	--	--	--	N/A	--	N/A	--	--
			(Total)	--	5.65E-09	--		5.65E-09		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						5.65E-09					--
	Exposure Medium Total							5.65E-09					--
Soil Total								1.99E-04					--
Receptor Total								1.99E-04					--

Total Risk Across All Media **1.99E-04**

Total Hazard Index Across All Media --

For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04
COPCs that are non-cancer risk drivers of importance to recreational receptors are highlighted on a separate table for the recreational child.

TABLE 9.34a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	**1.47E-05**	**--**	**1.39E-06**	**--**	**1.61E-05**	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	**3.93E-05**	**--**	**4.64E-05**	**--**	**8.56E-05**	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Copper	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Lead	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Mercury	--	--	--	--	--	N/A	N/A	--	N/A	--
			Nickel	--	--	--	--	--	N/A	N/A	--	N/A	--
			Silver	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Zinc	--	--	--	--	--	N/A	N/A	--	N/A	--
			4,4'-DDD	5.17E-07	--	4.90E-08	--	5.66E-07	N/A	N/A	--	N/A	--
			4,4'-DDE	9.54E-08	--	9.03E-09	--	1.04E-07	N/A	N/A	--	N/A	--
			4,4'-DDT	**2.74E-06**	**--**	**2.59E-07**	**--**	**3.00E-06**	N/A	N/A	--	N/A	--
			Aroclor-1248	5.21E-07	--	2.30E-07	--	7.51E-07	N/A	N/A	--	N/A	--
			Aroclor-1254	1.25E-07	--	5.51E-08	--	1.80E-07	N/A	N/A	--	N/A	--
			Aroclor-1260	4.20E-08	--	1.85E-08	--	6.05E-08	N/A	N/A	--	N/A	--
			Dieldrin	5.22E-06	--	1.65E-06	--	6.86E-06	N/A	N/A	--	N/A	--
			Heptachlor Epoxide	5.42E-08	--	1.71E-08	--	7.13E-08	N/A	N/A	--	N/A	--
			Benz(a)anthracene	**5.70E-06**	**--**	**2.19E-06**	**--**	**7.89E-06**	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	**4.20E-05**	**--**	**1.61E-05**	**--**	**5.82E-05**	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	**4.67E-06**	**--**	**1.79E-06**	**--**	**6.46E-06**	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	3.11E-07	--	1.19E-07	--	4.31E-07	N/A	N/A	--	N/A	--
			Chrysene	5.21E-08	--	2.00E-08	--	7.21E-08	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	**4.07E-06**	**--**	**1.56E-06**	**--**	**5.64E-06**	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	**1.89E-06**	**--**	**7.26E-07**	**--**	**2.62E-06**	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Ethylbenzene	3.35E-09	--	3.17E-10	--	3.67E-09	N/A	N/A	--	N/A	--
			(Total)	1.22E-04	--	7.26E-05		1.95E-04		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.95E-04					--
	Exposure Medium Total							1.95E-04					--

TABLE 9.34a.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
REASONABLE MAXIMUM EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	8.52E-08	--	--	8.52E-08	N/A	--	N/A	--	--
			Ethylbenzene	--	2.21E-07	--	--	2.21E-07	N/A	--	N/A	--	--
			(Total)	--	3.06E-07	--		3.06E-07		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.06E-07					--
	Exposure Medium Total							3.06E-07					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	5.65E-09	--	--	5.65E-09	N/A	--	N/A	--	--
			Manganese	--	--	--	--	--	N/A	--	N/A	--	--
			(Total)	--	5.65E-09	--		5.65E-09		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						5.65E-09					--
	Exposure Medium Total							5.65E-09					--
Soil Total								1.95E-04					--
Receptor Total								1.95E-04					--

Total Risk Across All Media **1.95E-04**

Total Hazard Index Across All Media --

For the reporting of cancer risks, COPCs shown in bold contribute at least 1.0E-06 to a cumulative cancer risk that exceeds 1.0E-04
COPCs that are non-cancer risk drivers of importance to recreational receptors are highlighted on a separate table for the recreational child.

TABLE 9.35.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER EXPOSURE TO SITE 3 SURFACE WATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Contact With Surface Water From Site 3	Chromium	2.13E-10	--	1.41E-08	--	1.43E-08	Fetotoxicity/GI Tract/Bone	9.92E-06	--	6.59E-04	6.69E-04
			Benzo(a)pyrene	1.25E-10	--	2.32E-07	--	2.33E-07	N/A	--	--	--	--
			(Total)	3.37E-10	--	2.47E-07		2.47E-07		9.92E-06	--	6.59E-04	6.69E-04
			Radionuclide Total										
		Exposure Point Total						2.47E-07					6.69E-04
	Exposure Medium Total							2.47E-07					6.69E-04
Surface Water Total								2.47E-07					6.69E-04
Receptor Total								2.47E-07					6.69E-04

Total Risk Across All Media: 2.47E-07

Total Hazard Index Across All Media: 6.69E-04

Total Bone HI = 6.69E-04
Total Fetotoxicity HI = 6.69E-04
Total GI Tract HI = 6.69E-04

TABLE 9.36.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SURFACE WATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Contact With Surface Water From Site 3	Chromium	1.27E-08	--	9.03E-07	--	9.16E-07	Fetotoxicity/GI Tract/Bone	1.85E-05	--	1.32E-03	1.34E-03
			Benzo(a)pyrene	7.45E-09	--	1.49E-05	--	1.49E-05	N/A	--	--	--	--
			(Total)	2.01E-08	--	1.58E-05		1.58E-05		1.85E-05	--	1.32E-03	1.34E-03
			Radionuclide Total										
		Exposure Point Total						1.58E-05					1.34E-03
	Exposure Medium Total							1.58E-05					1.34E-03
Surface Water Total								1.58E-05					1.34E-03
Receptor Total								1.58E-05					1.34E-03

Total Risk Across All Media: 1.58E-05

Total Hazard Index Across All Media: 1.34E-03

Total Bone HI = 1.34E-03
Total Fetotoxicity HI = 1.34E-03
Total GI Tract HI = 1.34E-03

TABLE 9.37.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SURFACE WATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Contact With Surface Water From Site 3	Chromium	3.74E-09	--	2.49E-07	--	2.52E-07	Fetotoxicity/GI Tract/Bone	3.97E-06	--	2.64E-04	2.68E-04
			Benzo(a)pyrene	2.19E-09	--	4.09E-06	--	4.09E-06	N/A	--	--	--	--
			(Total)	5.94E-09	--	4.34E-06		4.35E-06		3.97E-06	--	2.64E-04	2.68E-04
			Radionuclide Total										
		Exposure Point Total						4.35E-06					2.68E-04
	Exposure Medium Total							4.35E-06					2.68E-04
Surface Water Total								4.35E-06					2.68E-04
Receptor Total								4.35E-06					2.68E-04

Total Risk Across All Media: 4.35E-06

Total Hazard Index Across All Media: 2.68E-04

Total Bone HI = 2.68E-04
Total Fetotoxicity HI = 2.68E-04
Total GI Tract HI = 2.68E-04

TABLE 9.38.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SURFACE WATER
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Contact With Surface Water From Site 3	Chromium	1.64E-08	--	1.15E-06	--	1.17E-06	N/A	--	--	--	--
			Benzo(a)pyrene	9.64E-09	--	1.89E-05	--	1.90E-05		--	--	--	--
			(Total)	2.61E-08	--	2.01E-05		2.01E-05					
			Radionuclide Total										
		Exposure Point Total						2.01E-05					--
	Exposure Medium Total							2.01E-05					--
Surface Water Total								2.01E-05					--
Receptor Total								2.01E-05					--

Total Risk Across All Media 2.01E-05

Total Hazard Index Across All Media --

TABLE 9.39.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER EXPOSURE TO SITE 3 SEDIMENT
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Contact With Sediment From Site 3											
			Arsenic	3.99E-07	--	2.40E-08	--	4.23E-07	Skin/Vascular	6.21E-02	--	3.73E-03	6.59E-02
			Chromium	3.13E-07	--	2.50E-07	--	5.63E-07	Fetotoxicity/GI Tract/Bone	1.46E-02	--	1.17E-02	2.63E-02
			Benzo(a)pyrene	1.71E-07	--	4.44E-08	--	2.15E-07	N/A	--	--	--	--
			Benzo(b)fluoranthene	5.38E-08	--	1.40E-08	--	6.77E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	5.36E-08	--	1.39E-08	--	6.75E-08	N/A	--	--	--	--
			(Total)	9.91E-07	--	3.47E-07		1.34E-06		7.67E-02	--	1.54E-02	9.21E-02
			Radionuclide Total										
		Exposure Point Total						1.34E-06					9.21E-02
	Exposure Medium Total							1.34E-06					9.21E-02
Sediment Total								1.34E-06					9.21E-02
Receptor Total								1.34E-06					9.21E-02

Total Risk Across All Media: 1.34E-06

Total Hazard Index Across All Media: 9.21E-02

Total Bone HI = 2.63E-02
Total Fetotoxicity HI = 2.63E-02
Total GI Tract HI = 2.63E-02
Total Skin HI = 6.59E-02
Total Vascular HI = 6.59E-02

TABLE 9.40.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SEDIMENT
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Contact With Sediment From Site 3											
			Arsenic	1.36E-06	--	2.28E-07	--	1.58E-06	Skin/Vascular	3.51E-02	--	5.90E-03	4.10E-02
			Chromium	5.67E-06	--	1.27E-05	--	1.84E-05	Fetotoxicity/GI Tract/Bone	8.26E-03	--	1.85E-02	2.68E-02
			Benzo(a)pyrene	3.09E-06	--	2.25E-06	--	5.35E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	9.73E-07	--	7.08E-07	--	1.68E-06	N/A	--	--	--	--
			Dibenz(a,h)anthracene	9.70E-07	--	7.06E-07	--	1.68E-06	N/A	--	--	--	--
			(Total)	1.21E-05	--	1.66E-05		2.86E-05		4.34E-02	--	2.44E-02	6.78E-02
			Radionuclide Total										
		Exposure Point Total						2.86E-05					6.78E-02
	Exposure Medium Total							2.86E-05					6.78E-02
Sediment Total								2.86E-05					6.78E-02
Receptor Total								2.86E-05					6.78E-02

Total Risk Across All Media: 2.86E-05

Total Hazard Index Across All Media: 6.78E-02

Total Bone HI =	2.68E-02
Total Fetotoxicity HI =	2.68E-02
Total GI Tract HI =	2.68E-02
Total Skin HI =	4.10E-02
Total Vascular HI =	4.10E-02

TABLE 9.41.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SEDIMENT
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Contact With Sediment From Site 3											
			Arsenic	5.81E-07	--	3.97E-07	--	9.78E-07	Skin/Vascular	3.77E-03	--	2.58E-03	6.34E-03
			Chromium	8.35E-07	--	7.61E-06	--	8.45E-06	Fetotoxicity/GI Tract/Bone	8.85E-04	--	8.07E-03	8.96E-03
			Benzo(a)pyrene	4.56E-07	--	1.35E-06	--	1.81E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.43E-07	--	4.25E-07	--	5.68E-07	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.43E-07	--	4.24E-07	--	5.66E-07	N/A	--	--	--	--
			(Total)	2.16E-06	--	1.02E-05		1.24E-05		4.65E-03	--	1.06E-02	1.53E-02
			Radionuclide Total										
		Exposure Point Total						1.24E-05					1.53E-02
	Exposure Medium Total							1.24E-05					1.53E-02
Sediment Total								1.24E-05					1.53E-02
Receptor Total								1.24E-05					1.53E-02

Total Risk Across All Media: 1.24E-05

Total Hazard Index Across All Media: 1.53E-02

Total Bone HI = 8.96E-03
Total Fetotoxicity HI = 8.96E-03
Total GI Tract HI = 8.96E-03
Total Skin HI = 6.34E-03
Total Vascular HI = 6.34E-03

TABLE 9.42.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 SEDIMENT
REASONABLE MAXIMUM EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Contact With Sediment From Site 3											
			Arsenic	1.94E-06	--	6.25E-07	--	2.56E-06	N/A	N/A	--	N/A	--
			Chromium	6.50E-06	--	2.03E-05	--	2.68E-05	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	3.55E-06	--	3.60E-06	--	7.15E-06					
			Benzo(b)fluoranthene	1.12E-06	--	1.13E-06	--	2.25E-06	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	1.11E-06	--	1.13E-06	--	2.24E-06	N/A	N/A	--	N/A	--
			(Total)	1.42E-05	--	2.68E-05		4.10E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						4.10E-05					--
	Exposure Medium Total							4.10E-05					--
Sediment Total								4.10E-05					--
Receptor Total								4.10E-05					--

Total Risk Across All Media 4.10E-05

Total Hazard Index Across All Media --

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SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

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9.01.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 GROUNDWATER
9.02.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT CONTACT WITH SITE 3 GROUNDWATER
9.03.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT CONTACT WITH SITE 3 GROUNDWATER
9.04.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 HANGAR AREA DISTURBED SOIL
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9.07.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
9.07a.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL - BACKGROUND ELIMINATION
9.08.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT CONTACT WITH SITE 3 LANDFILL AREA SURFACE SOIL
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9.16a.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.17.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.17a.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION
9.18.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL
9.18a.CTE SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RECREATIONAL PERSON CONTACT WITH SITE 3 LANDFILL AREA DISTURBED SOIL - BACKGROUND ELIMINATION

TABLE 9.01.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 GROUNDWATER
CENTRAL TENDENCY EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water Contact With Site 3 Groundwater												
			Arsenic	9.16E-06	--	2.70E-08	--	9.19E-06	Arsenic	Skin/Vascular	7.13E-01	--	2.10E-03	7.15E-01
			Cobalt	--	--	--	--	--	Cobalt		3.78E-01	--	4.46E-04	3.79E-01
			Manganese	--	--	--	--	--	Manganese	CNS	8.53E-02	--	6.28E-03	9.16E-02
			Bis(2-ethylhexyl) Phthalate	2.08E-07	--	2.40E-07	--	4.49E-07	Bis(2-ethylhexyl) Phthalate	Liver	2.60E-02	--	3.01E-02	5.61E-02
			1,1-Dichloroethane	6.32E-08	--	3.69E-09	--	6.69E-08	1,1-Dichloroethane	NOEL	1.94E-03	--	1.13E-04	2.05E-03
			Bromodichloromethane	9.22E-08	--	5.63E-09	--	9.78E-08	Bromodichloromethane	Kidney	2.60E-03	--	1.59E-04	2.76E-03
			Carbon Tetrachloride	3.60E-08	--	7.19E-09	--	4.31E-08	Carbon Tetrachloride	Liver	4.49E-03	--	8.99E-04	5.39E-03
			Chloroform	2.19E-08	--	1.49E-09	--	2.34E-08	Chloroform	Liver	2.47E-03	--	1.68E-04	2.64E-03
			Dibromochloromethane	1.70E-07	--	9.67E-09	--	1.80E-07	Dibromochloromethane	Liver	3.55E-03	--	2.01E-04	3.75E-03
			Tetrachloroethene	3.70E-07	--	1.65E-07	--	5.34E-07	Tetrachloroethene	Liver	2.49E-02	--	1.11E-02	3.60E-02
			Trichloroethene	4.61E-08	--	5.96E-09	--	5.21E-08	Trichloroethene	N/A	--	--	--	--
			(Total)	1.02E-05	--	4.66E-07		1.06E-05	(Total)		1.24E+00	--	5.15E-02	1.29E+00
			Radionuclide Total											
		Exposure Point Total						1.06E-05						1.29E+00
	Exposure Medium Total							1.06E-05						1.29E+00
Groundwater Total								1.06E-05						1.29E+00
Receptor Total								1.06E-05						1.29E+00

Total Risk Across All Media: 1.06E-05

Total Hazard Index Across All Media: 1.29E+00

Total CNS HI =	9.16E-02
Total Kidney HI =	2.76E-03
Total Liver HI =	1.04E-01
Total Skin HI =	7.15E-01
Total Vascular HI =	7.15E-01

TABLE 9.02.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 GROUNDWATER
CENTRAL TENDENCY EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water Contact With Site 3 Groundwater											
			Arsenic	1.30E-05	--	2.79E-08	--	1.30E-05	Skin/Vascular	2.89E-01	--	6.20E-04	2.90E-01
			Cobalt	--	--	--	--	--		1.53E-01	--	1.32E-04	1.54E-01
			Manganese	--	--	--	--	--	CNS	3.46E-02	--	1.86E-03	3.65E-02
			Bis(2-ethylhexyl) Phthalate	2.95E-07	--	3.50E-07	--	6.45E-07	Liver	1.05E-02	--	1.25E-02	2.30E-02
			1,1-Dichloroethane	8.96E-08	--	4.64E-09	--	9.43E-08	NOEL	7.86E-04	--	4.07E-05	8.27E-04
			Bromodichloromethane	1.31E-07	--	7.35E-09	--	1.38E-07	Kidney	1.05E-03	--	5.92E-05	1.11E-03
			Carbon Tetrachloride	5.10E-08	--	9.29E-09	--	6.03E-08	Liver	1.82E-03	--	3.32E-04	2.15E-03
			Chloroform	3.11E-08	--	1.90E-09	--	3.30E-08	Liver	1.00E-03	--	6.14E-05	1.06E-03
			Dibromochloromethane	2.42E-07	--	1.28E-08	--	2.54E-07	Liver	1.44E-03	--	7.64E-05	1.51E-03
			Tetrachloroethene	5.25E-07	--	2.14E-07	--	7.38E-07	Liver	1.01E-02	--	4.11E-03	1.42E-02
			Trichloroethene	6.54E-08	--	7.63E-09	--	7.30E-08	N/A	--	--	--	--
			(Total)	1.44E-05	--	6.35E-07		1.51E-05		5.04E-01	--	1.98E-02	5.24E-01
			Radionuclide Total										
		Exposure Point Total						1.51E-05					5.24E-01
	Exposure Medium Total							1.51E-05					5.24E-01
	Air	Inhalation of Site 3 Groundwater Vapors During Showering											
			1,1-Dichloroethane	--	1.32E-08	--	--	1.32E-08	N/A	--	--	--	--
			Bromodichloromethane	--	3.10E-08	--	--	3.10E-08	N/A	--	--	--	--
			Carbon Tetrachloride	--	1.89E-09	--	--	1.89E-09	Liver	--	3.15E-05	--	3.15E-05
			Chloroform	--	1.09E-08	--	--	1.09E-08	Liver	--	4.86E-05	--	4.86E-05
			Dibromochloromethane	--	2.62E-08	--	--	2.62E-08	N/A	--	--	--	--
			Tetrachloroethene	--	1.22E-08	--	--	1.22E-08	CNS/Kidney	--	1.56E-04	--	1.56E-04
			Trichloroethene	--	4.68E-09	--	--	4.68E-09	N/A	--	--	--	--
			(Total)	--	1.00E-07	--		1.00E-07		--	2.36E-04	--	2.36E-04
			Radionuclide Total										
		Exposure Point Total						1.00E-07					2.36E-04
	Exposure Medium Total							1.00E-07					2.36E-04
Groundwater Total								1.52E-05					5.24E-01
Receptor Total								1.52E-05					5.24E-01

Total Risk Across All Media: 1.52E-05

Total Hazard Index Across All Media: 5.24E-01

Total CNS HI = 3.66E-02
Total Kidney HI = 1.27E-03
Total Liver HI = 4.21E-02
Total Skin HI = 2.90E-01
Total Vascular HI = 2.90E-01

TABLE 9.03.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 GROUNDWATER
CENTRAL TENDENCY EXPOSURE
NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water Contact With Site 3 Groundwater											
			Arsenic	2.22E-05	--	5.49E-08	--	2.22E-05	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Bis(2-ethylhexyl) Phthalate	5.03E-07	--	5.90E-07	--	1.09E-06	N/A	N/A	--	N/A	--
			1,1-Dichloroethane	1.53E-07	--	8.34E-09	--	1.61E-07	N/A	N/A	--	N/A	--
			Bromodichloromethane	2.23E-07	--	1.30E-08	--	2.36E-07	N/A	N/A	--	N/A	--
			Carbon Tetrachloride	8.70E-08	--	1.65E-08	--	1.03E-07	N/A	N/A	--	N/A	--
			Chloroform	5.30E-08	--	3.39E-09	--	5.64E-08	N/A	N/A	--	N/A	--
			Dibromochloromethane	4.12E-07	--	2.25E-08	--	4.34E-07	N/A	N/A	--	N/A	--
			Tetrachloroethene	8.94E-07	--	3.78E-07	--	1.27E-06	N/A	N/A	--	N/A	--
			Trichloroethene	1.11E-07	--	1.36E-08	--	1.25E-07	N/A	N/A	--	N/A	--
			(Total)	2.46E-05	--	1.10E-06		2.57E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						2.57E-05					--
	Exposure Medium Total							2.57E-05					--
	Air	Inhalation of Site 3 Groundwater Vapors During Showering											
			1,1-Dichloroethane	--	1.32E-08	--	--	1.32E-08	N/A	--	N/A	--	--
			Bromodichloromethane	--	3.10E-08	--	--	3.10E-08	N/A	--	N/A	--	--
			Carbon Tetrachloride	--	1.89E-09	--	--	1.89E-09	N/A	--	N/A	--	--
			Chloroform	--	1.09E-08	--	--	1.09E-08	N/A	--	N/A	--	--
			Dibromochloromethane	--	2.62E-08	--	--	2.62E-08	N/A	--	N/A	--	--
			Tetrachloroethene	--	1.22E-08	--	--	1.22E-08	N/A	--	N/A	--	--
			Trichloroethene	--	4.68E-09	--	--	4.68E-09	N/A	--	N/A	--	--
			(Total)	--	1.00E-07	--		1.00E-07		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.00E-07					--
	Exposure Medium Total							1.00E-07					--
Groundwater Total								2.58E-05					--
Receptor Total								2.58E-05					--

Total Risk Across All Media: 2.58E-05

Total Hazard Index Across All Media: --

TABLE 9.04.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	1.12E-06	--	1.64E-07	--	1.29E-06	N/A	--	--	--	--
			Benzo(a)pyrene	8.56E-06	--	1.25E-06	--	9.80E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.12E-06	--	1.64E-07	--	1.29E-06	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.55E-06	--	2.26E-07	--	1.78E-06	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	5.35E-07	--	7.79E-08	--	6.13E-07	N/A	--	--	--	--
			(Total)	1.29E-05	--	1.88E-06		1.48E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.48E-05					--
	Exposure Medium Total							1.48E-05					--
Soil Total								1.48E-05					--
Receptor Total								1.48E-05					--

Total Risk Across All Media 1.48E-05

Total Hazard Index Across All Media --

TABLE 9.05.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	1.40E-07	--	2.08E-08	--	1.61E-07	N/A	--	--	--	--
			Benzo(a)pyrene	1.07E-06	--	1.59E-07	--	1.23E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.40E-07	--	2.08E-08	--	1.61E-07	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.94E-07	--	2.87E-08	--	2.23E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	6.69E-08	--	9.91E-09	--	7.68E-08	N/A	--	--	--	--
			(Total)	1.61E-06	--	2.39E-07		1.85E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.85E-06					--
	Exposure Medium Total							1.85E-06					--
Soil Total								1.85E-06					--
Receptor Total								1.85E-06					--

Total Risk Across All Media 1.85E-06

Total Hazard Index Across All Media --

TABLE 9.06.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 HANGAR AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Hangar Area Soil											
			Benz(a)anthracene	1.26E-06	--	1.84E-07	--	1.45E-06	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	9.63E-06	--	1.40E-06	--	1.10E-05	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	1.26E-06	--	1.84E-07	--	1.45E-06	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	1.74E-06	--	2.55E-07	--	2.00E-06	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	6.02E-07	--	8.78E-08	--	6.89E-07	N/A	N/A	--	N/A	--
			(Total)	1.45E-05	--	2.12E-06		1.66E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						1.66E-05					--
	Exposure Medium Total							1.66E-05					--
Soil Total								1.66E-05					--
Receptor Total								1.66E-05					--

Total Risk Across All Media **1.66E-05**

Total Hazard Index Across All Media --

TABLE 9.07.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	2.00E-07	--	6.72E-09	--	2.07E-07	CNS (Behavioral)	5.39E-02	--	1.81E-03	5.57E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	7.01E-02	--	7.85E-04	7.09E-02
			Antimony	--	--	--	--	--	Blood/Liver	1.42E-02	--	1.06E-03	1.53E-02
			Arsenic	9.80E-07	--	3.29E-08	--	1.01E-06	Skin/Vascular	7.62E-02	--	2.56E-03	7.88E-02
			Cadmium	--	--	--	--	--	Kidney	1.20E-02	--	5.38E-04	1.25E-02
			Chromium	3.92E-06	--	1.76E-06	--	5.68E-06	Fetotoxicity/GI Tract/Bone	3.05E-02	--	1.37E-02	4.41E-02
			Cobalt	--	--	--	--	--		1.25E-01	--	1.40E-03	1.26E-01
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.32E-01	--	1.48E-03	1.34E-01
			Manganese	--	--	--	--	--	CNS	1.21E-01	--	3.38E-02	1.55E-01
			Vanadium	--	--	--	--	--		2.70E-02	--	1.16E-02	3.86E-02
			Dieldrin	2.70E-07	--	3.02E-08	--	3.00E-07	Liver	1.18E-02	--	1.32E-03	1.31E-02
			Benz(a)anthracene	1.50E-06	--	2.18E-07	--	1.72E-06	N/A	--	--	--	--
			Benzo(a)pyrene	1.13E-05	--	1.64E-06	--	1.29E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.24E-06	--	1.81E-07	--	1.42E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	8.08E-08	--	1.18E-08	--	9.25E-08	N/A	--	--	--	--
			Chrysene	1.25E-08	--	1.83E-09	--	1.44E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	7.22E-07	--	1.05E-07	--	8.27E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	5.08E-07	--	7.40E-08	--	5.82E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.19E-04	--	1.73E-05	1.36E-04
			Phenanthrene	--	--	--	--	--	Kidney	2.55E-03	--	3.71E-04	2.92E-03
			(Total)	2.07E-05	--	4.06E-06		2.47E-05		6.76E-01	--	7.04E-02	7.47E-01
			Radionuclide Total										
		Exposure Point Total						2.47E-05					7.47E-01
	Exposure Medium Total							2.47E-05					7.47E-01
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	1.83E-08	--	--	1.83E-08	Respiratory	--	6.29E-03	--	6.29E-03
			(Total)	--	1.83E-08	--		1.83E-08		--	6.29E-03	--	6.29E-03
			Radionuclide Total										
		Exposure Point Total						1.83E-08					6.29E-03
	Exposure Medium Total							1.83E-08					6.29E-03

TABLE 9.07.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.09E-09	--	--	1.09E-09	Lung/Nasal	--	1.06E-05	--	1.06E-05
			(Total)	--	1.09E-09	--		1.09E-09		--	1.06E-05	--	1.06E-05
			Radionuclide Total										
		Exposure Point Total						1.09E-09					1.06E-05
	Exposure Medium Total							1.09E-09					1.06E-05
Surface Soil Total								2.47E-05					7.53E-01
Receptor Total								2.47E-05					7.53E-01

Total Risk Across All Media: 2.47E-05

Total Hazard Index Across All Media: 7.53E-01

Total Blood HI =	1.49E-01
Total Bone HI =	4.41E-02
Total CNS HI =	2.81E-01
Total CNS (Behavioral) HI =	5.57E-02
Total CNS (Developmental) HI =	7.09E-02
Total Decr. Wt. Gain HI =	1.36E-04
Total Fetotoxicity HI =	4.41E-02
Total GI Tract HI =	1.78E-01
Total Kidney HI =	1.55E-02
Total Liver HI =	1.62E-01
Total Lung HI =	1.06E-05
Total Nasal HI =	1.06E-05
Total Respiratory HI =	6.29E-03
Total Skin HI =	7.88E-02
Total Vascular HI =	7.88E-02

TABLE 9.07a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	2.00E-07	--	6.72E-09	--	2.07E-07	CNS (Behavioral)	5.39E-02	--	1.81E-03	5.57E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	7.01E-02	--	7.85E-04	7.09E-02
			Antimony	--	--	--	--	--	Blood/Liver	1.42E-02	--	1.06E-03	1.53E-02
			Cadmium	--	--	--	--	--	Kidney	1.20E-02	--	5.38E-04	1.25E-02
			Chromium	3.92E-06	--	1.76E-06	--	5.68E-06	Fetotoxicity/GI Tract/Bone	3.05E-02	--	1.37E-02	4.41E-02
			Cobalt	--	--	--	--	--		1.25E-01	--	1.40E-03	1.26E-01
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.32E-01	--	1.48E-03	1.34E-01
			Vanadium	--	--	--	--	--		2.70E-02	--	1.16E-02	3.86E-02
			Dieldrin	2.70E-07	--	3.02E-08	--	3.00E-07	Liver	1.18E-02	--	1.32E-03	1.31E-02
			Benz(a)anthracene	1.50E-06	--	2.18E-07	--	1.72E-06	N/A	--	--	--	--
			Benzo(a)pyrene	1.13E-05	--	1.64E-06	--	1.29E-05	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.24E-06	--	1.81E-07	--	1.42E-06	N/A	--	--	--	--
			Benzo(k)fluoranthene	8.08E-08	--	1.18E-08	--	9.25E-08	N/A	--	--	--	--
			Chrysene	1.25E-08	--	1.83E-09	--	1.44E-08	N/A	--	--	--	--
			Dibenz(a,h)anthracene	7.22E-07	--	1.05E-07	--	8.27E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	5.08E-07	--	7.40E-08	--	5.82E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.19E-04	--	1.73E-05	1.36E-04
			Phenanthrene	--	--	--	--	--	Kidney	2.55E-03	--	3.71E-04	2.92E-03
			(Total)	1.97E-05	--	4.02E-06		2.37E-05		4.79E-01	--	3.41E-02	5.14E-01
			Radionuclide Total										
		Exposure Point Total						2.37E-05					5.14E-01
	Exposure Medium Total							2.37E-05					5.14E-01
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	1.83E-08	--	--	1.83E-08	Respiratory	--	6.29E-03	--	6.29E-03
			(Total)	--	1.83E-08	--		1.83E-08		--	6.29E-03	--	6.29E-03
			Radionuclide Total										
		Exposure Point Total						1.83E-08					6.29E-03
	Exposure Medium Total							1.83E-08					6.29E-03

TABLE 9.07a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.09E-09	--	--	1.09E-09	Lung/Nasal	--	1.06E-05	--	1.06E-05
			(Total)	--	1.09E-09	--		1.09E-09		--	1.06E-05	--	1.06E-05
			Radionuclide Total										
		Exposure Point Total						1.09E-09					1.06E-05
	Exposure Medium Total							1.09E-09					1.06E-05
Surface Soil Total								2.37E-05					5.20E-01
Receptor Total								2.37E-05					5.20E-01

Total Risk Across All Media: 2.37E-05

Total Hazard Index Across All Media: 5.20E-01

Total Blood HI =	1.49E-01
Total Bone HI =	4.41E-02
Total CNS (Behavioral) HI =	5.57E-02
Total CNS (Developmental) HI =	7.09E-02
Total Decr. Wt. Gain HI =	1.36E-04
Total Fetotoxicity HI =	4.41E-02
Total GI Tract HI =	1.78E-01
Total Kidney HI =	1.55E-02
Total Liver HI =	1.62E-01
Total Lung HI =	1.06E-05
Total Nasal HI =	1.06E-05
Total Respiratory HI =	6.29E-03

TABLE 9.08.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil	Total 2,3,7,8-TCDD Equiv.	7.50E-08	--	2.57E-09	--	7.76E-08	CNS (Behavioral)	5.77E-03	--	1.97E-04	5.97E-03
			Aluminum	--	--	--	--	--	CNS (Developmental)	7.51E-03	--	8.56E-05	7.60E-03
			Antimony	--	--	--	--	--	Blood/Liver	1.52E-03	--	1.16E-04	1.64E-03
			Arsenic	3.67E-07	--	1.26E-08	--	3.80E-07	Skin/Vascular	8.17E-03	--	2.79E-04	8.45E-03
			Cadmium	--	--	--	--	--	Kidney	1.29E-03	--	5.87E-05	1.35E-03
			Chromium	4.90E-07	--	2.23E-07	--	7.13E-07	Fetotoxicity/GI Tract/Bone	3.27E-03	--	1.49E-03	4.76E-03
			Cobalt	--	--	--	--	--		1.34E-02	--	1.52E-04	1.35E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.42E-02	--	1.62E-04	1.44E-02
			Manganese	--	--	--	--	--	CNS	1.29E-02	--	3.69E-03	1.66E-02
			Vanadium	--	--	--	--	--		2.89E-03	--	1.27E-03	4.16E-03
			Dieldrin	1.01E-07	--	1.15E-08	--	1.13E-07	Liver	1.26E-03	--	1.44E-04	1.41E-03
			Benz(a)anthracene	1.87E-07	--	2.77E-08	--	2.15E-07	N/A	--	--	--	--
			Benzo(a)pyrene	1.41E-06	--	2.09E-07	--	1.62E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.55E-07	--	2.30E-08	--	1.78E-07	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.01E-08	--	1.50E-09	--	1.16E-08	N/A	--	--	--	--
			Chrysene	1.57E-09	--	2.32E-10	--	1.80E-09	N/A	--	--	--	--
			Dibenz(a,h)anthracene	9.03E-08	--	1.34E-08	--	1.04E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	6.35E-08	--	9.41E-09	--	7.29E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.28E-05	--	1.89E-06	1.46E-05
			Phenanthrene	--	--	--	--	--	Kidney	2.73E-04	--	4.05E-05	3.14E-04
			(Total)	2.95E-06	--	5.34E-07		3.48E-06		7.25E-02	--	7.68E-03	8.02E-02
			Radionuclide Total										
		Exposure Point Total						3.48E-06					8.02E-02
	Exposure Medium Total							3.48E-06					8.02E-02
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	6.42E-08	--	--	6.42E-08	Respiratory	--	6.29E-03	--	6.29E-03
			(Total)	--	6.42E-08	--		6.42E-08		--	6.29E-03	--	6.29E-03
			Radionuclide Total										
		Exposure Point Total						6.42E-08					6.29E-03
	Exposure Medium Total							6.42E-08					6.29E-03

TABLE 9.08.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.27E-09	--	--	1.27E-09	Lung/Nasal	--	1.06E-05	--	1.06E-05
			(Total)	--	1.27E-09	--		1.27E-09		--	1.06E-05	--	1.06E-05
			Radionuclide Total										
		Exposure Point Total						1.27E-09					1.06E-05
	Exposure Medium Total							1.27E-09					1.06E-05
Surface Soil Total								3.55E-06					8.65E-02
Receptor Total								3.55E-06					8.65E-02

Total Risk Across All Media	3.55E-06
Total Hazard Index Across All Media	8.65E-02

Total Blood HI =	1.60E-02
Total Bone HI =	4.76E-03
Total CNS HI =	3.02E-02
Total CNS (Behavioral) HI =	5.97E-03
Total CNS (Developmental) HI =	7.60E-03
Total Decr. Wt. Gain HI =	1.46E-05
Total Fetotoxicity HI =	4.76E-03
Total GI Tract HI =	1.91E-02
Total Kidney HI =	1.66E-03
Total Liver HI =	1.74E-02
Total Lung HI =	1.06E-05
Total Nasal HI =	1.06E-05
Total Respiratory HI =	6.29E-03
Total Skin HI =	8.45E-03
Total Vascular HI =	8.45E-03

TABLE 9.08a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	7.50E-08	--	2.57E-09	--	7.76E-08	CNS (Behavioral)	5.77E-03	--	1.97E-04	5.97E-03
			Aluminum	--	--	--	--	--	CNS (Developmental)	7.51E-03	--	8.56E-05	7.60E-03
			Antimony	--	--	--	--	--	Blood/Liver	1.52E-03	--	1.16E-04	1.64E-03
			Cadmium	--	--	--	--	--	Kidney	1.29E-03	--	5.87E-05	1.35E-03
			Chromium	4.90E-07	--	2.23E-07	--	7.13E-07	Fetotoxicity/GI Tract/Bone	3.27E-03	--	1.49E-03	4.76E-03
			Cobalt	--	--	--	--	--		1.34E-02	--	1.52E-04	1.35E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	1.42E-02	--	1.62E-04	1.44E-02
			Vanadium	--	--	--	--	--		2.89E-03	--	1.27E-03	4.16E-03
			Dieldrin	1.01E-07	--	1.15E-08	--	1.13E-07	Liver	1.26E-03	--	1.44E-04	1.41E-03
			Benz(a)anthracene	1.87E-07	--	2.77E-08	--	2.15E-07	N/A	--	--	--	--
			Benzo(a)pyrene	1.41E-06	--	2.09E-07	--	1.62E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.55E-07	--	2.30E-08	--	1.78E-07	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.01E-08	--	1.50E-09	--	1.16E-08	N/A	--	--	--	--
			Chrysene	1.57E-09	--	2.32E-10	--	1.80E-09	N/A	--	--	--	--
			Dibenz(a,h)anthracene	9.03E-08	--	1.34E-08	--	1.04E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	6.35E-08	--	9.41E-09	--	7.29E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.28E-05	--	1.89E-06	1.46E-05
			Phenanthrene	--	--	--	--	--	Kidney	2.73E-04	--	4.05E-05	3.14E-04
			(Total)	2.58E-06	--	5.21E-07		3.10E-06		5.14E-02	--	3.72E-03	5.51E-02
			Radionuclide Total										
		Exposure Point Total						3.10E-06					5.51E-02
	Exposure Medium Total							3.10E-06					5.51E-02
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil											
			Naphthalene	--	6.42E-08	--	--	6.42E-08	Respiratory	--	6.29E-03	--	6.29E-03
			(Total)	--	6.42E-08	--		6.42E-08		--	6.29E-03	--	6.29E-03
			Radionuclide Total										
		Exposure Point Total						6.42E-08					6.29E-03
	Exposure Medium Total							6.42E-08					6.29E-03

TABLE 9.08a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	1.27E-09	--	--	1.27E-09	Lung/Nasal	--	1.06E-05	--	1.06E-05
			(Total)	--	1.27E-09	--		1.27E-09		--	1.06E-05	--	1.06E-05
			Radionuclide Total										
		Exposure Point Total						1.27E-09					1.06E-05
	Exposure Medium Total							1.27E-09					1.06E-05
Surface Soil Total								3.17E-06					6.14E-02
Receptor Total								3.17E-06					6.14E-02

Total Risk Across All Media: 3.17E-06

Total Hazard Index Across All Media: 6.14E-02

Total Blood HI =	1.60E-02
Total Bone HI =	4.76E-03
Total CNS (Behavioral) HI =	5.97E-03
Total CNS (Developmental) HI =	7.60E-03
Total Decr. Wt. Gain HI =	1.46E-05
Total Fetotoxicity HI =	4.76E-03
Total GI Tract HI =	1.91E-02
Total Kidney HI =	1.66E-03
Total Liver HI =	1.74E-02
Total Lung HI =	1.06E-05
Total Nasal HI =	1.06E-05
Total Respiratory HI =	6.29E-03

TABLE 9.09.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	2.75E-07	--	9.29E-09	--	2.84E-07	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Arsenic	1.35E-06	--	4.55E-08	--	1.39E-06	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	4.41E-06	--	1.98E-06	--	6.39E-06	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Dieldrin	3.71E-07	--	4.17E-08	--	4.12E-07	N/A	N/A	--	N/A	--
			Benz(a)anthracene	1.68E-06	--	2.46E-07	--	1.93E-06	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	1.27E-05	--	1.85E-06	--	1.45E-05	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	1.40E-06	--	2.04E-07	--	1.60E-06	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	9.09E-08	--	1.33E-08	--	1.04E-07	N/A	N/A	--	N/A	--
			Chrysene	1.41E-08	--	2.06E-09	--	1.62E-08	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	8.12E-07	--	1.19E-07	--	9.31E-07	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	5.72E-07	--	8.34E-08	--	6.55E-07	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			(Total)	2.36E-05	--	4.59E-06		2.82E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						2.82E-05					--
	Exposure Medium Total							2.82E-05					--

TABLE 9.09.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil							N/A	N/A	--	N/A	--
			Naphthalene	--	8.25E-08	--	--	8.25E-08	N/A	N/A	--	N/A	--
			(Total)	--	8.25E-08	--		8.25E-08	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						8.25E-08					--
	Exposure Medium Total							8.25E-08					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil											
			Chromium	--	2.36E-09	--	--	2.36E-09	N/A	N/A	--	N/A	--
			(Total)	--	2.36E-09	--		2.36E-09	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						2.36E-09					--
	Exposure Medium Total							2.36E-09					--
Surface Soil Total								2.83E-05					--
Receptor Total								2.83E-05					--

Total Risk Across All Media: 2.83E-05

Total Hazard Index Across All Media: --

TABLE 9.09a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	2.75E-07	--	9.29E-09	--	2.84E-07	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	4.41E-06	--	1.98E-06	--	6.39E-06	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Dieldrin	3.71E-07	--	4.17E-08	--	4.12E-07	N/A	N/A	--	N/A	--
			Benz(a)anthracene	1.68E-06	--	2.46E-07	--	1.93E-06	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	1.27E-05	--	1.85E-06	--	1.45E-05	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	1.40E-06	--	2.04E-07	--	1.60E-06	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	9.09E-08	--	1.33E-08	--	1.04E-07	N/A	N/A	--	N/A	--
			Chrysene	1.41E-08	--	2.06E-09	--	1.62E-08	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	8.12E-07	--	1.19E-07	--	9.31E-07	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	5.72E-07	--	8.34E-08	--	6.55E-07	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			(Total)	2.23E-05	--	4.55E-06		2.68E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						2.68E-05					--
	Exposure Medium Total							2.68E-05					--

TABLE 9.09a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil							N/A	N/A	--	N/A	--
			Naphthalene	--	8.25E-08	--	--	8.25E-08	N/A	N/A	--	N/A	--
			(Total)	--	8.25E-08	--		8.25E-08	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						8.25E-08					--
	Exposure Medium Total							8.25E-08					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil											
			Chromium	--	2.36E-09	--	--	2.36E-09	N/A	N/A	--	N/A	--
			(Total)	--	2.36E-09	--		2.36E-09	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						2.36E-09					--
	Exposure Medium Total							2.36E-09					--
Surface Soil Total								2.69E-05					--
Receptor Total								2.69E-05					--

Total Risk Across All Media: 2.69E-05

Total Hazard Index Across All Media: --

TABLE 9.10.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	4.44E-08	--	1.49E-09	--	4.59E-08	CNS (Behavioral)	1.20E-02	--	4.02E-04	1.24E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	1.56E-02	--	1.74E-04	1.58E-02
			Antimony	--	--	--	--	--	Blood/Liver	3.16E-03	--	2.36E-04	3.39E-03
			Arsenic	2.18E-07	--	7.32E-09	--	2.25E-07	Skin/Vascular	1.69E-02	--	5.69E-04	1.75E-02
			Cadmium	--	--	--	--	--	Kidney	2.67E-03	--	1.20E-04	2.79E-03
			Chromium	8.71E-07	--	3.90E-07	--	1.26E-06	Fetotoxicity/GI Tract/Bone	6.78E-03	--	3.04E-03	9.81E-03
			Cobalt	--	--	--	--	--		2.77E-02	--	3.11E-04	2.80E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	2.94E-02	--	3.30E-04	2.98E-02
			Manganese	--	--	--	--	--	CNS	2.68E-02	--	7.51E-03	3.43E-02
			Vanadium	--	--	--	--	--		6.00E-03	--	2.59E-03	8.59E-03
			Dieldrin	5.99E-08	--	6.71E-09	--	6.66E-08	Liver	2.62E-03	--	2.94E-04	2.91E-03
			Benz(a)anthracene	3.33E-07	--	4.85E-08	--	3.81E-07	N/A	--	--	--	--
			Benzo(a)pyrene	2.50E-06	--	3.64E-07	--	2.87E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.76E-07	--	4.01E-08	--	3.16E-07	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.79E-08	--	2.61E-09	--	2.06E-08	N/A	--	--	--	--
			Chrysene	2.79E-09	--	4.06E-10	--	3.19E-09	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.60E-07	--	2.34E-08	--	1.84E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.13E-07	--	1.64E-08	--	1.29E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	2.65E-05	--	3.85E-06	3.03E-05
			Phenanthrene	--	--	--	--	--	Kidney	5.67E-04	--	8.25E-05	6.49E-04
			(Total)	4.60E-06	--	9.01E-07		5.50E-06		1.50E-01	--	1.57E-02	1.66E-01
			Radionuclide Total										
		Exposure Point Total						5.50E-06					1.66E-01
	Exposure Medium Total							5.50E-06					1.66E-01

TABLE 9.10.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	1.36E-09	--	--	1.36E-09	Respiratory	--	4.66E-04	--	4.66E-04
			(Total)	--	1.36E-09	--		1.36E-09		--	4.66E-04	--	4.66E-04
			Radionuclide Total										
		Exposure Point Total						1.36E-09					4.66E-04
	Exposure Medium Total							1.36E-09					4.66E-04
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	8.08E-11	--	--	8.08E-11	Lung/Nasal	--	7.85E-07	--	7.85E-07
			(Total)	--	8.08E-11	--		8.08E-11		--	7.85E-07	--	7.85E-07
			Radionuclide Total										
		Exposure Point Total						8.08E-11					7.85E-07
	Exposure Medium Total							8.08E-11					7.85E-07
Surface Soil Total								5.50E-06					1.66E-01
Receptor Total								5.50E-06					1.66E-01

Total Risk Across All Media: 5.50E-06

Total Hazard Index Across All Media: 1.66E-01

Total Blood HI =	3.32E-02
Total Bone HI =	9.81E-03
Total CNS HI =	6.25E-02
Total CNS (Behavioral) HI =	1.24E-02
Total CNS (Developmental) HI =	1.58E-02
Total Decr. Wt. Gain HI =	3.03E-05
Total Fetotoxicity HI =	9.81E-03
Total GI Tract HI =	3.96E-02
Total Kidney HI =	3.44E-03
Total Liver HI =	3.61E-02
Total Lung HI =	7.85E-07
Total Nasal HI =	7.85E-07
Total Respiratory HI =	4.66E-04
Total Skin HI =	1.75E-02
Total Vascular HI =	1.75E-02

TABLE 9.10a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	4.44E-08	--	1.49E-09	--	4.59E-08	CNS (Behavioral)	1.20E-02	--	4.02E-04	1.24E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	1.56E-02	--	1.74E-04	1.58E-02
			Antimony	--	--	--	--	--	Blood/Liver	3.16E-03	--	2.36E-04	3.39E-03
			Cadmium	--	--	--	--	--	Kidney	2.67E-03	--	1.20E-04	2.79E-03
			Chromium	8.71E-07	--	3.90E-07	--	1.26E-06	Fetotoxicity/GI Tract/Bone	6.78E-03	--	3.04E-03	9.81E-03
			Cobalt	--	--	--	--	--		2.77E-02	--	3.11E-04	2.80E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	2.94E-02	--	3.30E-04	2.98E-02
			Vanadium	--	--	--	--	--		6.00E-03	--	2.59E-03	8.59E-03
			Dieldrin	5.99E-08	--	6.71E-09	--	6.66E-08	Liver	2.62E-03	--	2.94E-04	2.91E-03
			Benz(a)anthracene	3.33E-07	--	4.85E-08	--	3.81E-07	N/A	--	--	--	--
			Benzo(a)pyrene	2.50E-06	--	3.64E-07	--	2.87E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.76E-07	--	4.01E-08	--	3.16E-07	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.79E-08	--	2.61E-09	--	2.06E-08	N/A	--	--	--	--
			Chrysene	2.79E-09	--	4.06E-10	--	3.19E-09	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.60E-07	--	2.34E-08	--	1.84E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.13E-07	--	1.64E-08	--	1.29E-07	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	2.65E-05	--	3.85E-06	3.03E-05
			Phenanthrene	--	--	--	--	--	Kidney	5.67E-04	--	8.25E-05	6.49E-04
			(Total)	4.38E-06	--	8.94E-07		5.27E-06		1.07E-01	--	7.57E-03	1.14E-01
			Radionuclide Total										
		Exposure Point Total						5.27E-06					1.14E-01
	Exposure Medium Total							5.27E-06					1.14E-01

TABLE 9.10a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	1.36E-09	--	--	1.36E-09	Respiratory	--	4.66E-04	--	4.66E-04
			(Total)	--	1.36E-09	--		1.36E-09		--	4.66E-04	--	4.66E-04
			Radionuclide Total										
		Exposure Point Total						1.36E-09					4.66E-04
	Exposure Medium Total							1.36E-09					4.66E-04
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	8.08E-11	--	--	8.08E-11	Lung/Nasal	--	7.85E-07	--	7.85E-07
			(Total)	--	8.08E-11	--		8.08E-11		--	7.85E-07	--	7.85E-07
			Radionuclide Total										
		Exposure Point Total						8.08E-11					7.85E-07
	Exposure Medium Total							8.08E-11					7.85E-07
Surface Soil Total								5.27E-06					1.14E-01
Receptor Total								5.27E-06					1.14E-01

Total Risk Across All Media: 5.27E-06

Total Hazard Index Across All Media: 1.14E-01

Total Blood HI =	3.32E-02
Total Bone HI =	9.81E-03
Total CNS (Behavioral) HI =	1.24E-02
Total CNS (Developmental) HI =	1.58E-02
Total Decr. Wt. Gain HI =	3.03E-05
Total Fetotoxicity HI =	9.81E-03
Total GI Tract HI =	3.96E-02
Total Kidney HI =	3.44E-03
Total Liver HI =	3.61E-02
Total Lung HI =	7.85E-07
Total Nasal HI =	7.85E-07
Total Respiratory HI =	4.66E-04

TABLE 9.11.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	1.67E-08	--	5.70E-10	--	1.72E-08	CNS (Behavioral)	1.28E-03	--	4.39E-05	1.33E-03
			Aluminum	--	--	--	--	--	CNS (Developmental)	1.67E-03	--	1.90E-05	1.69E-03
			Antimony	--	--	--	--	--	Blood/Liver	3.38E-04	--	2.57E-05	3.64E-04
			Arsenic	8.17E-08	--	2.79E-09	--	8.45E-08	Skin/Vascular	1.81E-03	--	6.21E-05	1.88E-03
			Cadmium	--	--	--	--	--	Kidney	2.86E-04	--	1.30E-05	2.99E-04
			Chromium	1.09E-07	--	4.97E-08	--	1.59E-07	Fetotoxicity/GI Tract/Bone	7.26E-04	--	3.31E-04	1.06E-03
			Cobalt	--	--	--	--	--		2.97E-03	--	3.39E-05	3.01E-03
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	3.15E-03	--	3.60E-05	3.19E-03
			Manganese	--	--	--	--	--	CNS	2.87E-03	--	8.19E-04	3.69E-03
			Vanadium	--	--	--	--	--		6.43E-04	--	2.82E-04	9.25E-04
			Dieldrin	2.25E-08	--	2.56E-09	--	2.50E-08	Liver	2.81E-04	--	3.20E-05	3.13E-04
			Benz(a)anthracene	4.16E-08	--	6.17E-09	--	4.78E-08	N/A	--	--	--	--
			Benzo(a)pyrene	3.13E-07	--	4.63E-08	--	3.59E-07	N/A	--	--	--	--
			Benzo(b)fluoranthene	3.45E-08	--	5.11E-09	--	3.96E-08	N/A	--	--	--	--
			Benzo(k)fluoranthene	2.24E-09	--	3.32E-10	--	2.58E-09	N/A	--	--	--	--
			Chrysene	3.48E-10	--	5.16E-11	--	4.00E-10	N/A	--	--	--	--
			Dibenz(a,h)anthracene	2.01E-08	--	2.97E-09	--	2.30E-08	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.41E-08	--	2.09E-09	--	1.62E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	2.83E-06	--	4.20E-07	3.25E-06
			Phenanthrene	--	--	--	--	--	Kidney	6.07E-05	--	9.00E-06	6.97E-05
			(Total)	6.55E-07	--	1.19E-07		7.74E-07		1.61E-02	--	1.71E-03	1.78E-02
			Radionuclide Total										
		Exposure Point Total						7.74E-07					1.78E-02
	Exposure Medium Total							7.74E-07					1.78E-02

TABLE 9.11.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	4.75E-09	--	--	4.75E-09	Respiratory	--	4.66E-04	--	4.66E-04
			(Total)	--	4.75E-09	--		4.75E-09		--	4.66E-04	--	4.66E-04
			Radionuclide Total										
		Exposure Point Total						4.75E-09					4.66E-04
	Exposure Medium Total							4.75E-09					4.66E-04
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	9.42E-11	--	--	9.42E-11	Lung/Nasal	--	7.85E-07	--	7.85E-07
			(Total)	--	9.42E-11	--		9.42E-11		--	7.85E-07	--	7.85E-07
			Radionuclide Total										
		Exposure Point Total						9.42E-11					7.85E-07
	Exposure Medium Total							9.42E-11					7.85E-07
Surface Soil Total								7.79E-07					1.83E-02
Receptor Total								7.79E-07					1.83E-02

Total Risk Across All Media	7.79E-07
Total Hazard Index Across All Media	1.83E-02

Total Blood HI =	3.55E-03
Total Bone HI =	1.06E-03
Total CNS HI =	6.71E-03
Total CNS (Behavioral) HI =	1.33E-03
Total CNS (Developmental) HI =	1.69E-03
Total Decr. Wt. Gain HI =	3.25E-06
Total Fetotoxicity HI =	1.06E-03
Total GI Tract HI =	4.25E-03
Total Kidney HI =	3.69E-04
Total Liver HI =	3.87E-03
Total Lung HI =	7.85E-07
Total Nasal HI =	7.85E-07
Total Respiratory HI =	4.66E-04
Total Skin HI =	1.88E-03
Total Vascular HI =	1.88E-03

TABLE 9.11a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	1.67E-08	--	5.70E-10	--	1.72E-08	CNS (Behavioral)	1.28E-03	--	4.39E-05	1.33E-03
			Aluminum	--	--	--	--	--	CNS (Developmental)	1.67E-03	--	1.90E-05	1.69E-03
			Antimony	--	--	--	--	--	Blood/Liver	3.38E-04	--	2.57E-05	3.64E-04
			Cadmium	--	--	--	--	--	Kidney	2.86E-04	--	1.30E-05	2.99E-04
			Chromium	1.09E-07	--	4.97E-08	--	1.59E-07	Fetotoxicity/GI Tract/Bone	7.26E-04	--	3.31E-04	1.06E-03
			Cobalt	--	--	--	--	--		2.97E-03	--	3.39E-05	3.01E-03
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	3.15E-03	--	3.60E-05	3.19E-03
			Vanadium	--	--	--	--	--		6.43E-04	--	2.82E-04	9.25E-04
			Dieldrin	2.25E-08	--	2.56E-09	--	2.50E-08	Liver	2.81E-04	--	3.20E-05	3.13E-04
			Benz(a)anthracene	4.16E-08	--	6.17E-09	--	4.78E-08	N/A	--	--	--	--
			Benzo(a)pyrene	3.13E-07	--	4.63E-08	--	3.59E-07	N/A	--	--	--	--
			Benzo(b)fluoranthene	3.45E-08	--	5.11E-09	--	3.96E-08	N/A	--	--	--	--
			Benzo(k)fluoranthene	2.24E-09	--	3.32E-10	--	2.58E-09	N/A	--	--	--	--
			Chrysene	3.48E-10	--	5.16E-11	--	4.00E-10	N/A	--	--	--	--
			Dibenz(a,h)anthracene	2.01E-08	--	2.97E-09	--	2.30E-08	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.41E-08	--	2.09E-09	--	1.62E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	2.83E-06	--	4.20E-07	3.25E-06
			Phenanthrene	--	--	--	--	--	Kidney	6.07E-05	--	9.00E-06	6.97E-05
			(Total)	5.74E-07	--	1.16E-07		6.89E-07		1.14E-02	--	8.26E-04	1.22E-02
			Radionuclide Total										
		Exposure Point Total						6.89E-07					1.22E-02
	Exposure Medium Total							6.89E-07					1.22E-02

TABLE 9.11a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	4.75E-09	--	--	4.75E-09	Respiratory	--	4.66E-04	--	4.66E-04
			(Total)	--	4.75E-09	--		4.75E-09		--	4.66E-04	--	4.66E-04
			Radionuclide Total										
		Exposure Point Total						4.75E-09					4.66E-04
	Exposure Medium Total							4.75E-09					4.66E-04
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil	Chromium	--	9.42E-11	--	--	9.42E-11	Lung/Nasal	--	7.85E-07	--	7.85E-07
			(Total)	--	9.42E-11	--		9.42E-11		--	7.85E-07	--	7.85E-07
			Radionuclide Total										
		Exposure Point Total						9.42E-11					7.85E-07
	Exposure Medium Total							9.42E-11					7.85E-07
Surface Soil Total								6.94E-07					1.27E-02
Receptor Total								6.94E-07					1.27E-02

Total Risk Across All Media: 6.94E-07

Total Hazard Index Across All Media: 1.27E-02

Total Blood HI =	3.55E-03
Total Bone HI =	1.06E-03
Total CNS (Behavioral) HI =	1.33E-03
Total CNS (Developmental) HI =	1.69E-03
Total Decr. Wt. Gain HI =	3.25E-06
Total Fetotoxicity HI =	1.06E-03
Total GI Tract HI =	4.25E-03
Total Kidney HI =	3.69E-04
Total Liver HI =	3.87E-03
Total Lung HI =	7.85E-07
Total Nasal HI =	7.85E-07
Total Respiratory HI =	4.66E-04

TABLE 9.12.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	6.11E-08	--	2.06E-09	--	6.32E-08	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Arsenic	2.99E-07	--	1.01E-08	--	3.10E-07	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	9.80E-07	--	4.40E-07	--	1.42E-06	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Dieldrin	8.24E-08	--	9.27E-09	--	9.17E-08	N/A	N/A	--	N/A	--
			Benz(a)anthracene	3.74E-07	--	5.46E-08	--	4.29E-07	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	2.81E-06	--	4.11E-07	--	3.23E-06	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	3.10E-07	--	4.53E-08	--	3.55E-07	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	2.02E-08	--	2.95E-09	--	2.31E-08	N/A	N/A	--	N/A	--
			Chrysene	3.14E-09	--	4.57E-10	--	3.59E-09	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	1.81E-07	--	2.63E-08	--	2.07E-07	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	1.27E-07	--	1.85E-08	--	1.46E-07	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			(Total)	5.25E-06	--	1.02E-06		6.27E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						6.27E-06					--
	Exposure Medium Total							6.27E-06					--

TABLE 9.12.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil	Naphthalene	--	6.11E-09	--	--	6.11E-09	N/A	N/A	--	N/A	--
			(Total)	--	6.11E-09	--		6.11E-09	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						6.11E-09					--
	Exposure Medium Total							6.11E-09					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil							N/A	N/A	--	N/A	--
			Chromium	--	1.75E-10	--	--	1.75E-10	N/A	N/A	--	N/A	--
			(Total)	--	1.75E-10	--		1.75E-10	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						1.75E-10					--
	Exposure Medium Total							1.75E-10					--
Surface Soil Total								6.28E-06					--
Receptor Total								6.28E-06					--

Total Risk Across All Media: 6.28E-06

Total Hazard Index Across All Media: --

TABLE 9.12a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Contact With Site 3 Landfill Area Surface Soil											
			Total 2,3,7,8-TCDD Equiv.	6.11E-08	--	2.06E-09	--	6.32E-08	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	3.99E-07	--	1.80E-07	--	5.79E-07	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Dieldrin	8.24E-08	--	9.27E-09	--	9.17E-08	N/A	N/A	--	N/A	--
			Benz(a)anthracene	3.74E-07	--	5.46E-08	--	4.29E-07	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	2.81E-06	--	4.11E-07	--	3.23E-06	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	3.10E-07	--	4.53E-08	--	3.55E-07	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	2.02E-08	--	2.95E-09	--	2.31E-08	N/A	N/A	--	N/A	--
			Chrysene	3.14E-09	--	4.57E-10	--	3.59E-09	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	1.81E-07	--	2.63E-08	--	2.07E-07	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	1.27E-07	--	1.85E-08	--	1.46E-07	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			(Total)	4.37E-06	--	7.50E-07		5.12E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						5.12E-06					--
	Exposure Medium Total							5.12E-06					--

TABLE 9.12a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SURFACE SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Surface Soil							N/A	N/A	--	N/A	--
			Naphthalene	--	6.11E-09	--	--	6.11E-09	N/A	N/A	--	N/A	--
			(Total)	--	6.11E-09	--		6.11E-09	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						6.11E-09					--
	Exposure Medium Total							6.11E-09					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Surface Soil											
			Chromium	--	1.21E-10	--	--	1.21E-10	N/A	N/A	--	N/A	--
			(Total)	--	1.21E-10	--		1.21E-10	N/A	N/A	--	N/A	--
			Radionuclide Total										
		Exposure Point Total						1.21E-10					--
	Exposure Medium Total							1.21E-10					--
Surface Soil Total								5.13E-06					--
Receptor Total								5.13E-06					--

Total Risk Across All Media: 5.13E-06

Total Hazard Index Across All Media: --

TABLE 9.13.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil												
			Total 2,3,7,8-TCDD Equiv.	3.86E-06	--	1.30E-07	--	3.99E-06	Total 2,3,7,8-TCDD Equiv.	CNS (Behavioral)	1.04E+00	--	3.49E-02	1.07E+00
			Aluminum	--	--	--	--	--	Aluminum	CNS (Developmental)	8.46E-02	--	9.48E-04	8.56E-02
			Antimony	--	--	--	--	--	Antimony	Blood/Liver	2.67E-01	--	1.99E-02	2.87E-01
			Arsenic	1.14E-06	--	3.82E-08	--	1.18E-06	Arsenic	Skin/Vascular	8.85E-02	--	2.97E-03	9.14E-02
			Cadmium	--	--	--	--	--	Cadmium	Kidney	2.01E-01	--	9.02E-03	2.10E-01
			Chromium	7.22E-06	--	3.23E-06	--	1.05E-05	Chromium	Fetotoxicity/GI Tract/Bone	5.61E-02	--	2.51E-02	8.13E-02
			Cobalt	--	--	--	--	--	Cobalt		1.75E-01	--	1.96E-03	1.77E-01
			Copper	--	--	--	--	--	Copper	GI Tract	1.03E-01	--	1.16E-03	1.04E-01
			Iron	--	--	--	--	--	Iron	Liver/Blood/GI Tract	2.05E-01	--	2.30E-03	2.07E-01
			Lead	--	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	--	Manganese	CNS	2.35E-01	--	6.58E-02	3.01E-01
			Mercury	--	--	--	--	--	Mercury	CNS	4.92E-02	--	5.50E-04	4.97E-02
			Nickel	--	--	--	--	--	Nickel	Decr. Org. Wt.	7.99E-03	--	2.24E-03	1.02E-02
			Silver	--	--	--	--	--	Silver	Skin	1.37E-02	--	3.83E-03	1.75E-02
			Vanadium	--	--	--	--	--	Vanadium		3.80E-02	--	1.64E-02	5.44E-02
			Zinc	--	--	--	--	--	Zinc	Blood	1.97E-02	--	2.20E-04	1.99E-02
			4,4'-DDD	1.36E-07	--	4.56E-09	--	1.40E-07	4,4'-DDD	N/A	--	--	--	--
			4,4'-DDE	2.50E-08	--	8.41E-10	--	2.59E-08	4,4'-DDE	N/A	--	--	--	--
			4,4'-DDT	7.18E-07	--	2.41E-08	--	7.42E-07	4,4'-DDT	Liver	1.48E-01	--	4.97E-03	1.53E-01
			Aroclor-1248	1.37E-07	--	2.14E-08	--	1.58E-07	Aroclor-1248	N/A	--	--	--	--
			Aroclor-1254	3.27E-08	--	5.13E-09	--	3.79E-08	Aroclor-1254	Skin/Eye	2.86E-02	--	4.49E-03	3.31E-02
			Aroclor-1260	1.10E-08	--	1.73E-09	--	1.27E-08	Aroclor-1260	N/A	--	--	--	--
			Dieldrin	1.37E-06	--	1.53E-07	--	1.52E-06	Dieldrin	Liver	5.99E-02	--	6.71E-03	6.66E-02
			Heptachlor Epoxide	1.42E-08	--	1.59E-09	--	1.58E-08	Heptachlor Epoxide	Liver	4.21E-03	--	4.71E-04	4.68E-03
			Benz(a)anthracene	1.05E-06	--	1.53E-07	--	1.20E-06	Benz(a)anthracene	N/A	--	--	--	--
			Benzo(a)pyrene	7.73E-06	--	1.13E-06	--	8.85E-06	Benzo(a)pyrene	N/A	--	--	--	--
			Benzo(b)fluoranthene	8.58E-07	--	1.25E-07	--	9.83E-07	Benzo(b)fluoranthene	N/A	--	--	--	--
			Benzo(k)fluoranthene	5.72E-08	--	8.33E-09	--	6.56E-08	Benzo(k)fluoranthene	N/A	--	--	--	--
			Chrysene	9.57E-09	--	1.39E-09	--	1.10E-08	Chrysene	N/A	--	--	--	--
			Dibenz(a,h)anthracene	7.49E-07	--	1.09E-07	--	8.58E-07	Dibenz(a,h)anthracene	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.48E-07	--	5.06E-08	--	3.98E-07	Indeno(1,2,3-cd)pyrene	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Naphthalene	Decr. Wt. Gain	1.66E-04	--	2.41E-05	1.90E-04
			Phenanthrene	--	--	--	--	--	Phenanthrene	Kidney	1.78E-03	--	2.59E-04	2.04E-03
			Ethylbenzene	8.80E-10	--	2.96E-11	--	9.09E-10	Ethylbenzene	Liver/Kidney	2.80E-05	--	9.41E-07	2.89E-05
			(Total)	2.55E-05	--	5.19E-06		3.06E-05	(Total)		2.83E+00	--	2.04E-01	3.03E+00
			Radionuclide Total											
		Exposure Point Total						3.06E-05						3.03E+00
	Exposure Medium Total							3.06E-05						3.03E+00

TABLE 9.13.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil												
			Naphthalene	--	2.55E-08	--	--	2.55E-08	Naphthalene	Respiratory	--	8.77E-03	--	8.77E-03
			Ethylbenzene	--	6.62E-08	--	--	6.62E-08	Ethylbenzene	Developmental	--	9.27E-04	--	9.27E-04
			(Total)	--	9.18E-08	--		9.18E-08	(Total)		--	9.69E-03	--	9.69E-03
			Radionuclide Total											
		Exposure Point Total						9.18E-08						9.69E-03
	Exposure Medium Total							9.18E-08						9.69E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil												
			Chromium	--	2.01E-09	--	--	2.01E-09	Chromium	Lung/Nasal	--	1.95E-05	--	1.95E-05
			Manganese	--	--	--	--	--	Manganese	CNS	--	1.31E-03	--	1.31E-03
			(Total)	--	2.01E-09	--		2.01E-09	(Total)		--	1.33E-03	--	1.33E-03
			Radionuclide Total											
		Exposure Point Total						2.01E-09						1.33E-03
	Exposure Medium Total							2.01E-09						1.33E-03
Soil Total								3.07E-05						3.04E+00
Receptor Total								3.07E-05						3.04E+00

Total Risk Across All Media: 3.07E-05

Total Hazard Index Across All Media: 3.04E+00

Total Blood HI =	5.14E-01
Total Bone HI =	8.13E-02
Total CNS HI =	1.51E+00
Total CNS (Behavioral) HI =	1.07E+00
Total CNS (Developmental) HI =	8.56E-02
Total Decr. Org. Wt. HI =	1.02E-02
Total Decr. Wt. Gain HI =	1.90E-04
Total Developmental HI =	8.65E-02
Total Eye HI =	3.31E-02
Total Fetotoxicity HI =	8.13E-02
Total GI Tract HI =	3.93E-01
Total Kidney HI =	2.12E-01
Total Liver HI =	7.19E-01
Total Lung HI =	1.95E-05
Total Nasal HI =	1.95E-05
Total Respiratory HI =	8.77E-03
Total Skin HI =	1.42E-01
Total Vascular HI =	9.14E-02

TABLE 9.13a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil												
			Total 2,3,7,8-TCDD Equiv.	3.86E-06	--	1.30E-07	--	3.99E-06	Total 2,3,7,8-TCDD Equiv.	CNS (Behavioral)	1.04E+00	--	3.49E-02	1.07E+00
			Aluminum	--	--	--	--	--	Aluminum	CNS (Developmental)	8.46E-02	--	9.48E-04	8.56E-02
			Antimony	--	--	--	--	--	Antimony	Blood/Liver	2.67E-01	--	1.99E-02	2.87E-01
			Cadmium	--	--	--	--	--	Cadmium	Kidney	2.01E-01	--	9.02E-03	2.10E-01
			Chromium	7.22E-06	--	3.23E-06	--	1.05E-05	Chromium	Fetotoxicity/GI Tract/Bone	5.61E-02	--	2.51E-02	8.13E-02
			Cobalt	--	--	--	--	--	Cobalt		1.75E-01	--	1.96E-03	1.77E-01
			Copper	--	--	--	--	--	Copper	GI Tract	1.03E-01	--	1.16E-03	1.04E-01
			Iron	--	--	--	--	--	Iron	Liver/Blood/GI Tract	2.05E-01	--	2.30E-03	2.07E-01
			Lead	--	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	--	Manganese	CNS	2.35E-01	--	6.58E-02	3.01E-01
			Mercury	--	--	--	--	--	Mercury	CNS	4.92E-02	--	5.50E-04	4.97E-02
			Nickel	--	--	--	--	--	Nickel	Decr. Org. Wt.	7.99E-03	--	2.24E-03	1.02E-02
			Silver	--	--	--	--	--	Silver	Skin	1.37E-02	--	3.83E-03	1.75E-02
			Vanadium	--	--	--	--	--	Vanadium		3.80E-02	--	1.64E-02	5.44E-02
			Zinc	--	--	--	--	--	Zinc	Blood	1.97E-02	--	2.20E-04	1.99E-02
			4,4'-DDD	1.36E-07	--	4.56E-09	--	1.40E-07	4,4'-DDD	N/A	--	--	--	--
			4,4'-DDE	2.50E-08	--	8.41E-10	--	2.59E-08	4,4'-DDE	N/A	--	--	--	--
			4,4'-DDT	7.18E-07	--	2.41E-08	--	7.42E-07	4,4'-DDT	Liver	1.48E-01	--	4.97E-03	1.53E-01
			Aroclor-1248	1.37E-07	--	2.14E-08	--	1.58E-07	Aroclor-1248	N/A	--	--	--	--
			Aroclor-1254	3.27E-08	--	5.13E-09	--	3.79E-08	Aroclor-1254	Skin/Eye	2.86E-02	--	4.49E-03	3.31E-02
			Aroclor-1260	1.10E-08	--	1.73E-09	--	1.27E-08	Aroclor-1260	N/A	--	--	--	--
			Dieldrin	1.37E-06	--	1.53E-07	--	1.52E-06	Dieldrin	Liver	5.99E-02	--	6.71E-03	6.66E-02
			Heptachlor Epoxide	1.42E-08	--	1.59E-09	--	1.58E-08	Heptachlor Epoxide	Liver	4.21E-03	--	4.71E-04	4.68E-03
			Benz(a)anthracene	1.05E-06	--	1.53E-07	--	1.20E-06	Benz(a)anthracene	N/A	--	--	--	--
			Benzo(a)pyrene	7.73E-06	--	1.13E-06	--	8.85E-06	Benzo(a)pyrene	N/A	--	--	--	--
			Benzo(b)fluoranthene	8.58E-07	--	1.25E-07	--	9.83E-07	Benzo(b)fluoranthene	N/A	--	--	--	--
			Benzo(k)fluoranthene	5.72E-08	--	8.33E-09	--	6.56E-08	Benzo(k)fluoranthene	N/A	--	--	--	--
			Chrysene	9.57E-09	--	1.39E-09	--	1.10E-08	Chrysene	N/A	--	--	--	--
			Dibenz(a,h)anthracene	7.49E-07	--	1.09E-07	--	8.58E-07	Dibenz(a,h)anthracene	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.48E-07	--	5.06E-08	--	3.98E-07	Indeno(1,2,3-cd)pyrene	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Naphthalene	Decr. Wt. Gain	1.66E-04	--	2.41E-05	1.90E-04
			Phenanthrene	--	--	--	--	--	Phenanthrene	Kidney	1.78E-03	--	2.59E-04	2.04E-03
			Ethylbenzene	8.80E-10	--	2.96E-11	--	9.09E-10	Ethylbenzene	Liver/Kidney	2.80E-05	--	9.41E-07	2.89E-05
			(Total)	2.43E-05	--	5.15E-06		2.95E-05	(Total)		2.74E+00	--	2.01E-01	2.94E+00
			Radionuclide Total											
		Exposure Point Total						2.95E-05						2.94E+00
	Exposure Medium Total							2.95E-05						2.94E+00

TABLE 9.13a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil												
			Naphthalene	--	2.55E-08	--	--	2.55E-08	Naphthalene	Respiratory	--	8.77E-03	--	8.77E-03
			Ethylbenzene	--	6.62E-08	--	--	6.62E-08	Ethylbenzene	Developmental	--	9.27E-04	--	9.27E-04
			(Total)	--	9.18E-08	--		9.18E-08	(Total)		--	9.69E-03	--	9.69E-03
			Radionuclide Total											
		Exposure Point Total						9.18E-08						9.69E-03
	Exposure Medium Total							9.18E-08						9.69E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil												
			Chromium	--	2.01E-09	--	--	2.01E-09	Chromium	Lung/Nasal	--	1.95E-05	--	1.95E-05
			Manganese	--	--	--	--	--	Manganese	CNS	--	1.31E-03	--	1.31E-03
			(Total)	--	2.01E-09	--		2.01E-09	(Total)		--	1.33E-03	--	1.33E-03
			Radionuclide Total											
		Exposure Point Total						2.01E-09						1.33E-03
	Exposure Medium Total							2.01E-09						1.33E-03
Soil Total								2.96E-05						2.95E+00
Receptor Total								2.96E-05						2.95E+00

Total Risk Across All Media: 2.96E-05

Total Hazard Index Across All Media: 2.95E+00

Total Blood HI =	5.14E-01
Total Bone HI =	8.13E-02
Total CNS HI =	1.51E+00
Total CNS (Behavioral) HI =	1.07E+00
Total CNS (Developmental) HI =	8.56E-02
Total Decr. Org. Wt. HI =	1.02E-02
Total Decr. Wt. Gain HI =	1.90E-04
Total Developmental HI =	8.65E-02
Total Eye HI =	3.31E-02
Total Fetotoxicity HI =	8.13E-02
Total GI Tract HI =	3.93E-01
Total Kidney HI =	2.12E-01
Total Liver HI =	7.19E-01
Total Lung HI =	1.95E-05
Total Nasal HI =	1.95E-05
Total Respiratory HI =	8.77E-03
Total Skin HI =	5.06E-02

TABLE 9.14.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	1.45E-06	--	4.95E-08	--	1.50E-06	CNS (Behavioral)	1.11E-01	--	3.81E-03	1.15E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	9.07E-03	--	1.03E-04	9.17E-03
			Antimony	--	--	--	--	--	Blood/Liver	2.86E-02	--	2.18E-03	3.08E-02
			Arsenic	4.27E-07	--	1.46E-08	--	4.41E-07	Skin/Vascular	9.48E-03	--	3.24E-04	9.80E-03
			Cadmium	--	--	--	--	--	Kidney	2.16E-02	--	9.84E-04	2.26E-02
			Chromium	9.02E-07	--	4.11E-07	--	1.31E-06	Fetotoxicity/GI Tract/Bone	6.01E-03	--	2.74E-03	8.76E-03
			Cobalt	--	--	--	--	--		1.88E-02	--	2.14E-04	1.90E-02
			Copper	--	--	--	--	--	GI Tract	1.11E-02	--	1.26E-04	1.12E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	2.20E-02	--	2.51E-04	2.22E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	2.52E-02	--	7.18E-03	3.24E-02
			Mercury	--	--	--	--	--	CNS	5.27E-03	--	6.00E-05	5.33E-03
			Nickel	--	--	--	--	--	Decr. Org. Wt.	8.56E-04	--	2.44E-04	1.10E-03
			Silver	--	--	--	--	--	Skin	1.47E-03	--	4.18E-04	1.88E-03
			Vanadium	--	--	--	--	--		4.08E-03	--	1.79E-03	5.86E-03
			Zinc	--	--	--	--	--	Blood	2.11E-03	--	2.40E-05	2.13E-03
			4,4'-DDD	5.09E-08	--	1.74E-09	--	5.26E-08	N/A	--	--	--	--
			4,4'-DDE	9.39E-09	--	3.21E-10	--	9.71E-09	N/A	--	--	--	--
			4,4'-DDT	2.69E-07	--	9.21E-09	--	2.79E-07	Liver	1.58E-02	--	5.42E-04	1.64E-02
			Aroclor-1248	5.13E-08	--	8.19E-09	--	5.95E-08	N/A	--	--	--	--
			Aroclor-1254	1.23E-08	--	1.96E-09	--	1.42E-08	Skin/Eye	3.07E-03	--	4.90E-04	3.56E-03
			Aroclor-1260	4.13E-09	--	6.59E-10	--	4.79E-09	N/A	--	--	--	--
			Dieldrin	5.14E-07	--	5.86E-08	--	5.72E-07	Liver	6.42E-03	--	7.32E-04	7.15E-03
			Heptachlor Epoxide	5.33E-09	--	6.08E-10	--	5.94E-09	Liver	4.51E-04	--	5.14E-05	5.02E-04
			Benz(a)anthracene	1.31E-07	--	1.94E-08	--	1.50E-07	N/A	--	--	--	--
			Benzo(a)pyrene	9.66E-07	--	1.43E-07	--	1.11E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.07E-07	--	1.59E-08	--	1.23E-07	N/A	--	--	--	--
			Benzo(k)fluoranthene	7.15E-09	--	1.06E-09	--	8.21E-09	N/A	--	--	--	--
			Chrysene	1.20E-09	--	1.77E-10	--	1.37E-09	N/A	--	--	--	--
			Dibenz(a,h)anthracene	9.36E-08	--	1.39E-08	--	1.07E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	4.35E-08	--	6.44E-09	--	4.99E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.78E-05	--	2.63E-06	2.04E-05
			Phenanthrene	--	--	--	--	--	Kidney	1.91E-04	--	2.83E-05	2.19E-04
			Ethylbenzene	3.30E-10	--	1.13E-11	--	3.41E-10	Liver/Kidney	3.00E-06	--	1.03E-07	3.10E-06
			(Total)	5.04E-06	--	7.57E-07		5.80E-06		3.03E-01	--	2.23E-02	3.25E-01
			Radionuclide Total										
		Exposure Point Total						5.80E-06					3.25E-01
	Exposure Medium Total							5.80E-06					3.25E-01

TABLE 9.14.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	8.94E-08	--	--	8.94E-08	Respiratory	--	8.77E-03	--	8.77E-03
			Ethylbenzene	--	2.32E-07	--	--	2.32E-07	Developmental	--	9.27E-04	--	9.27E-04
			(Total)	--	3.21E-07	--		3.21E-07		--	9.69E-03	--	9.69E-03
			Radionuclide Total										
		Exposure Point Total						3.21E-07					9.69E-03
	Exposure Medium Total							3.21E-07					9.69E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	2.34E-09	--	--	2.34E-09	Lung/Nasal	--	1.95E-05	--	1.95E-05
			Manganese	--	--	--	--	--	CNS	--	1.31E-03	--	1.31E-03
			(Total)	--	2.34E-09	--		2.34E-09		--	1.33E-03	--	1.33E-03
			Radionuclide Total										
		Exposure Point Total						2.34E-09					1.33E-03
	Exposure Medium Total							2.34E-09					1.33E-03
Soil Total								6.12E-06					3.36E-01
Receptor Total								6.12E-06					3.36E-01

Total Risk Across All Media: 6.12E-06

Total Hazard Index Across All Media: 3.36E-01

Total Blood HI =	5.52E-02
Total Bone HI =	8.76E-03
Total CNS HI =	1.63E-01
Total CNS (Behavioral) HI =	1.15E-01
Total CNS (Developmental) HI =	9.17E-03
Total Decr. Org. Wt. HI =	1.10E-03
Total Decr. Wt. Gain HI =	2.04E-05
Total Developmental HI =	1.01E-02
Total Eye HI =	3.56E-03
Total Fetotoxicity HI =	8.76E-03
Total GI Tract HI =	4.22E-02
Total Kidney HI =	2.28E-02
Total Liver HI =	7.71E-02
Total Lung HI =	1.95E-05
Total Nasal HI =	1.95E-05
Total Respiratory HI =	8.77E-03
Total Skin HI =	1.52E-02
Total Vascular HI =	9.80E-03

TABLE 9.14a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	1.45E-06	--	4.95E-08	--	1.50E-06	CNS (Behavioral)	1.11E-01	--	3.81E-03	1.15E-01
			Aluminum	--	--	--	--	--	CNS (Developmental)	9.07E-03	--	1.03E-04	9.17E-03
			Antimony	--	--	--	--	--	Blood/Liver	2.86E-02	--	2.18E-03	3.08E-02
			Cadmium	--	--	--	--	--	Kidney	2.16E-02	--	9.84E-04	2.26E-02
			Chromium	9.02E-07	--	4.11E-07	--	1.31E-06	Fetotoxicity/GI Tract/Bone	6.01E-03	--	2.74E-03	8.76E-03
			Cobalt	--	--	--	--	--		1.88E-02	--	2.14E-04	1.90E-02
			Copper	--	--	--	--	--	GI Tract	1.11E-02	--	1.26E-04	1.12E-02
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	2.20E-02	--	2.51E-04	2.22E-02
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	2.52E-02	--	7.18E-03	3.24E-02
			Mercury	--	--	--	--	--	CNS	5.27E-03	--	6.00E-05	5.33E-03
			Nickel	--	--	--	--	--	Decr. Org. Wt.	8.56E-04	--	2.44E-04	1.10E-03
			Silver	--	--	--	--	--	Skin	1.47E-03	--	4.18E-04	1.88E-03
			Vanadium	--	--	--	--	--		4.08E-03	--	1.79E-03	5.86E-03
			Zinc	--	--	--	--	--	Blood	2.11E-03	--	2.40E-05	2.13E-03
			4,4'-DDD	5.09E-08	--	1.74E-09	--	5.26E-08	N/A	--	--	--	--
			4,4'-DDE	9.39E-09	--	3.21E-10	--	9.71E-09	N/A	--	--	--	--
			4,4'-DDT	2.69E-07	--	9.21E-09	--	2.79E-07	Liver	1.58E-02	--	5.42E-04	1.64E-02
			Aroclor-1248	5.13E-08	--	8.19E-09	--	5.95E-08	N/A	--	--	--	--
			Aroclor-1254	1.23E-08	--	1.96E-09	--	1.42E-08	Skin/Eye	3.07E-03	--	4.90E-04	3.56E-03
			Aroclor-1260	4.13E-09	--	6.59E-10	--	4.79E-09	N/A	--	--	--	--
			Dieldrin	5.14E-07	--	5.86E-08	--	5.72E-07	Liver	6.42E-03	--	7.32E-04	7.15E-03
			Heptachlor Epoxide	5.33E-09	--	6.08E-10	--	5.94E-09	Liver	4.51E-04	--	5.14E-05	5.02E-04
			Benz(a)anthracene	1.31E-07	--	1.94E-08	--	1.50E-07	N/A	--	--	--	--
			Benzo(a)pyrene	9.66E-07	--	1.43E-07	--	1.11E-06	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.07E-07	--	1.59E-08	--	1.23E-07	N/A	--	--	--	--
			Benzo(k)fluoranthene	7.15E-09	--	1.06E-09	--	8.21E-09	N/A	--	--	--	--
			Chrysene	1.20E-09	--	1.77E-10	--	1.37E-09	N/A	--	--	--	--
			Dibenz(a,h)anthracene	9.36E-08	--	1.39E-08	--	1.07E-07	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	4.35E-08	--	6.44E-09	--	4.99E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	1.78E-05	--	2.63E-06	2.04E-05
			Phenanthrene	--	--	--	--	--	Kidney	1.91E-04	--	2.83E-05	2.19E-04
			Ethylbenzene	3.30E-10	--	1.13E-11	--	3.41E-10	Liver/Kidney	3.00E-06	--	1.03E-07	3.10E-06
			(Total)	4.62E-06	--	7.42E-07		5.36E-06		2.93E-01	--	2.20E-02	3.15E-01
			Radionuclide Total										
		Exposure Point Total						5.36E-06					3.15E-01
	Exposure Medium Total							5.36E-06					3.15E-01

TABLE 9.14a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	8.94E-08	--	--	8.94E-08	Respiratory	--	8.77E-03	--	8.77E-03
			Ethylbenzene	--	2.32E-07	--	--	2.32E-07	Developmental	--	9.27E-04	--	9.27E-04
			(Total)	--	3.21E-07	--		3.21E-07		--	9.69E-03	--	9.69E-03
			Radionuclide Total										
		Exposure Point Total						3.21E-07					9.69E-03
	Exposure Medium Total							3.21E-07					9.69E-03
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	2.34E-09	--	--	2.34E-09	Lung/Nasal	--	1.95E-05	--	1.95E-05
			Manganese	--	--	--	--	--	CNS	--	1.31E-03	--	1.31E-03
			(Total)	--	2.34E-09	--		2.34E-09		--	1.33E-03	--	1.33E-03
			Radionuclide Total										
		Exposure Point Total						2.34E-09					1.33E-03
	Exposure Medium Total							2.34E-09					1.33E-03
Soil Total								5.68E-06					3.26E-01
Receptor Total								5.68E-06					3.26E-01

Total Risk Across All Media: 5.68E-06

Total Hazard Index Across All Media: 3.26E-01

Total Blood HI =	5.52E-02
Total Bone HI =	8.76E-03
Total CNS HI =	1.63E-01
Total CNS (Behavioral) HI =	1.15E-01
Total CNS (Developmental) HI =	9.17E-03
Total Decr. Org. Wt. HI =	1.10E-03
Total Decr. Wt. Gain HI =	2.04E-05
Total Developmental HI =	1.01E-02
Total Eye HI =	3.56E-03
Total Fetotoxicity HI =	8.76E-03
Total GI Tract HI =	4.22E-02
Total Kidney HI =	2.28E-02
Total Liver HI =	7.71E-02
Total Lung HI =	1.95E-05
Total Nasal HI =	1.95E-05
Total Respiratory HI =	8.77E-03
Total Skin HI =	5.44E-03

TABLE 9.15.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	5.30E-06	--	1.79E-07	--	5.48E-06	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Arsenic	1.56E-06	--	5.28E-08	--	1.62E-06	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	8.12E-06	--	3.64E-06	--	1.18E-05	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Copper	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Lead	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Mercury	--	--	--	--	--	N/A	N/A	--	N/A	--
			Nickel	--	--	--	--	--	N/A	N/A	--	N/A	--
			Silver	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Zinc	--	--	--	--	--	N/A	N/A	--	N/A	--
			4,4'-DDD	1.87E-07	--	6.30E-09	--	1.93E-07	N/A	N/A	--	N/A	--
			4,4'-DDE	3.44E-08	--	1.16E-09	--	3.56E-08	N/A	N/A	--	N/A	--
			4,4'-DDT	9.88E-07	--	3.33E-08	--	1.02E-06	N/A	N/A	--	N/A	--
			Aroclor-1248	1.88E-07	--	2.96E-08	--	2.18E-07	N/A	N/A	--	N/A	--
			Aroclor-1254	4.50E-08	--	7.09E-09	--	5.21E-08	N/A	N/A	--	N/A	--
			Aroclor-1260	1.51E-08	--	2.39E-09	--	1.75E-08	N/A	N/A	--	N/A	--
			Dieldrin	1.88E-06	--	2.12E-07	--	2.10E-06	N/A	N/A	--	N/A	--
			Heptachlor Epoxide	1.96E-08	--	2.20E-09	--	2.18E-08	N/A	N/A	--	N/A	--
			Benz(a)anthracene	1.18E-06	--	1.72E-07	--	1.35E-06	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	8.69E-06	--	1.27E-06	--	9.96E-06	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	9.66E-07	--	1.41E-07	--	1.11E-06	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	6.44E-08	--	9.39E-09	--	7.38E-08	N/A	N/A	--	N/A	--
			Chrysene	1.08E-08	--	1.57E-09	--	1.23E-08	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	8.42E-07	--	1.23E-07	--	9.65E-07	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	3.91E-07	--	5.71E-08	--	4.48E-07	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Ethylbenzene	1.21E-09	--	4.08E-11	--	1.25E-09	N/A	N/A	--	N/A	--
			(Total)	3.05E-05	--	5.94E-06		3.64E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.64E-05					--
	Exposure Medium Total							3.64E-05					--

TABLE 9.15.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	1.15E-07	--	--	1.15E-07	N/A	--	N/A	--	--
			Ethylbenzene	--	2.98E-07	--	--	2.98E-07	N/A	--	N/A	--	--
			(Total)	--	4.13E-07	--		4.13E-07		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						4.13E-07					--
	Exposure Medium Total							4.13E-07					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	4.35E-09	--	--	4.35E-09	N/A	--	N/A	--	--
			Manganese	--	--	--	--	--	N/A	--	N/A	--	--
			(Total)	--	4.35E-09	--		4.35E-09		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						4.35E-09					--
	Exposure Medium Total							4.35E-09					--
Soil Total								3.68E-05					--
Receptor Total								3.68E-05					--

Total Risk Across All Media: 3.68E-05

Total Hazard Index Across All Media: --

TABLE 9.15a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	5.30E-06	--	1.79E-07	--	5.48E-06	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	8.12E-06	--	3.64E-06	--	1.18E-05	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Copper	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Lead	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Mercury	--	--	--	--	--	N/A	N/A	--	N/A	--
			Nickel	--	--	--	--	--	N/A	N/A	--	N/A	--
			Silver	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Zinc	--	--	--	--	--	N/A	N/A	--	N/A	--
			4,4'-DDD	1.87E-07	--	6.30E-09	--	1.93E-07	N/A	N/A	--	N/A	--
			4,4'-DDE	3.44E-08	--	1.16E-09	--	3.56E-08	N/A	N/A	--	N/A	--
			4,4'-DDT	9.88E-07	--	3.33E-08	--	1.02E-06	N/A	N/A	--	N/A	--
			Aroclor-1248	1.88E-07	--	2.96E-08	--	2.18E-07	N/A	N/A	--	N/A	--
			Aroclor-1254	4.50E-08	--	7.09E-09	--	5.21E-08	N/A	N/A	--	N/A	--
			Aroclor-1260	1.51E-08	--	2.39E-09	--	1.75E-08	N/A	N/A	--	N/A	--
			Dieldrin	1.88E-06	--	2.12E-07	--	2.10E-06	N/A	N/A	--	N/A	--
			Heptachlor Epoxide	1.96E-08	--	2.20E-09	--	2.18E-08	N/A	N/A	--	N/A	--
			Benz(a)anthracene	1.18E-06	--	1.72E-07	--	1.35E-06	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	8.69E-06	--	1.27E-06	--	9.96E-06	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	9.66E-07	--	1.41E-07	--	1.11E-06	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	6.44E-08	--	9.39E-09	--	7.38E-08	N/A	N/A	--	N/A	--
			Chrysene	1.08E-08	--	1.57E-09	--	1.23E-08	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	8.42E-07	--	1.23E-07	--	9.65E-07	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	3.91E-07	--	5.71E-08	--	4.48E-07	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Ethylbenzene	1.21E-09	--	4.08E-11	--	1.25E-09	N/A	N/A	--	N/A	--
			(Total)	2.89E-05	--	5.89E-06		3.48E-05		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.48E-05					--
	Exposure Medium Total							3.48E-05					--

TABLE 9.15a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME RESIDENT EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	1.15E-07	--	--	1.15E-07	N/A	--	N/A	--	--
			Ethylbenzene	--	2.98E-07	--	--	2.98E-07	N/A	--	N/A	--	--
			(Total)	--	4.13E-07	--		4.13E-07		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						4.13E-07					--
	Exposure Medium Total							4.13E-07					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	4.35E-09	--	--	4.35E-09	N/A	--	N/A	--	--
			Manganese	--	--	--	--	--	N/A	--	N/A	--	--
			(Total)	--	4.35E-09	--		4.35E-09		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						4.35E-09					--
	Exposure Medium Total							4.35E-09					--
Soil Total								3.52E-05					--
Receptor Total								3.52E-05					--

Total Risk Across All Media: 3.52E-05

Total Hazard Index Across All Media: --

TABLE 9.16.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil												
			Total 2,3,7,8-TCDD Equiv.	8.57E-07	--	2.88E-08	--	8.86E-07	Total 2,3,7,8-TCDD Equiv.	CNS (Behavioral)	2.31E-01	--	7.75E-03	2.39E-01
			Aluminum	--	--	--	--	--	Aluminum	CNS (Developmental)	1.88E-02	--	2.11E-04	1.90E-02
			Antimony	--	--	--	--	--	Antimony	Blood/Liver	5.94E-02	--	4.43E-03	6.38E-02
			Arsenic	2.53E-07	--	8.49E-09	--	2.61E-07	Arsenic	Skin/Vascular	1.97E-02	--	6.61E-04	2.03E-02
			Cadmium	--	--	--	--	--	Cadmium	Kidney	4.47E-02	--	2.00E-03	4.67E-02
			Chromium	1.60E-06	--	7.18E-07	--	2.32E-06	Chromium	Fetotoxicity/GI Tract/Bone	1.25E-02	--	5.59E-03	1.81E-02
			Cobalt	--	--	--	--	--	Cobalt		3.89E-02	--	4.36E-04	3.94E-02
			Copper	--	--	--	--	--	Copper	GI Tract	2.30E-02	--	2.57E-04	2.32E-02
			Iron	--	--	--	--	--	Iron	Liver/Blood/GI Tract	4.56E-02	--	5.11E-04	4.61E-02
			Lead	--	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	--	Manganese	CNS	5.22E-02	--	1.46E-02	6.69E-02
			Mercury	--	--	--	--	--	Mercury	CNS	1.09E-02	--	1.22E-04	1.10E-02
			Nickel	--	--	--	--	--	Nickel	Decr. Org. Wt.	1.78E-03	--	4.97E-04	2.27E-03
			Silver	--	--	--	--	--	Silver	Skin	3.04E-03	--	8.51E-04	3.89E-03
			Vanadium	--	--	--	--	--	Vanadium		8.45E-03	--	3.64E-03	1.21E-02
			Zinc	--	--	--	--	--	Zinc	Blood	4.37E-03	--	4.89E-05	4.42E-03
			4,4'-DDD	3.02E-08	--	1.01E-09	--	3.12E-08	4,4'-DDD	N/A	--	--	--	--
			4,4'-DDE	5.56E-09	--	1.87E-10	--	5.75E-09	4,4'-DDE	N/A	--	--	--	--
			4,4'-DDT	1.60E-07	--	5.36E-09	--	1.65E-07	4,4'-DDT	Liver	3.29E-02	--	1.10E-03	3.40E-02
			Aroclor-1248	3.04E-08	--	4.77E-09	--	3.52E-08	Aroclor-1248	N/A	--	--	--	--
			Aroclor-1254	7.27E-09	--	1.14E-09	--	8.41E-09	Aroclor-1254	Skin/Eye	6.36E-03	--	9.98E-04	7.36E-03
			Aroclor-1260	2.45E-09	--	3.84E-10	--	2.83E-09	Aroclor-1260	N/A	--	--	--	--
			Dieldrin	3.04E-07	--	3.41E-08	--	3.38E-07	Dieldrin	Liver	1.33E-02	--	1.49E-03	1.48E-02
			Heptachlor Epoxide	3.16E-09	--	3.54E-10	--	3.51E-09	Heptachlor Epoxide	Liver	9.35E-04	--	1.05E-04	1.04E-03
			Benz(a)anthracene	2.33E-07	--	3.39E-08	--	2.67E-07	Benz(a)anthracene	N/A	--	--	--	--
			Benzo(a)pyrene	1.72E-06	--	2.50E-07	--	1.97E-06	Benzo(a)pyrene	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.91E-07	--	2.78E-08	--	2.19E-07	Benzo(b)fluoranthene	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.27E-08	--	1.85E-09	--	1.46E-08	Benzo(k)fluoranthene	N/A	--	--	--	--
			Chrysene	2.13E-09	--	3.10E-10	--	2.44E-09	Chrysene	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.66E-07	--	2.42E-08	--	1.91E-07	Dibenz(a,h)anthracene	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	7.73E-08	--	1.12E-08	--	8.85E-08	Indeno(1,2,3-cd)pyrene	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Naphthalene	Decr. Wt. Gain	3.69E-05	--	5.37E-06	4.22E-05
			Phenanthrene	--	--	--	--	--	Phenanthrene	Kidney	3.96E-04	--	5.76E-05	4.53E-04
			Ethylbenzene	1.96E-10	--	6.57E-12	--	2.02E-10	Ethylbenzene	Liver/Kidney	6.22E-06	--	2.09E-07	6.43E-06
			(Total)	5.66E-06	--	1.15E-06		6.81E-06	(Total)		6.28E-01	--	4.54E-02	6.73E-01
			Radionuclide Total											
		Exposure Point Total						6.81E-06						6.73E-01
Exposure Medium Total								6.81E-06						6.73E-01

TABLE 9.16.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil												
			Naphthalene	--	1.89E-09	--	--	1.89E-09	Naphthalene	Respiratory	--	6.49E-04	--	6.49E-04
			Ethylbenzene	--	4.91E-09	--	--	4.91E-09	Ethylbenzene	Developmental	--	6.87E-05	--	6.87E-05
			(Total)	--	6.80E-09	--		6.80E-09	(Total)		--	7.18E-04	--	7.18E-04
			Radionuclide Total											
		Exposure Point Total						6.80E-09						7.18E-04
	Exposure Medium Total							6.80E-09						7.18E-04
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil												
			Chromium	--	1.49E-10	--	--	1.49E-10	Chromium	Lung/Nasal	--	1.45E-06	--	1.45E-06
			Manganese	--	--	--	--	--	Manganese	CNS	--	9.69E-05	--	9.69E-05
			(Total)	--	1.49E-10	--		1.49E-10	(Total)		--	9.83E-05	--	9.83E-05
			Radionuclide Total											
		Exposure Point Total						1.49E-10						9.83E-05
	Exposure Medium Total							1.49E-10						9.83E-05
Soil Total								6.82E-06						6.74E-01
Receptor Total								6.82E-06						6.74E-01

Total Risk Across All Media	6.82E-06
Total Hazard Index Across All Media	6.74E-01

Total Blood HI =	1.14E-01
Total Bone HI =	1.81E-02
Total CNS HI =	3.36E-01
Total CNS (Behavioral) HI =	2.39E-01
Total CNS (Developmental) HI =	1.90E-02
Total Decr. Org. Wt. HI =	2.27E-03
Total Decr. Wt. Gain HI =	4.22E-05
Total Developmental HI =	1.91E-02
Total Eye HI =	7.36E-03
Total Fetotoxicity HI =	1.81E-02
Total GI Tract HI =	8.74E-02
Total Kidney HI =	4.72E-02
Total Liver HI =	1.60E-01
Total Lung HI =	1.45E-06
Total Nasal HI =	1.45E-06
Total Respiratory HI =	6.49E-04
Total Skin HI =	3.16E-02
Total Vascular HI =	2.03E-02

TABLE 9.16a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil												
			Total 2,3,7,8-TCDD Equiv.	8.57E-07	--	2.88E-08	--	8.86E-07	Total 2,3,7,8-TCDD Equiv.	CNS (Behavioral)	2.31E-01	--	7.75E-03	2.39E-01
			Aluminum	--	--	--	--	--	Aluminum	CNS (Developmental)	1.88E-02	--	2.11E-04	1.90E-02
			Antimony	--	--	--	--	--	Antimony	Blood/Liver	5.94E-02	--	4.43E-03	6.38E-02
			Cadmium	--	--	--	--	--	Cadmium	Kidney	4.47E-02	--	2.00E-03	4.67E-02
			Chromium	1.60E-06	--	7.18E-07	--	2.32E-06	Chromium	Fetotoxicity/GI Tract/Bone	1.25E-02	--	5.59E-03	1.81E-02
			Cobalt	--	--	--	--	--	Cobalt		3.89E-02	--	4.36E-04	3.94E-02
			Copper	--	--	--	--	--	Copper	GI Tract	2.30E-02	--	2.57E-04	2.32E-02
			Iron	--	--	--	--	--	Iron	Liver/Blood/GI Tract	4.56E-02	--	5.11E-04	4.61E-02
			Lead	--	--	--	--	--	Lead	N/A	--	--	--	--
			Manganese	--	--	--	--	--	Manganese	CNS	5.22E-02	--	1.46E-02	6.69E-02
			Mercury	--	--	--	--	--	Mercury	CNS	1.09E-02	--	1.22E-04	1.10E-02
			Nickel	--	--	--	--	--	Nickel	Decr. Org. Wt.	1.78E-03	--	4.97E-04	2.27E-03
			Silver	--	--	--	--	--	Silver	Skin	3.04E-03	--	8.51E-04	3.89E-03
			Vanadium	--	--	--	--	--	Vanadium		8.45E-03	--	3.64E-03	1.21E-02
			Zinc	--	--	--	--	--	Zinc	Blood	4.37E-03	--	4.89E-05	4.42E-03
			4,4'-DDD	3.02E-08	--	1.01E-09	--	3.12E-08	4,4'-DDD	N/A	--	--	--	--
			4,4'-DDE	5.56E-09	--	1.87E-10	--	5.75E-09	4,4'-DDE	N/A	--	--	--	--
			4,4'-DDT	1.60E-07	--	5.36E-09	--	1.65E-07	4,4'-DDT	Liver	3.29E-02	--	1.10E-03	3.40E-02
			Aroclor-1248	3.04E-08	--	4.77E-09	--	3.52E-08	Aroclor-1248	N/A	--	--	--	--
			Aroclor-1254	7.27E-09	--	1.14E-09	--	8.41E-09	Aroclor-1254	Skin/Eye	6.36E-03	--	9.98E-04	7.36E-03
			Aroclor-1260	2.45E-09	--	3.84E-10	--	2.83E-09	Aroclor-1260	N/A	--	--	--	--
			Dieldrin	3.04E-07	--	3.41E-08	--	3.38E-07	Dieldrin	Liver	1.33E-02	--	1.49E-03	1.48E-02
			Heptachlor Epoxide	3.16E-09	--	3.54E-10	--	3.51E-09	Heptachlor Epoxide	Liver	9.35E-04	--	1.05E-04	1.04E-03
			Benz(a)anthracene	2.33E-07	--	3.39E-08	--	2.67E-07	Benz(a)anthracene	N/A	--	--	--	--
			Benzo(a)pyrene	1.72E-06	--	2.50E-07	--	1.97E-06	Benzo(a)pyrene	N/A	--	--	--	--
			Benzo(b)fluoranthene	1.91E-07	--	2.78E-08	--	2.19E-07	Benzo(b)fluoranthene	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.27E-08	--	1.85E-09	--	1.46E-08	Benzo(k)fluoranthene	N/A	--	--	--	--
			Chrysene	2.13E-09	--	3.10E-10	--	2.44E-09	Chrysene	N/A	--	--	--	--
			Dibenz(a,h)anthracene	1.66E-07	--	2.42E-08	--	1.91E-07	Dibenz(a,h)anthracene	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	7.73E-08	--	1.12E-08	--	8.85E-08	Indeno(1,2,3-cd)pyrene	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Naphthalene	Decr. Wt. Gain	3.69E-05	--	5.37E-06	4.22E-05
			Phenanthrene	--	--	--	--	--	Phenanthrene	Kidney	3.96E-04	--	5.76E-05	4.53E-04
			Ethylbenzene	1.96E-10	--	6.57E-12	--	2.02E-10	Ethylbenzene	Liver/Kidney	6.22E-06	--	2.09E-07	6.43E-06
			(Total)	5.40E-06	--	1.14E-06		6.55E-06	(Total)		6.08E-01	--	4.47E-02	6.53E-01
			Radionuclide Total											
		Exposure Point Total						6.55E-06						6.53E-01
	Exposure Medium Total							6.55E-06						6.53E-01

TABLE 9.16a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CHILD TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total		Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil												
			Naphthalene	--	1.89E-09	--	--	1.89E-09	Naphthalene	Respiratory	--	6.49E-04	--	6.49E-04
			Ethylbenzene	--	4.91E-09	--	--	4.91E-09	Ethylbenzene	Developmental	--	6.87E-05	--	6.87E-05
			(Total)	--	6.80E-09	--		6.80E-09	(Total)		--	7.18E-04	--	7.18E-04
			Radionuclide Total											
		Exposure Point Total						6.80E-09						7.18E-04
	Exposure Medium Total							6.80E-09						7.18E-04
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil												
			Chromium	--	1.49E-10	--	--	1.49E-10	Chromium	Lung/Nasal	--	1.45E-06	--	1.45E-06
			Manganese	--	--	--	--	--	Manganese	CNS	--	9.69E-05	--	9.69E-05
			(Total)	--	1.49E-10	--		1.49E-10	(Total)		--	9.83E-05	--	9.83E-05
			Radionuclide Total											
		Exposure Point Total						1.49E-10						9.83E-05
	Exposure Medium Total							1.49E-10						9.83E-05
Soil Total								6.56E-06						6.54E-01
Receptor Total								6.56E-06						6.54E-01

Total Risk Across All Media: 6.56E-06

Total Hazard Index Across All Media: 6.54E-01

Total Blood HI =	1.14E-01
Total Bone HI =	1.81E-02
Total CNS HI =	3.36E-01
Total CNS (Behavioral) HI =	2.39E-01
Total CNS (Developmental) HI =	1.90E-02
Total Decr. Org. Wt. HI =	2.27E-03
Total Decr. Wt. Gain HI =	4.22E-05
Total Developmental HI =	1.91E-02
Total Eye HI =	7.36E-03
Total Fetotoxicity HI =	1.81E-02
Total GI Tract HI =	8.74E-02
Total Kidney HI =	4.72E-02
Total Liver HI =	1.60E-01
Total Lung HI =	1.45E-06
Total Nasal HI =	1.45E-06
Total Respiratory HI =	6.49E-04
Total Skin HI =	1.13E-02

TABLE 9.17.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	3.21E-07	--	1.10E-08	--	3.32E-07	CNS (Behavioral)	2.47E-02	--	8.46E-04	2.56E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	2.01E-03	--	2.30E-05	2.04E-03
			Antimony	--	--	--	--	--	Blood/Liver	6.36E-03	--	4.83E-04	6.84E-03
			Arsenic	9.48E-08	--	3.24E-09	--	9.80E-08	Skin/Vascular	2.11E-03	--	7.20E-05	2.18E-03
			Cadmium	--	--	--	--	--	Kidney	4.79E-03	--	2.19E-04	5.01E-03
			Chromium	2.00E-07	--	9.14E-08	--	2.92E-07	Fetotoxicity/GI Tract/Bone	1.34E-03	--	6.09E-04	1.95E-03
			Cobalt	--	--	--	--	--		4.17E-03	--	4.76E-05	4.22E-03
			Copper	--	--	--	--	--	GI Tract	2.46E-03	--	2.80E-05	2.49E-03
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	4.88E-03	--	5.57E-05	4.94E-03
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	5.60E-03	--	1.60E-03	7.19E-03
			Mercury	--	--	--	--	--	CNS	1.17E-03	--	1.33E-05	1.18E-03
			Nickel	--	--	--	--	--	Decr. Org. Wt.	1.90E-04	--	5.42E-05	2.45E-04
			Silver	--	--	--	--	--	Skin	3.26E-04	--	9.28E-05	4.18E-04
			Vanadium	--	--	--	--	--		9.06E-04	--	3.97E-04	1.30E-03
			Zinc	--	--	--	--	--	Blood	4.68E-04	--	5.34E-06	4.73E-04
			4,4'-DDD	1.13E-08	--	3.87E-10	--	1.17E-08	N/A	--	--	--	--
			4,4'-DDE	2.09E-09	--	7.14E-11	--	2.16E-09	N/A	--	--	--	--
			4,4'-DDT	5.99E-08	--	2.05E-09	--	6.19E-08	Liver	3.52E-03	--	1.20E-04	3.64E-03
			Aroclor-1248	1.14E-08	--	1.82E-09	--	1.32E-08	N/A	--	--	--	--
			Aroclor-1254	2.73E-09	--	4.35E-10	--	3.16E-09	Skin/Eye	6.82E-04	--	1.09E-04	7.91E-04
			Aroclor-1260	9.18E-10	--	1.46E-10	--	1.06E-09	N/A	--	--	--	--
			Dieldrin	1.14E-07	--	1.30E-08	--	1.27E-07	Liver	1.43E-03	--	1.63E-04	1.59E-03
			Heptachlor Epoxide	1.19E-09	--	1.35E-10	--	1.32E-09	Liver	1.00E-04	--	1.14E-05	1.12E-04
			Benz(a)anthracene	2.91E-08	--	4.32E-09	--	3.34E-08	N/A	--	--	--	--
			Benzo(a)pyrene	2.15E-07	--	3.18E-08	--	2.47E-07	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.38E-08	--	3.53E-09	--	2.74E-08	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.59E-09	--	2.36E-10	--	1.83E-09	N/A	--	--	--	--
			Chrysene	2.66E-10	--	3.94E-11	--	3.05E-10	N/A	--	--	--	--
			Dibenz(a,h)anthracene	2.08E-08	--	3.08E-09	--	2.39E-08	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	9.66E-09	--	1.43E-09	--	1.11E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	3.95E-06	--	5.85E-07	4.53E-06
			Phenanthrene	--	--	--	--	--	Kidney	4.24E-05	--	6.28E-06	4.87E-05
			Ethylbenzene	7.33E-11	--	2.51E-12	--	7.58E-11	Liver/Kidney	6.67E-07	--	2.28E-08	6.89E-07
			(Total)	1.12E-06	--	1.68E-07		1.29E-06		6.73E-02	--	4.95E-03	7.22E-02
			Radionuclide Total										
		Exposure Point Total						1.29E-06					7.22E-02
Exposure Medium Total								1.29E-06					7.22E-02

TABLE 9.17.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	6.62E-09	--	--	6.62E-09	Respiratory	--	6.49E-04	--	6.49E-04
			Ethylbenzene	--	1.72E-08	--	--	1.72E-08	Developmental	--	6.87E-05	--	6.87E-05
			(Total)	--	2.38E-08	--		2.38E-08		--	7.18E-04	--	7.18E-04
			Radionuclide Total										
		Exposure Point Total						2.38E-08					7.18E-04
	Exposure Medium Total							2.38E-08					7.18E-04
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	1.73E-10	--	--	1.73E-10	Lung/Nasal	--	1.45E-06	--	1.45E-06
			Manganese	--	--	--	--	--	CNS	--	9.69E-05	--	9.69E-05
			(Total)	--	1.73E-10	--		1.73E-10		--	9.83E-05	--	9.83E-05
			Radionuclide Total										
		Exposure Point Total						1.73E-10					9.83E-05
	Exposure Medium Total							1.73E-10					9.83E-05
Soil Total								1.31E-06					7.30E-02
Receptor Total								1.31E-06					7.30E-02

Total Risk Across All Media: 1.31E-06

Total Hazard Index Across All Media: 7.30E-02

Total Blood HI =	1.23E-02
Total Bone HI =	1.95E-03
Total CNS HI =	3.61E-02
Total CNS (Behavioral) HI =	2.56E-02
Total CNS (Developmental) HI =	2.04E-03
Total Decr. Org. Wt. HI =	2.45E-04
Total Decr. Wt. Gain HI =	4.53E-06
Total Developmental HI =	2.11E-03
Total Eye HI =	7.91E-04
Total Fetotoxicity HI =	1.95E-03
Total GI Tract HI =	9.37E-03
Total Kidney HI =	5.06E-03
Total Liver HI =	1.71E-02
Total Lung HI =	1.45E-06
Total Nasal HI =	1.45E-06
Total Respiratory HI =	6.49E-04
Total Skin HI =	3.39E-03
Total Vascular HI =	2.18E-03

TABLE 9.17a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	3.21E-07	--	1.10E-08	--	3.32E-07	CNS (Behavioral)	2.47E-02	--	8.46E-04	2.56E-02
			Aluminum	--	--	--	--	--	CNS (Developmental)	2.01E-03	--	2.30E-05	2.04E-03
			Antimony	--	--	--	--	--	Blood/Liver	6.36E-03	--	4.83E-04	6.84E-03
			Cadmium	--	--	--	--	--	Kidney	4.79E-03	--	2.19E-04	5.01E-03
			Chromium	2.00E-07	--	9.14E-08	--	2.92E-07	Fetotoxicity/GI Tract/Bone	1.34E-03	--	6.09E-04	1.95E-03
			Cobalt	--	--	--	--	--		4.17E-03	--	4.76E-05	4.22E-03
			Copper	--	--	--	--	--	GI Tract	2.46E-03	--	2.80E-05	2.49E-03
			Iron	--	--	--	--	--	Liver/Blood/GI Tract	4.88E-03	--	5.57E-05	4.94E-03
			Lead	--	--	--	--	--	N/A	--	--	--	--
			Manganese	--	--	--	--	--	CNS	5.60E-03	--	1.60E-03	7.19E-03
			Mercury	--	--	--	--	--	CNS	1.17E-03	--	1.33E-05	1.18E-03
			Nickel	--	--	--	--	--	Decr. Org. Wt.	1.90E-04	--	5.42E-05	2.45E-04
			Silver	--	--	--	--	--	Skin	3.26E-04	--	9.28E-05	4.18E-04
			Vanadium	--	--	--	--	--		9.06E-04	--	3.97E-04	1.30E-03
			Zinc	--	--	--	--	--	Blood	4.68E-04	--	5.34E-06	4.73E-04
			4,4'-DDD	1.13E-08	--	3.87E-10	--	1.17E-08	N/A	--	--	--	--
			4,4'-DDE	2.09E-09	--	7.14E-11	--	2.16E-09	N/A	--	--	--	--
			4,4'-DDT	5.99E-08	--	2.05E-09	--	6.19E-08	Liver	3.52E-03	--	1.20E-04	3.64E-03
			Aroclor-1248	1.14E-08	--	1.82E-09	--	1.32E-08	N/A	--	--	--	--
			Aroclor-1254	2.73E-09	--	4.35E-10	--	3.16E-09	Skin/Eye	6.82E-04	--	1.09E-04	7.91E-04
			Aroclor-1260	9.18E-10	--	1.46E-10	--	1.06E-09	N/A	--	--	--	--
			Dieldrin	1.14E-07	--	1.30E-08	--	1.27E-07	Liver	1.43E-03	--	1.63E-04	1.59E-03
			Heptachlor Epoxide	1.19E-09	--	1.35E-10	--	1.32E-09	Liver	1.00E-04	--	1.14E-05	1.12E-04
			Benz(a)anthracene	2.91E-08	--	4.32E-09	--	3.34E-08	N/A	--	--	--	--
			Benzo(a)pyrene	2.15E-07	--	3.18E-08	--	2.47E-07	N/A	--	--	--	--
			Benzo(b)fluoranthene	2.38E-08	--	3.53E-09	--	2.74E-08	N/A	--	--	--	--
			Benzo(k)fluoranthene	1.59E-09	--	2.36E-10	--	1.83E-09	N/A	--	--	--	--
			Chrysene	2.66E-10	--	3.94E-11	--	3.05E-10	N/A	--	--	--	--
			Dibenz(a,h)anthracene	2.08E-08	--	3.08E-09	--	2.39E-08	N/A	--	--	--	--
			Indeno(1,2,3-cd)pyrene	9.66E-09	--	1.43E-09	--	1.11E-08	N/A	--	--	--	--
			Naphthalene	--	--	--	--	--	Decr. Wt. Gain	3.95E-06	--	5.85E-07	4.53E-06
			Phenanthrene	--	--	--	--	--	Kidney	4.24E-05	--	6.28E-06	4.87E-05
			Ethylbenzene	7.33E-11	--	2.51E-12	--	7.58E-11	Liver/Kidney	6.67E-07	--	2.28E-08	6.89E-07
			(Total)	1.03E-06	--	1.65E-07		1.19E-06		6.52E-02	--	4.88E-03	7.01E-02
			Radionuclide Total										
		Exposure Point Total						1.19E-06					7.01E-02
	Exposure Medium Total							1.19E-06					7.01E-02

TABLE 9.17a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	6.62E-09	--	--	6.62E-09	Respiratory	--	6.49E-04	--	6.49E-04
			Ethylbenzene	--	1.72E-08	--	--	1.72E-08	Developmental	--	6.87E-05	--	6.87E-05
			(Total)	--	2.38E-08	--		2.38E-08		--	7.18E-04	--	7.18E-04
			Radionuclide Total										
		Exposure Point Total						2.38E-08					7.18E-04
	Exposure Medium Total							2.38E-08					7.18E-04
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	1.73E-10	--	--	1.73E-10	Lung/Nasal	--	1.45E-06	--	1.45E-06
			Manganese	--	--	--	--	--	CNS	--	9.69E-05	--	9.69E-05
			(Total)	--	1.73E-10	--		1.73E-10		--	9.83E-05	--	9.83E-05
			Radionuclide Total										
		Exposure Point Total						1.73E-10					9.83E-05
	Exposure Medium Total							1.73E-10					9.83E-05
Soil Total								1.21E-06					7.09E-02
Receptor Total								1.21E-06					7.09E-02

Total Risk Across All Media	1.21E-06	Total Hazard Index Across All Media	7.09E-02

Total Blood HI =	1.23E-02
Total Bone HI =	1.95E-03
Total CNS HI =	3.61E-02
Total CNS (Behavioral) HI =	2.56E-02
Total CNS (Developmental) HI =	2.04E-03
Total Decr. Org. Wt. HI =	2.45E-04
Total Decr. Wt. Gain HI =	4.53E-06
Total Developmental HI =	2.11E-03
Total Eye HI =	7.91E-04
Total Fetotoxicity HI =	1.95E-03
Total GI Tract HI =	9.37E-03
Total Kidney HI =	5.06E-03
Total Liver HI =	1.71E-02
Total Lung HI =	1.45E-06
Total Nasal HI =	1.45E-06
Total Respiratory HI =	6.49E-04
Total Skin HI =	1.21E-03

TABLE 9.18.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	1.18E-06	--	3.98E-08	--	1.22E-06	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Arsenic	3.48E-07	--	1.17E-08	--	3.59E-07	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	1.80E-06	--	8.10E-07	--	2.61E-06	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Copper	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Lead	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Mercury	--	--	--	--	--	N/A	N/A	--	N/A	--
			Nickel	--	--	--	--	--	N/A	N/A	--	N/A	--
			Silver	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Zinc	--	--	--	--	--	N/A	N/A	--	N/A	--
			4,4'-DDD	4.15E-08	--	1.40E-09	--	4.29E-08	N/A	N/A	--	N/A	--
			4,4'-DDE	7.65E-09	--	2.58E-10	--	7.91E-09	N/A	N/A	--	N/A	--
			4,4'-DDT	2.19E-07	--	7.41E-09	--	2.27E-07	N/A	N/A	--	N/A	--
			Aroclor-1248	4.18E-08	--	6.58E-09	--	4.84E-08	N/A	N/A	--	N/A	--
			Aroclor-1254	1.00E-08	--	1.58E-09	--	1.16E-08	N/A	N/A	--	N/A	--
			Aroclor-1260	3.37E-09	--	5.30E-10	--	3.90E-09	N/A	N/A	--	N/A	--
			Dieldrin	4.18E-07	--	4.71E-08	--	4.66E-07	N/A	N/A	--	N/A	--
			Heptachlor Epoxide	4.35E-09	--	4.89E-10	--	4.84E-09	N/A	N/A	--	N/A	--
			Benz(a)anthracene	2.62E-07	--	3.82E-08	--	3.00E-07	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	1.93E-06	--	2.82E-07	--	2.21E-06	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	2.15E-07	--	3.13E-08	--	2.46E-07	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	1.43E-08	--	2.09E-09	--	1.64E-08	N/A	N/A	--	N/A	--
			Chrysene	2.39E-09	--	3.49E-10	--	2.74E-09	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	1.87E-07	--	2.73E-08	--	2.15E-07	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	8.69E-08	--	1.27E-08	--	9.96E-08	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Ethylbenzene	2.69E-10	--	9.08E-12	--	2.78E-10	N/A	N/A	--	N/A	--
			(Total)	6.78E-06	--	1.32E-06		8.10E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						8.10E-06					--
Exposure Medium Total								8.10E-06					--

TABLE 9.18.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	8.52E-09	--	--	8.52E-09	N/A	--	N/A	--	--
			Ethylbenzene	--	2.21E-08	--	--	2.21E-08	N/A	--	N/A	--	--
			(Total)	--	3.06E-08	--		3.06E-08		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.06E-08					--
	Exposure Medium Total							3.06E-08					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	3.22E-10	--	--	3.22E-10	N/A	--	N/A	--	--
			Manganese	--	--	--	--	--	N/A	--	N/A	--	--
			(Total)	--	3.22E-10	--		3.22E-10		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.22E-10					--
	Exposure Medium Total							3.22E-10					--
Soil Total								8.13E-06					--
Receptor Total								8.13E-06					--

Total Risk Across All Media: 8.13E-06

Total Hazard Index Across All Media: --

TABLE 9.18a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Contact With Site 3 Landfill Area Soil											
			Total 2,3,7,8-TCDD Equiv.	1.18E-06	--	3.98E-08	--	1.22E-06	N/A	N/A	--	N/A	--
			Aluminum	--	--	--	--	--	N/A	N/A	--	N/A	--
			Antimony	--	--	--	--	--	N/A	N/A	--	N/A	--
			Cadmium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Chromium	1.80E-06	--	8.10E-07	--	2.61E-06	N/A	N/A	--	N/A	--
			Cobalt	--	--	--	--	--	N/A	N/A	--	N/A	--
			Copper	--	--	--	--	--	N/A	N/A	--	N/A	--
			Iron	--	--	--	--	--	N/A	N/A	--	N/A	--
			Lead	--	--	--	--	--	N/A	N/A	--	N/A	--
			Manganese	--	--	--	--	--	N/A	N/A	--	N/A	--
			Mercury	--	--	--	--	--	N/A	N/A	--	N/A	--
			Nickel	--	--	--	--	--	N/A	N/A	--	N/A	--
			Silver	--	--	--	--	--	N/A	N/A	--	N/A	--
			Vanadium	--	--	--	--	--	N/A	N/A	--	N/A	--
			Zinc	--	--	--	--	--	N/A	N/A	--	N/A	--
			4,4'-DDD	4.15E-08	--	1.40E-09	--	4.29E-08	N/A	N/A	--	N/A	--
			4,4'-DDE	7.65E-09	--	2.58E-10	--	7.91E-09	N/A	N/A	--	N/A	--
			4,4'-DDT	2.19E-07	--	7.41E-09	--	2.27E-07	N/A	N/A	--	N/A	--
			Aroclor-1248	4.18E-08	--	6.58E-09	--	4.84E-08	N/A	N/A	--	N/A	--
			Aroclor-1254	1.00E-08	--	1.58E-09	--	1.16E-08	N/A	N/A	--	N/A	--
			Aroclor-1260	3.37E-09	--	5.30E-10	--	3.90E-09	N/A	N/A	--	N/A	--
			Dieldrin	4.18E-07	--	4.71E-08	--	4.66E-07	N/A	N/A	--	N/A	--
			Heptachlor Epoxide	4.35E-09	--	4.89E-10	--	4.84E-09	N/A	N/A	--	N/A	--
			Benz(a)anthracene	2.62E-07	--	3.82E-08	--	3.00E-07	N/A	N/A	--	N/A	--
			Benzo(a)pyrene	1.93E-06	--	2.82E-07	--	2.21E-06	N/A	N/A	--	N/A	--
			Benzo(b)fluoranthene	2.15E-07	--	3.13E-08	--	2.46E-07	N/A	N/A	--	N/A	--
			Benzo(k)fluoranthene	1.43E-08	--	2.09E-09	--	1.64E-08	N/A	N/A	--	N/A	--
			Chrysene	2.39E-09	--	3.49E-10	--	2.74E-09	N/A	N/A	--	N/A	--
			Dibenz(a,h)anthracene	1.87E-07	--	2.73E-08	--	2.15E-07	N/A	N/A	--	N/A	--
			Indeno(1,2,3-cd)pyrene	8.69E-08	--	1.27E-08	--	9.96E-08	N/A	N/A	--	N/A	--
			Naphthalene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Phenanthrene	--	--	--	--	--	N/A	N/A	--	N/A	--
			Ethylbenzene	2.69E-10	--	9.08E-12	--	2.78E-10	N/A	N/A	--	N/A	--
			(Total)	6.43E-06	--	1.31E-06		7.74E-06		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						7.74E-06					--
	Exposure Medium Total							7.74E-06					--

TABLE 9.18a.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFETIME TRESPASSER/RECREATIONAL PERSON EXPOSURE TO SITE 3 LANDFILL AREA SOIL
CENTRAL TENDENCY EXPOSURE, BACKGROUND ELIMINATED
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser/Recreational Person
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	Ambient VOC Inhalation from Site 3 Landfill Area Soil											
			Naphthalene	--	8.52E-09	--	--	8.52E-09	N/A	--	N/A	--	--
			Ethylbenzene	--	2.21E-08	--	--	2.21E-08	N/A	--	N/A	--	--
			(Total)	--	3.06E-08	--		3.06E-08		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.06E-08					--
	Exposure Medium Total							3.06E-08					--
	Particulates	Particulate Dust Inhalation from Site 3 Landfill Area Soil											
			Chromium	--	3.22E-10	--	--	3.22E-10	N/A	--	N/A	--	--
			Manganese	--	--	--	--	--	N/A	--	N/A	--	--
			(Total)	--	3.22E-10	--		3.22E-10		--	--	--	--
			Radionuclide Total										
		Exposure Point Total						3.22E-10					--
	Exposure Medium Total							3.22E-10					--
Soil Total								7.77E-06					--
Receptor Total								7.77E-06					--

Total Risk Across All Media: 7.77E-06

Total Hazard Index Across All Media: --

APPENDIX K

MISCELLANEOUS HUMAN HEALTH RISK SUPPORT DOCUMENTATION

Appendix K, Part 1

UCL Worksheets

NAS JRB Willow Grove, Pennsylvania

APPENDIX K, TABLE K-1
UCL AND DISTRIBUTION STASTISTICS - SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

	General UCL Statistics for Data Sets with Non-Detects			
User Selected Options				
From File	S:\ritchiem\Willow Grove\Site 3 Risk Assessment\ProUCL\ProUCL WSTs and Excel Outputs\S3GW.wst			
Full Precision	ON			
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
Arsenic				
General Statistics				
Number of Valid Data	20		Number of Detected Data	11
Number of Distinct Detected Data	7		Number of Non-Detect Data	9
			Percent Non-Detects	45.00%
Raw Statistics			**Log-transformed Statistics**	
Minimum Detected	0.4		Minimum Detected	-0.916291
Maximum Detected	9.1		Maximum Detected	2.2082744
Mean of Detected	1.9090909		Mean of Detected	-0.054288
SD of Detected	2.8891018		SD of Detected	1.0867426
Minimum Non-Detect	6		Minimum Non-Detect	1.7917595
Maximum Non-Detect	6		Maximum Non-Detect	1.7917595
UCL Statistics				
Normal Distribution Test with Detected Values Only			**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.5889019		Shapiro Wilk Test Statistic	0.7581042
5% Shapiro Wilk Critical Value	0.85		5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level			**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution			**Assuming Lognormal Distribution**	
DL/2 Substitution Method			DL/2 Substitution Method	
Mean	2.4		Mean	0.4645171
SD	2.1686765		SD	0.9838039
95% DL/2 (t) UCL	3.2385098		95% H-Stat (DL/2) UCL	8.7879783
Maximum Likelihood Estimate(MLE) Method	N/A		Log ROS Method	
MLE method failed to converge properly			Mean in Log Scale	-0.204927
			SD in Log Scale	0.9337494
			Mean in Original Scale	1.4287993
			SD in Original Scale	2.1964896
			95% Percentile Bootstrap UCL	2.28382
			95% BCA Bootstrap UCL	2.636213
Gamma Distribution Test with Detected Values Only			**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.6724022		**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	2.8392098			
nu star	14.792848			
A-D Test Statistic	1.618485		**Nonparametric Statistics**	
5% A-D Critical Value	0.7585173		Kaplan-Meier (KM) Method	
K-S Test Statistic	0.7585173		Mean	1.345

5% K-S Critical Value	0.2640059	SD	2.14627
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.5081421
		95% KM (t) UCL	2.2236451
Assuming Gamma Distribution		95% KM (z) UCL	2.1808193
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2.2065983
Minimum	0.0531147	95% KM (bootstrap t) UCL	5.3029368
Maximum	9.1	95% KM (BCA) UCL	2.3088889
Mean	1.8132343	95% KM (Percentile Bootstrap) UCL	2.225
Median	1.0009797	95% KM (Chebyshev) UCL	3.5599399
SD	2.1997125	97.5% KM (Chebyshev) UCL	4.5183461
k star	0.9007811	99% KM (Chebyshev) UCL	6.4009496
Theta star	2.0129576		
Nu star	36.031246	**Potential UCLs to Use**	
AppChi2	23.293857	97.5% KM (Chebyshev) UCL	4.5183461
95% Gamma Approximate UCL	2.8047347		
95% Adjusted Gamma UCL	2.9056471		

Note: DL/2 is not a recommended method.

Cobalt

General Statistics

Number of Valid Data	20	Number of Detected Data	8
Number of Distinct Detected Data	5	Number of Non-Detect Data	12
		Percent Non-Detects	60.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.2	Minimum Detected	-1.609438
Maximum Detected	4	Maximum Detected	1.3862944
Mean of Detected	1.375	Mean of Detected	-0.412565
SD of Detected	1.5322719	SD of Detected	1.3598573
Minimum Non-Detect	6	Minimum Non-Detect	1.7917595
Maximum Non-Detect	6	Maximum Non-Detect	1.7917595

Warning: There are only 8 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.7897881	Shapiro Wilk Test Statistic	0.7815741
5% Shapiro Wilk Critical Value	0.818	5% Shapiro Wilk Critical Value	0.818
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.35	Mean	0.4941414
SD	1.2377824	SD	1.1217006

95% DL/2 (t) UCL	2.8285834	95% H-Stat (DL/2) UCL	12.696032
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.412565
		SD in Log Scale	1.2893557
		Mean in Original Scale	1.3533919
		SD in Original Scale	1.5937256
		95% Percentile Bootstrap UCL	1.9374617
		95% BCA Bootstrap UCL	2.0598023
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.5898852	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	2.3309618		
nu star	9.438164		
A-D Test Statistic	0.8315648	**Nonparametric Statistics**	
5% A-D Critical Value	0.7428002	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.7428002	Mean	1.375
5% K-S Critical Value	0.303431	SD	1.4333091
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.5417399
		95% KM (t) UCL	2.3117403
Assuming Gamma Distribution		95% KM (z) UCL	2.2660829
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2.351061
Minimum	1E-09	95% KM (bootstrap t) UCL	3.147967
Maximum	4.0521106	95% KM (BCA) UCL	2.4
Mean	1.4236829	95% KM (Percentile Bootstrap) UCL	2.3
Median	0.861155	95% KM (Chebyshev) UCL	3.7363896
SD	1.430052	97.5% KM (Chebyshev) UCL	4.7581647
k star	0.2124117	99% KM (Chebyshev) UCL	6.7652442
Theta star	6.7024705		
Nu star	8.4964666	**Potential UCLs to Use**	
AppChi2	3.0257797	95% KM (BCA) UCL	2.4
95% Gamma Approximate UCL	3.997738		
95% Adjusted Gamma UCL	4.362309		
Note: DL/2 is not a recommended method.			

Manganese

General Statistics			
Number of Valid Data	20	Number of Detected Data	16
Number of Distinct Detected Data	16	Number of Non-Detect Data	4
		Percent Non-Detects	20.00%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.4	Minimum Detected	-0.916291
Maximum Detected	103	Maximum Detected	4.634729
Mean of Detected	12.8625	Mean of Detected	1.4682532
SD of Detected	25.636195	SD of Detected	1.4235839
Minimum Non-Detect	6	Minimum Non-Detect	1.7917595
Maximum Non-Detect	6	Maximum Non-Detect	1.7917595

APPENDIX K, TABLE K-1
UCL AND DISTRIBUTION STASTISTICS - SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.5104119	Shapiro Wilk Test Statistic	0.9494455
5% Shapiro Wilk Critical Value	0.887	5% Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	10.89	Mean	1.394325
SD	23.135161	SD	1.2739515
95% DL/2 (t) UCL	19.835114	95% H-Stat (DL/2) UCL	25.834444
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	1.304273
		SD in Log Scale	1.3447881
		Mean in Original Scale	10.760672
		SD in Original Scale	23.192104
		95% Percentile Bootstrap UCL	21.017844
		95% BCA Bootstrap UCL	25.911636
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.5071019	**Data appear Lognormal at 5% Significance Level**	
Theta Star	25.364726		
nu star	16.22726		
A-D Test Statistic	1.1302143	**Nonparametric Statistics**	
5% A-D Critical Value	0.7899822	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.7899822	Mean	10.688
5% K-S Critical Value	0.2260403	SD	22.626746
Data not Gamma Distributed at 5% Significance Level		SE of Mean	5.226459
		95% KM (t) UCL	19.725242
Assuming Gamma Distribution		95% KM (z) UCL	19.28476
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	19.665991
Minimum	1E-09	95% KM (bootstrap t) UCL	47.878009
Maximum	103	95% KM (BCA) UCL	20.974286
Mean	11.974095	95% KM (Percentile Bootstrap) UCL	19.708333
Median	2.85	95% KM (Chebyshev) UCL	33.469607
SD	23.254	97.5% KM (Chebyshev) UCL	43.327226
k star	0.3084359	99% KM (Chebyshev) UCL	62.69061
Theta star	38.821994		
Nu star	12.337434	**Potential UCLs to Use**	
AppChi2	5.4500887	97.5% KM (Chebyshev) UCL	43.327226
95% Gamma Approximate UCL	27.105908		
95% Adjusted Gamma UCL	29.015033		
Note: DL/2 is not a recommended method.			
Bis(2-ethylhexyl)phthalate			
General Statistics			
Number of Valid Data	19	Number of Detected Data	2

APPENDIX K, TABLE K-1
UCL AND DISTRIBUTION STASTISTICS - SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Number of Distinct Detected Data	2	Number of Non-Detect Data	17
		Percent Non-Detects	89.47%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	6	Minimum Detected	1.7917595
Maximum Detected	11	Maximum Detected	2.3978953
Mean of Detected	8.5	Mean of Detected	2.0948274
SD of Detected	3.5355339	SD of Detected	0.4286027
Minimum Non-Detect	10	Minimum Non-Detect	2.3025851
Maximum Non-Detect	11	Maximum Non-Detect	2.3978953
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	18
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	94.74%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.3947368	Mean	1.6655479
SD	1.3802068	SD	0.1832078
95% DL/2 (t) UCL	5.9438128	95% H-Stat (DL/2) UCL	6.0976142
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	N/A	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	N/A		

nu star	N/A		
A-D Test Statistic	N/A	**Nonparametric Statistics**	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	6.2631579
5% K-S Critical Value	N/A	SD	1.1164844
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.3622354
		95% KM (t) UCL	6.8912971
Assuming Gamma Distribution		95% KM (z) UCL	6.8589821
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	N/A
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	N/A
Mean	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Median	N/A	95% KM (Chebyshev) UCL	7.8421053
SD	N/A	97.5% KM (Chebyshev) UCL	8.5253171
k star	N/A	99% KM (Chebyshev) UCL	9.8673543
Theta star	N/A		
Nu star	N/A	**Potential UCLs to Use**	
AppChi2	N/A	95% KM (t) UCL	6.8912971
95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL	N/A
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			
1,1-Dichloroethane			
General Statistics			
Number of Valid Data	66	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	63
		Percent Non-Detects	95.45%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	5.9	Minimum Detected	1.7749524
Maximum Detected	8.2	Maximum Detected	2.1041342
Mean of Detected	6.8	Mean of Detected	1.9065454
SD of Detected	1.2288206	SD of Detected	0.1742319
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	1	Maximum Non-Detect	0
Warning: There are only 3 Distinct Detected Values in this data set			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.875811	Shapiro Wilk Test Statistic	0.8923765

5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.7863636	Mean	-0.574979
SD	1.3397918	SD	0.5465179
95% DL/2 (t) UCL	1.06155	95% H-Stat (DL/2) UCL	0.6757897
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.3946193
		SD in Log Scale	0.7174544
		Mean in Original Scale	1.9107743
		SD in Original Scale	1.4967849
		95% Percentile Bootstrap UCL	2.2246931
		95% BCA Bootstrap UCL	2.27504
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	N/A	**Data appear Normal at 5% Significance Level**	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	**Nonparametric Statistics**	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	5.9409091
5% K-S Critical Value	N/A	SD	0.2844331
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0428799
		95% KM (t) UCL	6.01246
Assuming Gamma Distribution		95% KM (z) UCL	6.0114403
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	6.1999653
Minimum	N/A	95% KM (bootstrap t) UCL	6.0675707
Maximum	N/A	95% KM (BCA) UCL	8.2
Mean	N/A	95% KM (Percentile Bootstrap) UCL	8.2
Median	N/A	95% KM (Chebyshev) UCL	6.1278183
SD	N/A	97.5% KM (Chebyshev) UCL	6.208694
k star	N/A	99% KM (Chebyshev) UCL	6.3675588
Theta star	N/A		
Nu star	N/A	**Potential UCLs to Use**	
AppChi2	N/A	95% KM (t) UCL	6.01246
95% Gamma Approximate UCL	N/A	95% KM (Percentile Bootstrap) UCL	8.2
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			
Bromodichloromethane			
General Statistics			
Number of Valid Data	66	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	65
		Percent Non-Detects	98.48%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bromodichloromethane was not processed!

Carbon Tetrachloride

General Statistics

Number of Valid Data	66	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	62
		Percent Non-Detects	93.94%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.27	Minimum Detected	-1.309333
Maximum Detected	0.38	Maximum Detected	-0.967584
Mean of Detected	0.3125	Mean of Detected	-1.172329
SD of Detected	0.0499166	SD of Detected	0.1548122
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	1	Maximum Non-Detect	0

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.9061258	Shapiro Wilk Test Statistic	0.9203571
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.4886364	Mean	-0.722189
SD	0.0463394	SD	0.1199165
95% DL/2 (t) UCL	0.4981542	95% H-Stat (DL/2) UCL	0.5540057
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.172329
		SD in Log Scale	0.1944798
		Mean in Original Scale	0.3154622
		SD in Original Scale	0.0617006
		95% Percentile Bootstrap UCL	0.3281943
		95% BCA Bootstrap UCL	0.3286233

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	13.826964	**Data appear Normal at 5% Significance Level**
Theta Star	0.0226008	

nu star	110.61571		
A-D Test Statistic	0.3331905	**Nonparametric Statistics**	
5% A-D Critical Value	0.6559938	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.6559938	Mean	0.3125
5% K-S Critical Value	0.3938358	SD	0.043229
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0249583
		95% KM (t) UCL	0.3541463
Assuming Gamma Distribution		95% KM (z) UCL	0.3535527
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.3602233
Minimum	0.1195391	95% KM (bootstrap t) UCL	0.3910147
Maximum	0.38	95% KM (BCA) UCL	0.35
Mean	0.3047655	95% KM (Percentile Bootstrap) UCL	0.36
Median	0.3192906	95% KM (Chebyshev) UCL	0.4212907
SD	0.0598117	97.5% KM (Chebyshev) UCL	0.4683645
k star	20.410984	99% KM (Chebyshev) UCL	0.5608319
Theta star	0.0149314		
Nu star	2694.2499	**Potential UCLs to Use**	
AppChi2	2574.6548	95% KM (t) UCL	0.3541463
95% Gamma Approximate UCL	0.3189222	95% KM (Percentile Bootstrap) UCL	0.36
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Chloroform

General Statistics

Number of Valid Data	66	Number of Detected Data	8
Number of Distinct Detected Data	6	Number of Non-Detect Data	58
		Percent Non-Detects	87.88%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.22	Minimum Detected	-1.514128
Maximum Detected	1.6	Maximum Detected	0.4700036
Mean of Detected	0.824375	Mean of Detected	-0.497153
SD of Detected	0.6502935	SD of Detected	0.8457939
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	1	Maximum Non-Detect	0

Warning: There are only 8 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.7438449	Shapiro Wilk Test Statistic	0.8368284
5% Shapiro Wilk Critical Value	0.818	5% Shapiro Wilk Critical Value	0.818
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

APPENDIX K, TABLE K-1
UCL AND DISTRIBUTION STASTISTICS - SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.5393182	Mean	-0.66939
SD	0.2385822	SD	0.2849462
95% DL/2 (t) UCL	0.5883217	95% H-Stat (DL/2) UCL	0.6096326
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.983742
		SD in Log Scale	0.6484053
		Mean in Original Scale	0.461979
		SD in Original Scale	0.3351804
		95% Percentile Bootstrap UCL	0.533252
		95% BCA Bootstrap UCL	0.5422757
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	1.2041184	**Data Follow Appr. Gamma Distribution at 5% Significance Level**	
Theta Star	0.6846295		
nu star	19.265895		
A-D Test Statistic	0.7851344	**Nonparametric Statistics**	
5% A-D Critical Value	0.72581	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.72581	Mean	0.4154091
5% K-S Critical Value	0.2980554	SD	0.2840184
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	0.0646355
		95% KM (t) UCL	0.5232623
Assuming Gamma Distribution		95% KM (z) UCL	0.5217251
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.5344486
Minimum	1E-09	95% KM (bootstrap t) UCL	0.5861542
Maximum	1.6	95% KM (BCA) UCL	0.5389697
Mean	0.6000482	95% KM (Percentile Bootstrap) UCL	0.5356818
Median	0.5459904	95% KM (Chebyshev) UCL	0.6971489
SD	0.4335897	97.5% KM (Chebyshev) UCL	0.8190579
k star	0.431985	99% KM (Chebyshev) UCL	1.0585246
Theta star	1.3890486		
Nu star	57.022019	**Potential UCLs to Use**	
AppChi2	40.664583	95% KM (t) UCL	0.5232623
95% Gamma Approximate UCL	0.8414191		
95% Adjusted Gamma UCL	0.8478445		
Note: DL/2 is not a recommended method.			
Dibromochloromethane			
General Statistics			
Number of Valid Data	66	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	65
		Percent Non-Detects	98.48%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			

The data set for variable Dibromochloromethane was not processed!			
Tetrachloroethene			
General Statistics			
Number of Valid Data	66	Number of Detected Data	50
Number of Distinct Detected Data	44	Number of Non-Detect Data	16
		Percent Non-Detects	24.24%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.23	Minimum Detected	-1.469676
Maximum Detected	14	Maximum Detected	2.6390573
Mean of Detected	4.0912	Mean of Detected	0.8601401
SD of Detected	3.9551876	SD of Detected	1.1394508
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	1	Maximum Non-Detect	0
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.8279376	Shapiro Wilk Test Statistic	0.9402841
5% Shapiro Wilk Critical Value	0.947	5% Shapiro Wilk Critical Value	0.947
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3.2206061	Mean	0.4835856
SD	3.7679943	SD	1.1952723
95% DL/2 (t) UCL	3.9945328	95% H-Stat (DL/2) UCL	3.6974088
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	1.4265898	Mean in Log Scale	0.5235575
SD	5.7085377	SD in Log Scale	1.1963775
95% MLE (t) UCL	2.5990942	Mean in Original Scale	3.2677258
95% MLE (Tiku) UCL	2.8073364	SD in Original Scale	3.7383888
		95% Percentile Bootstrap UCL	4.0475889
		95% BCA Bootstrap UCL	4.0950869
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.9970019	**Data Follow Appr. Gamma Distribution at 5% Significance Level**	
Theta Star	4.1035025		
nu star	99.700195		
A-D Test Statistic	0.8595202	**Nonparametric Statistics**	
5% A-D Critical Value	0.7787772	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.7787772	Mean	3.24329
5% K-S Critical Value	0.1287962	SD	3.7241493
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	0.4633671
		95% KM (t) UCL	4.0164811
Assuming Gamma Distribution		95% KM (z) UCL	4.0054612

Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	4.0146544
Minimum	1E-09	95% KM (bootstrap t) UCL	4.1074186
Maximum	14	95% KM (BCA) UCL	4.0058264
Mean	3.5508879	95% KM (Percentile Bootstrap) UCL	3.9666768
Median	2.45	95% KM (Chebyshev) UCL	5.2630606
SD	3.6620958	97.5% KM (Chebyshev) UCL	6.137017
k star	0.3690613	99% KM (Chebyshev) UCL	7.853735
Theta star	9.6214044		
Nu star	48.71609	**Potential UCLs to Use**	
AppChi2	33.693901	95% KM (Chebyshev) UCL	5.2630606
95% Gamma Approximate UCL	5.1340263		
95% Adjusted Gamma UCL	5.1768775		
Note: DL/2 is not a recommended method.			
Trichloroethene			
General Statistics			
Number of Valid Data	63	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	60
		Percent Non-Detects	95.24%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	1.5	Minimum Detected	0.4054651
Maximum Detected	3.1	Maximum Detected	1.1314021
Mean of Detected	2.1666667	Mean of Detected	0.7262404
SD of Detected	0.8326664	SD of Detected	0.3702525
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	1	Maximum Non-Detect	0
Warning: There are only 3 Distinct Detected Values in this data set			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.9230592	Shapiro Wilk Test Statistic	0.9610223
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.5793651	Mean	-0.625557
SD	0.3877806	SD	0.3118713
95% DL/2 (t) UCL	0.6609446	95% H-Stat (DL/2) UCL	0.5751288

APPENDIX K, TABLE K-1
UCL AND DISTRIBUTION STASTISTICS - SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-2.493394
		SD in Log Scale	1.5408242
		Mean in Original Scale	0.2525656
		SD in Original Scale	0.4976725
		95% Percentile Bootstrap UCL	0.3536917
		95% BCA Bootstrap UCL	0.4023385
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	N/A	**Data appear Normal at 5% Significance Level**	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	**Nonparametric Statistics**	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	1.531746
5% K-S Critical Value	N/A	SD	0.2053455
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0316855
		95% KM (t) UCL	1.5846546
Assuming Gamma Distribution		95% KM (z) UCL	1.5838641
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.7892507
Minimum	N/A	95% KM (bootstrap t) UCL	1.5928427
Maximum	N/A	95% KM (BCA) UCL	3.1
Mean	N/A	95% KM (Percentile Bootstrap) UCL	3.1
Median	N/A	95% KM (Chebyshev) UCL	1.6698599
SD	N/A	97.5% KM (Chebyshev) UCL	1.7296219
k star	N/A	99% KM (Chebyshev) UCL	1.8470128
Theta star	N/A		
Nu star	N/A	**Potential UCLs to Use**	
AppChi2	N/A	95% KM (t) UCL	1.5846546
95% Gamma Approximate UCL	N/A	95% KM (Percentile Bootstrap) UCL	3.1
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			

APPENDIX K, TABLE K-2
UCL AND DISTRIBUTION STASTISTICS - SITE 3 HANGAR AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

	General UCL Statistics for Data Sets with Non-Detects
User Selected Options	
From File	S:\ritchiem\Willow Grove\Site 3 Risk Assessment\ProUCL\H3SS.wst
Full Precision	ON
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benz(a)anthracene

General Statistics

Number of Valid Observations	1	Number of Distinct Observations	1

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Benz(a)anthracene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Benzo(a)pyrene

General Statistics

Number of Valid Observations	1	Number of Distinct Observations	1

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Benzo(a)pyrene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Benzo(b)fluoranthene

General Statistics

Number of Valid Observations	1	Number of Distinct Observations	1

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Benzo(b)fluoranthene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

APPENDIX K, TABLE K-2
UCL AND DISTRIBUTION STASTISTICS - SITE 3 HANGAR AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Dibenz(a,h)anthracene

General Statistics

Number of Valid Observations	1	Number of Distinct Observations	1

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Dibenz(a,h)anthracene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Indeno(1,2,3-cd)pyrene

General Statistics

Number of Valid Observations	1	Number of Distinct Observations	1

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Indeno(1,2,3-cd)pyrene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

APPENDIX K, TABLE K-3
UCL AND DISTRIBUTION STASTISTICS - SITE 3 HANGAR AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

	General UCL Statistics for Data Sets with Non-Detects			
User Selected Options				
From File	S:\ritchiem\Willow Grove\Site 3 Risk Assessment\ProUCL\ProUCL WSTs and Excel Outputs\H3SO.wst			
Full Precision	ON			
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
Benz(a)anthracene				
General Statistics				
Number of Valid Data	13		Number of Detected Data	4
Number of Distinct Detected Data	4		Number of Non-Detect Data	9
			Percent Non-Detects	69.23%
Raw Statistics			**Log-transformed Statistics**	
Minimum Detected	36		Minimum Detected	3.5835189
Maximum Detected	4200		Maximum Detected	8.3428398
Mean of Detected	2029		Mean of Detected	6.6562025
SD of Detected	1948.7032		SD of Detected	2.1755232
Minimum Non-Detect	380		Minimum Non-Detect	5.9401713
Maximum Non-Detect	440		Maximum Non-Detect	6.0867747
Note: Data have multiple DLs - Use of KM Method is recommended			Number treated as Non-Detect	10
For all methods (except KM, DL/2, and ROS Methods),			Number treated as Detected	3
Observations < Largest ND are treated as NDs			Single DL Non-Detect Percentage	76.92%
Warning: There are only 4 Distinct Detected Values in this data				
Note: It should be noted that even though bootstrap may be performed on this data set				
the resulting calculations may not be reliable enough to draw conclusions				
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.				
UCL Statistics				
Normal Distribution Test with Detected Values Only			**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.927481		Shapiro Wilk Test Statistic	0.8637453
5% Shapiro Wilk Critical Value	0.748		5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level			**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution			**Assuming Lognormal Distribution**	
DL/2 Substitution Method			DL/2 Substitution Method	
Mean	760.84615		Mean	5.7057802
SD	1312.9148		SD	1.2726178
95% DL/2 (t) UCL	1409.8431		95% H-Stat (DL/2) UCL	1153.3849
Maximum Likelihood Estimate(MLE) Method	N/A		Log ROS Method	
MLE yields a negative mean			Mean in Log Scale	4.4977392
			SD in Log Scale	2.0576335
			Mean in Original Scale	662.36929
			SD in Original Scale	1360.2692
			95% Percentile Bootstrap UCL	1302.4154

		95% BCA Bootstrap UCL	1539.1165
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.3262706	**Data appear Normal at 5% Significance Level**	
Theta Star	6218.764		
nu star	2.610165		
A-D Test Statistic	0.3371679	**Nonparametric Statistics**	
5% A-D Critical Value	0.6750356	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.6750356	Mean	649.23077
5% K-S Critical Value	0.4073422	SD	1312.4215
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	420.31126
		95% KM (t) UCL	1398.3463
Assuming Gamma Distribution		95% KM (z) UCL	1340.5813
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1344.91
Minimum	36	95% KM (bootstrap t) UCL	1176.1455
Maximum	4200	95% KM (BCA) UCL	4200
Mean	2053.5204	95% KM (Percentile Bootstrap) UCL	3184.6154
Median	1618.3844	95% KM (Chebyshev) UCL	2481.3251
SD	1500.6433	97.5% KM (Chebyshev) UCL	3274.0738
k star	1.0282822	99% KM (Chebyshev) UCL	4831.275
Theta star	1997.0397		
Nu star	26.735338	**Potential UCLs to Use**	
AppChi2	15.946768	95% KM (t) UCL	1398.3463
95% Gamma Approximate UCL	3442.8017	95% KM (Percentile Bootstrap) UCL	3184.6154
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			
Benzo(a)pyrene			
General Statistics			
Number of Valid Data	13	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	9
		Percent Non-Detects	69.23%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	40	Minimum Detected	3.6888795
Maximum Detected	3200	Maximum Detected	8.0709061
Mean of Detected	1675	Mean of Detected	6.5949962
SD of Detected	1474.076	SD of Detected	2.0214317
Minimum Non-Detect	380	Minimum Non-Detect	5.9401713
Maximum Non-Detect	440	Maximum Non-Detect	6.0867747
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	10
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	76.92%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			

APPENDIX K, TABLE K-3
UCL AND DISTRIBUTION STASTISTICS - SITE 3 HANGAR AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.9308747	Shapiro Wilk Test Statistic	0.8336968
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	651.92308	Mean	5.6869475
SD	1023.3494	SD	1.191621
95% DL/2 (t) UCL	1157.7827	95% H-Stat (DL/2) UCL	940.66023
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	2337.1636	Mean in Log Scale	4.588963
SD	992.3709	SD in Log Scale	1.9122032
95% MLE (t) UCL	2827.7101	Mean in Original Scale	557.49002
95% MLE (Tiku) UCL	3345.7094	SD in Original Scale	1070.6975
		95% Percentile Bootstrap UCL	1059.0199
		95% BCA Bootstrap UCL	1214.1999
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.3481017	**Data appear Normal at 5% Significance Level**	
Theta Star	4811.8123		
nu star	2.7848135		
A-D Test Statistic	0.3884727	**Nonparametric Statistics**	
5% A-D Critical Value	0.6713296	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.6713296	Mean	543.07692
5% K-S Critical Value	0.4055014	SD	1034.8347
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	331.41234
		95% KM (t) UCL	1133.749
Assuming Gamma Distribution		95% KM (z) UCL	1088.2017
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1183.0257
Minimum	40	95% KM (bootstrap t) UCL	903.07095
Maximum	3200	95% KM (BCA) UCL	3200
Mean	1690.8699	95% KM (Percentile Bootstrap) UCL	2692.3077
Median	1410.5411	95% KM (Chebyshev) UCL	1987.6698
SD	1082.778	97.5% KM (Chebyshev) UCL	2612.7463
k star	1.2411064	99% KM (Chebyshev) UCL	3840.588
Theta star	1362.3891		
Nu star	32.268768	**Potential UCLs to Use**	
AppChi2	20.285286	95% KM (t) UCL	1133.749
95% Gamma Approximate UCL	2689.7471	95% KM (Percentile Bootstrap) UCL	2692.3077
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			
Benzo(b)fluoranthene			

APPENDIX K, TABLE K-3
UCL AND DISTRIBUTION STASTISTICS - SITE 3 HANGAR AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

General Statistics			
Number of Valid Data	13	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	9
		Percent Non-Detects	69.23%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	68	Minimum Detected	4.2195077
Maximum Detected	4200	Maximum Detected	8.3428398
Mean of Detected	2067	Mean of Detected	6.8844697
SD of Detected	1841.6178	SD of Detected	1.8642842
Minimum Non-Detect	380	Minimum Non-Detect	5.9401713
Maximum Non-Detect	440	Maximum Non-Detect	6.0867747
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	10
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	76.92%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.9698801	Shapiro Wilk Test Statistic	0.8609414
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	772.53846	Mean	5.7760163
SD	1286.3642	SD	1.2090813
95% DL/2 (t) UCL	1408.411	95% H-Stat (DL/2) UCL	992.3331
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	2881.1716	Mean in Log Scale	5.0254037
SD	1271.0451	SD in Log Scale	1.7697221
95% MLE (t) UCL	3509.4715	Mean in Original Scale	701.94011
95% MLE (Tiku) UCL	4173.2499	SD in Original Scale	1322.5611
		95% Percentile Bootstrap UCL	1327.4505
		95% BCA Bootstrap UCL	1559.0832
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.3648929	**Data appear Normal at 5% Significance Level**	
Theta Star	5664.6753		
nu star	2.9191435		
A-D Test Statistic	0.3240296	**Nonparametric Statistics**	
5% A-D Critical Value	0.6696667	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.6696667	Mean	683.07692

5% K-S Critical Value	0.4045541	SD	1278.2355
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	409.36297
		95% KM (t) UCL	1412.6795
Assuming Gamma Distribution		95% KM (z) UCL	1356.4191
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1480.7831
Minimum	68	95% KM (bootstrap t) UCL	1220.0995
Maximum	4200	95% KM (BCA) UCL	4200
Mean	2087.4062	95% KM (Percentile Bootstrap) UCL	3100
Median	1727.7064	95% KM (Chebyshev) UCL	2467.4487
SD	1418.7805	97.5% KM (Chebyshev) UCL	3239.5479
k star	1.229919	99% KM (Chebyshev) UCL	4756.1871
Theta star	1697.19		
Nu star	31.977893	**Potential UCLs to Use**	
AppChi2	20.054505	95% KM (t) UCL	1412.6795
95% Gamma Approximate UCL	3328.4717	95% KM (Percentile Bootstrap) UCL	3100
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Dibenz(a,h)anthracene

General Statistics

Number of Valid Data	13	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	10
		Percent Non-Detects	76.92%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	180	Minimum Detected	5.1929569
Maximum Detected	580	Maximum Detected	6.3630281
Mean of Detected	420	Mean of Detected	5.923531
SD of Detected	211.6601	SD of Detected	0.637033
Minimum Non-Detect	380	Minimum Non-Detect	5.9401713
Maximum Non-Detect	440	Maximum Non-Detect	6.0867747
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	2
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	84.62%

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.89284	Shapiro Wilk Test Statistic	0.8433977
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

APPENDIX K, TABLE K-3
UCL AND DISTRIBUTION STASTISTICS - SITE 3 HANGAR AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	248.46154	Mean	5.430302
SD	130.72529	SD	0.3848571
95% DL/2 (t) UCL	313.08136	95% H-Stat (DL/2) UCL	310.22965
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	5.3584993
		SD in Log Scale	0.4944724
		Mean in Original Scale	240.89246
		SD in Original Scale	142.56752
		95% Percentile Bootstrap UCL	306.2668
		95% BCA Bootstrap UCL	327.36079
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	N/A	**Data appear Normal at 5% Significance Level**	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	**Nonparametric Statistics**	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	235.38462
5% K-S Critical Value	N/A	SD	130.83256
Data not Gamma Distributed at 5% Significance Level		SE of Mean	44.441612
		95% KM (t) UCL	314.59235
Assuming Gamma Distribution		95% KM (z) UCL	308.48456
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	441.13939
Minimum	N/A	95% KM (bootstrap t) UCL	268.48293
Maximum	N/A	95% KM (BCA) UCL	N/A
Mean	N/A	95% KM (Percentile Bootstrap) UCL	580
Median	N/A	95% KM (Chebyshev) UCL	429.10111
SD	N/A	97.5% KM (Chebyshev) UCL	512.92239
k star	N/A	99% KM (Chebyshev) UCL	677.57307
Theta star	N/A		
Nu star	N/A	**Potential UCLs to Use**	
AppChi2	N/A	95% KM (t) UCL	314.59235
95% Gamma Approximate UCL	N/A	95% KM (Percentile Bootstrap) UCL	580
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			
Indeno(1,2,3-cd)pyrene			
General Statistics			
Number of Valid Data	13	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	9
		Percent Non-Detects	69.23%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	28	Minimum Detected	3.3322045
Maximum Detected	2000	Maximum Detected	7.6009025

APPENDIX K, TABLE K-3
UCL AND DISTRIBUTION STASTISTICS - SITE 3 HANGAR AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Mean of Detected	1102	Mean of Detected	6.2233958
SD of Detected	912.0614	SD of Detected	1.9851051
Minimum Non-Detect	380	Minimum Non-Detect	5.9401713
Maximum Non-Detect	440	Maximum Non-Detect	6.0867747
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	10
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	76.92%
Warning: There are only 4 Distinct Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.9333844	Shapiro Wilk Test Statistic	0.8061508
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	475.61538	Mean	5.572609
SD	630.02838	SD	1.0910943
95% DL/2 (t) UCL	787.04952	95% H-Stat (DL/2) UCL	747.55777
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	1525.6127	Mean in Log Scale	4.2563862
SD	564.97788	SD in Log Scale	1.8757973
95% MLE (t) UCL	1804.8912	Mean in Original Scale	369.35883
95% MLE (Tiku) UCL	2099.9542	SD in Original Scale	683.62912
		95% Percentile Bootstrap UCL	693.60752
		95% BCA Bootstrap UCL	792.33306
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.3576907	**Data appear Normal at 5% Significance Level**	
Theta Star	3080.8738		
nu star	2.8615258		
A-D Test Statistic	0.4405828	**Nonparametric Statistics**	
5% A-D Critical Value	0.6700919	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.6700919	Mean	358.46154
5% K-S Critical Value	0.4048468	SD	661.57209
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	211.87264
		95% KM (t) UCL	736.0795
Assuming Gamma Distribution		95% KM (z) UCL	706.96101
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	824.70769
Minimum	28	95% KM (bootstrap t) UCL	583.53058
Maximum	2000	95% KM (BCA) UCL	1792.3077
Mean	1110.8577	95% KM (Percentile Bootstrap) UCL	1746.1538

APPENDIX K, TABLE K-3
UCL AND DISTRIBUTION STASTISTICS - SITE 3 HANGAR AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Median	954.60204	95% KM (Chebyshev) UCL	1281.9929
SD	645.75436	97.5% KM (Chebyshev) UCL	1681.6057
k star	1.376769	99% KM (Chebyshev) UCL	2466.5676
Theta star	806.85845		
Nu star	35.795994	**Potential UCLs to Use**	
AppChi2	23.104541	95% KM (t) UCL	736.0795
95% Gamma Approximate UCL	1721.0581	95% KM (Percentile Bootstrap) UCL	1746.1538
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			

APPENDIX K, TABLE K-4
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\willow_grove\WGSite3\Site3_2010\ProUCL\ProUCL WSTs and Excel Outputs\WGs3SSProUCL.xls.wst
Full Precision	ON
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Total 2,3,7,8-TCDD Equiv.

General Statistics

Number of Valid Data	2	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	0
Number of Missing Values	66	Percent Non-Detects	0.00%

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Total 2,3,7,8-TCDD Equiv. was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Aluminum

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	54

Raw Statistics

Minimum	8200
Maximum	24250
Mean	15651.99
Median	15050
SD	3497.927
Coefficient of Variation	0.223481
Skewness	0.690741

Log-transformed Statistics

Minimum of Log Data	9.0118894
Maximum of Log Data	10.096172
Mean of log Data	9.6343236
SD of log Data	0.2210677

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.12893
Lilliefors Critical Value	0.107443

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	16359.49

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	16387.68
95% Modified-t UCL	16365.41

Gamma Distribution Test

k star (bias corrected)	20.05761
Theta Star	780.3515
MLE of Mean	15651.99
MLE of Standard Deviation	3494.861
nu star	2727.835
Approximate Chi Square Value (.05)	2607.49
Adjusted Level of Significance	0.046471
Adjusted Chi Square Value	2604.965
Anderson-Darling Test Statistic	0.695655
Anderson-Darling 5% Critical Value	0.749103
Kolmogorov-Smirnov Test Statistic	0.099768
Kolmogorov-Smirnov 5% Critical Value	0.107784

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	16374.38
95% Adjusted Gamma UCL	16390.25

Potential UCL to Use

Lognormal Distribution Test

Lilliefors Test Statistic	0.0964388
Lilliefors Critical Value	0.1074433

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL	16404.071
95% Chebyshev (MVUE) UCL	17501.279
97.5% Chebyshev (MVUE) UCL	18301.211
99% Chebyshev (MVUE) UCL	19872.522

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	16349.709
95% Jackknife UCL	16359.492
95% Standard Bootstrap UCL	16336.658
95% Bootstrap-t UCL	16381.907
95% Hall's Bootstrap UCL	16393.621
95% Percentile Bootstrap UCL	16361.912
95% BCA Bootstrap UCL	16455.882
95% Chebyshev(Mean, Sd) UCL	17500.969
97.5% Chebyshev(Mean, Sd) UCL	18301.026
99% Chebyshev(Mean, Sd) UCL	19872.583

Use 95% Approximate Gamma UCL 16374.383

Antimony

General Statistics

APPENDIX K, TABLE K-4
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Number of Valid Data	51	Number of Detected Data	21
Number of Distinct Detected Data	18	Number of Non-Detect Data	30
Number of Missing Values	17	Percent Non-Detects	58.82%

Raw Statistics

Minimum Detected	0.1625
Maximum Detected	10.4
Mean of Detected	1.379643
SD of Detected	2.111504
Minimum Non-Detect	0.2
Maximum Non-Detect	10.1

Log-transformed Statistics

Minimum Detected	-1.817077
Maximum Detected	2.3418058
Mean of Detected	-0.116648
SD of Detected	0.8636201
Minimum Non-Detect	-1.609438
Maximum Non-Detect	2.3125354

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	50
Number treated as Detected	1
Single DL Non-Detect Percentage	98.04%

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.410291
5% Shapiro Wilk Critical Value	0.908

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	2.387255
SD	2.083948
95% DL/2 (t) UCL	2.876303
Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.868084
5% Shapiro Wilk Critical Value	0.908

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	0.3240864
SD	1.2513706
95% H-Stat (DL/2) UCL	5.35764
Log ROS Method	
Mean in Log Scale	-0.481283
SD in Log Scale	0.7564296
Mean in Original Scale	0.8911324
SD in Original Scale	1.4136459
95% Percentile Bootstrap UCL	1.2713861
95% BCA Bootstrap UCL	1.5412283

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.130041
Theta Star	1.220879
nu star	47.46172
A-D Test Statistic	1.772013
5% A-D Critical Value	0.763194
K-S Test Statistic	0.763194
5% K-S Critical Value	0.193692

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	10.4
Mean	1.451206
Median	1.065108
SD	1.512344
k star	0.42966
Theta star	3.377568
Nu star	43.82533
AppChi2	29.64368
95% Gamma Approximate UCL	2.145469
95% Adjusted Gamma UCL	2.170354

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.9439527
SD	1.4241253
SE of Mean	0.2152299
95% KM (t) UCL	1.3046575
95% KM (z) UCL	1.2979743
95% KM (jackknife) UCL	1.291113
95% KM (bootstrap t) UCL	1.6390364
95% KM (BCA) UCL	1.4158824
95% KM (Percentile Bootstrap) UCL	1.3336415
95% KM (Chebyshev) UCL	1.882118
97.5% KM (Chebyshev) UCL	2.2880629
99% KM (Chebyshev) UCL	3.085463

Potential UCLs to Use

95% KM (t) UCL	1.3046575
95% KM (% Bootstrap) UCL	1.3336415

Arsenic

General Statistics

Number of Valid Data	61	Number of Detected Data	61
Number of Distinct Detected Data	46	Number of Non-Detect Data	0
Number of Missing Values	7	Percent Non-Detects	0.00%

Raw Statistics

Minimum Detected	0.37
Maximum Detected	13
Mean of Detected	4.920328
SD of Detected	2.010643
Minimum Non-Detect	N/A

Log-transformed Statistics

Minimum Detected	-0.994252
Maximum Detected	2.5649494
Mean of Detected	1.4888303
SD of Detected	0.5320914
Minimum Non-Detect	N/A

Maximum Non-Detect	N/A	Maximum Non-Detect	N/A

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.100425	Lilliefors Test Statistic	0.1731365
5% Lilliefors Critical Value	0.113441	5% Lilliefors Critical Value	0.1134407
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.920328	Mean	1.4888303
SD	2.010643	SD	0.5320914
95% DL/2 (t) UCL	5.350414	95% H-Stat (DL/2) UCL	5.8104599
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.71106	Data appear Normal at 5% Significance Level	
Theta Star	1.044421		
nu star	574.7493		
A-D Test Statistic	1.17868	**Nonparametric Statistics**	
5% A-D Critical Value	0.753444	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.753444	Mean	4.9203279
5% K-S Critical Value	0.114191	SD	1.9940945
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.2574365
		95% KM (t) UCL	5.3504138
Assuming Gamma Distribution		95% KM (z) UCL	5.3437732
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	5.3504138
Minimum	0.37	95% KM (bootstrap t) UCL	5.3957621
Maximum	13	95% KM (BCA) UCL	5.342459
Mean	4.920328	95% KM (Percentile Bootstrap) UCL	5.3762295
Median	4.6	95% KM (Chebyshev) UCL	6.0424675
SD	2.010643	97.5% KM (Chebyshev) UCL	6.5280183
k star	4.71106	99% KM (Chebyshev) UCL	7.4817887
Theta star	1.044421		
Nu star	574.7493	**Potential UCLs to Use**	
AppChi2	520.1417	95% KM (t) UCL	5.3504138
95% Gamma Approximate UCL	5.436893	95% KM (Percentile Bootstrap) UCL	5.3762295
95% Adjusted Gamma UCL	5.449978		
Note: DL/2 is not a recommended method.			

Cadmium

General Statistics

Number of Valid Data	49	Number of Detected Data	23
Number of Distinct Detected Data	20	Number of Non-Detect Data	26
Number of Missing Values	19	Percent Non-Detects	53.06%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.365	Minimum Detected	-1.007858
Maximum Detected	18.4	Maximum Detected	2.9123507
Mean of Detected	3.381522	Mean of Detected	0.9459648
SD of Detected	3.548934	SD of Detected	0.7156908
Minimum Non-Detect	0.03	Minimum Non-Detect	-3.506558
Maximum Non-Detect	1.4	Maximum Non-Detect	0.3364722
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	28
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	21
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	57.14%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.534654	Shapiro Wilk Test Statistic	0.8872955
5% Shapiro Wilk Critical Value	0.914	5% Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	

APPENDIX K, TABLE K-4
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

DL/2 Substitution Method	
Mean	1.833296
SD	2.820335
95% DL/2 (t) UCL	2.509058

Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

DL/2 Substitution Method	
Mean	-0.062932
SD	1.2397868
95% H-Stat (DL/2) UCL	1.8893105

Log ROS Method	
Mean in Log Scale	0.0299433
SD in Log Scale	1.0254207
Mean in Original Scale	1.8437617
SD in Original Scale	2.8145849
95% Percentile Bootstrap UCL	2.5177937
95% BCA Bootstrap UCL	2.8752681

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.756215
Theta Star	1.92546
nu star	80.78588
A-D Test Statistic	1.56074
5% A-D Critical Value	0.754867
K-S Test Statistic	0.754867
5% K-S Critical Value	0.18385

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.365
Maximum	18.4
Mean	3.392597
Median	3.232232
SD	2.453715
k star	3.540757
Theta star	0.958156
Nu star	346.9942
AppChi2	304.8292
95% Gamma Approximate UCL	3.861872
95% Adjusted Gamma UCL	3.877051

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	1.7881152
SD	2.8115264
SE of Mean	0.4108314
95% KM (t) UCL	2.4771717
95% KM (z) UCL	2.4638728
95% KM (jackknife) UCL	2.3635058
95% KM (bootstrap t) UCL	2.9509375
95% KM (BCA) UCL	2.9908163
95% KM (Percentile Bootstrap) UCL	2.8112245
95% KM (Chebyshev) UCL	3.5788879
97.5% KM (Chebyshev) UCL	4.3537567
99% KM (Chebyshev) UCL	5.8758364

Potential UCLs to Use

95% KM (t) UCL	2.4771717
95% KM (% Bootstrap) UCL	2.8112245

Chromium

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	60

Raw Statistics

Minimum	6.6
Maximum	33.25
Mean	20.45
Median	20.1
SD	4.732966
Coefficient of Variation	0.231441
Skewness	-0.165296

Log-transformed Statistics

Minimum of Log Data	1.8870696
Maximum of Log Data	3.5040548
Mean of log Data	2.9876222
SD of log Data	0.2608321

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.081765
Lilliefors Critical Value	0.107443

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	21.40731

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	21.38178
95% Modified-t UCL	21.40539

Gamma Distribution Test

k star (bias corrected)	15.90961
Theta Star	1.285387
MLE of Mean	20.45
MLE of Standard Deviation	5.127004
nu star	2163.706
Approximate Chi Square Value (.05)	2056.652
Adjusted Level of Significance	0.046471
Adjusted Chi Square Value	2054.412

Lognormal Distribution Test

Lilliefors Test Statistic	0.1340429
Lilliefors Critical Value	0.1074433

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL	21.694536
95% Chebyshev (MVUE) UCL	23.384771
97.5% Chebyshev (MVUE) UCL	24.626824
99% Chebyshev (MVUE) UCL	27.066596

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	21.394074
95% Jackknife UCL	21.407311
95% Standard Bootstrap UCL	21.364501

Anderson-Darling Test Statistic	0.803929	95% Bootstrap-t UCL	21.380099
Anderson-Darling 5% Critical Value	0.749683	95% Hall's Bootstrap UCL	21.39735
Kolmogorov-Smirnov Test Statistic	0.114128	95% Percentile Bootstrap UCL	21.370588
Kolmogorov-Smirnov 5% Critical Value	0.107867	95% BCA Bootstrap UCL	21.339706
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22.951818
		97.5% Chebyshev(Mean, Sd) UCL	24.034357
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	26.160795
95% Approximate Gamma UCL	21.51448		
95% Adjusted Gamma UCL	21.53793		
Potential UCL to Use		Use 95% Student's-t UCL	21.407311

Cobalt

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	39
Raw Statistics		**Log-transformed Statistics**	
Minimum	5.6	Minimum of Log Data	1.7227666
Maximum	12.2	Maximum of Log Data	2.501436
Mean	8.5	Mean of log Data	2.1292194
Median	8.3	SD of log Data	0.1486705
SD	1.265265		
Coefficient of Variation	0.148855		
Skewness	0.456653		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.088235	Lilliefors Test Statistic	0.08578
Lilliefors Critical Value	0.107443	Lilliefors Critical Value	0.1074433
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	8.755918	95% H-UCL	8.7677441
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.1716103
95% Adjusted-CLT UCL	8.761459	97.5% Chebyshev (MVUE) UCL	9.4620677
95% Modified-t UCL	8.757334	99% Chebyshev (MVUE) UCL	10.032615
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	44.23171	Data appear Normal at 5% Significance Level	
Theta Star	0.19217		
MLE of Mean	8.5		
MLE of Standard Deviation	1.278063		
nu star	6015.512		
Approximate Chi Square Value (.05)	5836.239	**Nonparametric Statistics**	
Adjusted Level of Significance	0.046471	95% CLT UCL	8.7523796
Adjusted Chi Square Value	5832.453	95% Jackknife UCL	8.7559182
		95% Standard Bootstrap UCL	8.7484594
Anderson-Darling Test Statistic	0.414681	95% Bootstrap-t UCL	8.7620083
Anderson-Darling 5% Critical Value	0.74849	95% Hall's Bootstrap UCL	8.7687955
Kolmogorov-Smirnov Test Statistic	0.079094	95% Percentile Bootstrap UCL	8.7558824
Kolmogorov-Smirnov 5% Critical Value	0.107718	95% BCA Bootstrap UCL	8.7661765
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.1688117
		97.5% Chebyshev(Mean, Sd) UCL	9.458207
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10.026668
95% Approximate Gamma UCL	8.761097		
95% Adjusted Gamma UCL	8.766784		
Potential UCL to Use		Use 95% Student's-t UCL	8.7559182

Iron

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	52
Raw Statistics		**Log-transformed Statistics**	
Minimum	14150	Minimum of Log Data	9.5574699
Maximum	55550	Maximum of Log Data	10.925039
Mean	20645.59	Mean of log Data	9.9065142
Median	19875	SD of log Data	0.2291537
SD	5780.311		
Coefficient of Variation	0.279978		
Skewness	3.35879		

APPENDIX K, TABLE K-4
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.132231	Lilliefors Test Statistic	0.0791227
Lilliefors Critical Value	0.107443	Lilliefors Critical Value	0.1074433
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	21814.74	95% H-UCL	21613.823
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	23108.451
95% Adjusted-CLT UCL	22103.65	97.5% Chebyshev (MVUE) UCL	24199.85
95% Modified-t UCL	21862.33	99% Chebyshev (MVUE) UCL	26343.692
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	16.79582	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	1229.21		
MLE of Mean	20645.59		
MLE of Standard Deviation	5037.635		
nu star	2284.231		
Approximate Chi Square Value (.05)	2174.204	**Nonparametric Statistics**	
Adjusted Level of Significance	0.046471	95% CLT UCL	21798.574
Adjusted Chi Square Value	2171.901	95% Jackknife UCL	21814.74
		95% Standard Bootstrap UCL	21787.043
Anderson-Darling Test Statistic	1.049025	95% Bootstrap-t UCL	22235.514
Anderson-Darling 5% Critical Value	0.74953	95% Hall's Bootstrap UCL	24369.004
Kolmogorov-Smirnov Test Statistic	0.089363	95% Percentile Bootstrap UCL	21846.324
Kolmogorov-Smirnov 5% Critical Value	0.107845	95% BCA Bootstrap UCL	22145.588
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	23701.027
		97.5% Chebyshev(Mean, Sd) UCL	25023.117
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	27620.109
95% Approximate Gamma UCL	21690.38		
95% Adjusted Gamma UCL	21713.38		
Potential UCL to Use		Use 95% Approximate Gamma UCL	21690.379

Manganese

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	65
Raw Statistics		**Log-transformed Statistics**	
Minimum	334	Minimum of Log Data	5.811141
Maximum	1780	Maximum of Log Data	7.4843686
Mean	632.5662	Mean of log Data	6.3923352
Median	590	SD of log Data	0.3311032
SD	238.808		
Coefficient of Variation	0.377523		
Skewness	2.056645		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.118499	Lilliefors Test Statistic	0.0635928
Lilliefors Critical Value	0.107443	Lilliefors Critical Value	0.1074433
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	680.8686	95% H-UCL	677.77788
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	743.3178
95% Adjusted-CLT UCL	687.9182	97.5% Chebyshev (MVUE) UCL	792.19187
95% Modified-t UCL	682.0724	99% Chebyshev (MVUE) UCL	888.1955
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.485297	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	74.54851		
MLE of Mean	632.5662		
MLE of Standard Deviation	217.1563		
nu star	1154		
Approximate Chi Square Value (.05)	1076.132	**Nonparametric Statistics**	
Adjusted Level of Significance	0.046471	95% CLT UCL	680.20069
Adjusted Chi Square Value	1074.518	95% Jackknife UCL	680.86857
		95% Standard Bootstrap UCL	678.36711
Anderson-Darling Test Statistic	0.619471	95% Bootstrap-t UCL	686.74665
Anderson-Darling 5% Critical Value	0.751514	95% Hall's Bootstrap UCL	698.76536
Kolmogorov-Smirnov Test Statistic	0.076769	95% Percentile Bootstrap UCL	684.16176
Kolmogorov-Smirnov 5% Critical Value	0.108099	95% BCA Bootstrap UCL	692.29412
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	758.79869

		97.5% Chebyshev(Mean, Sd) UCL	813.4196
		99% Chebyshev(Mean, Sd) UCL	920.71181
Assuming Gamma Distribution			
95% Approximate Gamma UCL	678.3383		
95% Adjusted Gamma UCL	679.3575		
Potential UCL to Use		Use 95% Approximate Gamma UCL	678.33826

Thallium

General Statistics

Number of Valid Data	61	Number of Detected Data	24
Number of Distinct Detected Data	19	Number of Non-Detect Data	37
Number of Missing Values	7	Percent Non-Detects	60.66%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.26	Minimum Detected	-1.347074
Maximum Detected	1.8	Maximum Detected	0.5877867
Mean of Detected	0.540729	Mean of Detected	-0.772441
SD of Detected	0.406024	SD of Detected	0.5103352
Minimum Non-Detect	0.15	Minimum Non-Detect	-1.89712
Maximum Non-Detect	0.73	Maximum Non-Detect	-0.314711
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	59
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	2
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	96.72%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.588715	Shapiro Wilk Test Statistic	0.8294103
5% Shapiro Wilk Critical Value	0.916	5% Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.315779	Mean	-1.454942
SD	0.317987	SD	0.7485561
95% DL/2 (t) UCL	0.383798	95% H-Stat (DL/2) UCL	0.2900402
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.431342
		SD in Log Scale	0.6655524
		Mean in Original Scale	0.311845
		SD in Original Scale	0.3152978
		95% Percentile Bootstrap UCL	0.3868401
		95% BCA Bootstrap UCL	0.4085747
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	2.941451	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.183831		
nu star	141.1896		
A-D Test Statistic	1.862876	**Nonparametric Statistics**	
5% A-D Critical Value	0.750318	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.750318	Mean	0.3796033
5% K-S Critical Value	0.179038	SD	0.2837296
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0374505
		95% KM (t) UCL	0.44217
Assuming Gamma Distribution		95% KM (z) UCL	0.441204
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.4374262
Minimum	0.038941	95% KM (bootstrap t) UCL	0.500764
Maximum	1.8	95% KM (BCA) UCL	0.4615425
Mean	0.5691	95% KM (Percentile Bootstrap) UCL	0.4456026
Median	0.493738	95% KM (Chebyshev) UCL	0.5428464
SD	0.320868	97.5% KM (Chebyshev) UCL	0.6134818
k star	3.384987	99% KM (Chebyshev) UCL	0.7522314
Theta star	0.168125		
Nu star	412.9684	**Potential UCLs to Use**	
AppChi2	366.8608	95% KM (t) UCL	0.44217
95% Gamma Approximate UCL	0.640625	95% KM (% Bootstrap) UCL	0.4456026
95% Adjusted Gamma UCL	0.642456		
Note: DL/2 is not a recommended method.			

Vanadium

APPENDIX K, TABLE K-4
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

General Statistics

Number of Valid Observations	68	Number of Distinct Observations	57

Raw Statistics

Minimum	16.6
Maximum	45.7
Mean	30.35735
Median	29.95
SD	5.917923
Coefficient of Variation	0.194942
Skewness	0.253296

Log-transformed Statistics

Minimum of Log Data	2.8094027
Maximum of Log Data	3.8220983
Mean of log Data	3.3938797
SD of log Data	0.1992981

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.06439
Lilliefors Critical Value	0.107443

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.0691274
Lilliefors Critical Value	0.1074433

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	31.55434

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	31.56134
95% Modified-t UCL	31.55801

Assuming Lognormal Distribution

95% H-UCL	31.673425
95% Chebyshev (MVUE) UCL	33.596892
97.5% Chebyshev (MVUE) UCL	34.993346
99% Chebyshev (MVUE) UCL	37.736408

Gamma Distribution Test

k star (bias corrected)	25.11409
Theta Star	1.208778
MLE of Mean	30.35735
MLE of Standard Deviation	6.057664
nu star	3415.516
Approximate Chi Square Value (.05)	3280.716
Adjusted Level of Significance	0.046471
Adjusted Chi Square Value	3277.882
Anderson-Darling Test Statistic	0.196482
Anderson-Darling 5% Critical Value	0.748974
Kolmogorov-Smirnov Test Statistic	0.058607
Kolmogorov-Smirnov 5% Critical Value	0.10777

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	31.6047
95% Adjusted Gamma UCL	31.63202

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	31.537788
95% Jackknife UCL	31.554339
95% Standard Bootstrap UCL	31.484443
95% Bootstrap-t UCL	31.53933
95% Hall's Bootstrap UCL	31.569768
95% Percentile Bootstrap UCL	31.480147
95% BCA Bootstrap UCL	31.602206
95% Chebyshev(Mean, Sd) UCL	33.485532
97.5% Chebyshev(Mean, Sd) UCL	34.839098
99% Chebyshev(Mean, Sd) UCL	37.497916

Potential UCL to Use

Use 95% Student's-t UCL 31.554339

Dieldrin

General Statistics

Number of Valid Data	67	Number of Detected Data	59
Number of Distinct Detected Data	55	Number of Non-Detect Data	8
Number of Missing Values	1	Percent Non-Detects	11.94%

Raw Statistics

Minimum Detected	1.6
Maximum Detected	620
Mean of Detected	84.07797
SD of Detected	122.5948
Minimum Non-Detect	3.9
Maximum Non-Detect	43

Log-transformed Statistics

Minimum Detected	0.4700036
Maximum Detected	6.4297195
Mean of Detected	3.5171024
SD of Detected	1.4756572
Minimum Non-Detect	1.3609766
Maximum Non-Detect	3.7612001

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	41
Number treated as Detected	26
Single DL Non-Detect Percentage	61.19%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.250547
5% Lilliefors Critical Value	0.115347

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.0897406
5% Lilliefors Critical Value	0.1153474

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	75.19478
SD	117.4801

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	3.3496296
SD	1.4730219

95% DL/2 (t) UCL	99.1386
Maximum Likelihood Estimate(MLE) Method	N/A
MLE yields a negative mean	

95% H-Stat (DL/2) UCL	117.93356
Log ROS Method	
Mean in Log Scale	3.3200305
SD in Log Scale	1.4983137
Mean in Original Scale	74.932826
SD in Original Scale	117.62424
95% Percentile Bootstrap UCL	99.69604
95% BCA Bootstrap UCL	104.68431

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.642933
Theta Star	130.7724
nu star	75.86614
A-D Test Statistic	0.769968
5% A-D Critical Value	0.800175
K-S Test Statistic	0.800175
5% K-S Critical Value	0.121073

Data appear Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	620
Mean	74.68608
Median	27
SD	117.8088
k star	0.239125
Theta star	312.3308
Nu star	32.04274
AppChi2	20.10593
95% Gamma Approximate UCL	119.0269
95% Adjusted Gamma UCL	120.2723

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	74.90135
SD	116.77413
SE of Mean	14.390782
95% KM (t) UCL	98.909066
95% KM (z) UCL	98.572081
95% KM (jackknife) UCL	98.884662
95% KM (bootstrap t) UCL	109.77923
95% KM (BCA) UCL	101.12631
95% KM (Percentile Bootstrap) UCL	98.841516
95% KM (Chebyshev) UCL	137.62932
97.5% KM (Chebyshev) UCL	164.77176
99% KM (Chebyshev) UCL	218.08783

Potential UCLs to Use

95% KM (Chebyshev) UCL	137.62932

Benz(a)anthracene

General Statistics

Number of Valid Data	68
Number of Distinct Detected Data	46
Number of Detected Data	55
Number of Non-Detect Data	13
Percent Non-Detects	19.12%

Raw Statistics

Minimum Detected	4.2
Maximum Detected	44500
Mean of Detected	1455.93
SD of Detected	6439.308
Minimum Non-Detect	370
Maximum Non-Detect	430

Log-transformed Statistics

Minimum Detected	1.4350845
Maximum Detected	10.703244
Mean of Detected	4.3846487
SD of Detected	1.9187002
Minimum Non-Detect	5.913503
Maximum Non-Detect	6.0637852

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	60
Number treated as Detected	8
Single DL Non-Detect Percentage	88.24%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.446219
5% Lilliefors Critical Value	0.119468

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.1642831
5% Lilliefors Critical Value	0.1194682

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	1214.723
SD	5802.512
95% DL/2 (t) UCL	2388.365
Maximum Likelihood Estimate(MLE) Method	N/A
MLE yields a negative mean	

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	4.5535106
SD	1.7578323
95% H-Stat (DL/2) UCL	857.78531
Log ROS Method	
Mean in Log Scale	4.3001946
SD in Log Scale	1.7603756
Mean in Original Scale	1190.1682
SD in Original Scale	5807.149
95% Percentile Bootstrap UCL	2455.9657
95% BCA Bootstrap UCL	3188.1978

APPENDIX K, TABLE K-4
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.244435
Theta Star	5956.313
nu star	26.88783
A-D Test Statistic	8.749367
5% A-D Critical Value	0.887711
K-S Test Statistic	0.887711
5% K-S Critical Value	0.13177

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	4.2
Maximum	44500
Mean	1484.781
Median	100
SD	5782.102
k star	0.291412
Theta star	5095.121
Nu star	39.63209
AppChi2	26.20966
95% Gamma Approximate UCL	2245.164
95% Adjusted Gamma UCL	2265.609

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	1190.7148
SD	5764.2246
SE of Mean	705.46905
95% KM (t) UCL	2367.3779
95% KM (z) UCL	2351.1081
95% KM (jackknife) UCL	2365.3014
95% KM (bootstrap t) UCL	4825.1465
95% KM (BCA) UCL	2561.4902
95% KM (Percentile Bootstrap) UCL	2512.4971
95% KM (Chebyshev) UCL	4265.783
97.5% KM (Chebyshev) UCL	5596.3675
99% KM (Chebyshev) UCL	8210.0431

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	5596.3675

Benzo(a)pyrene

General Statistics

Number of Valid Data	68	Number of Detected Data	55
Number of Distinct Detected Data	46	Number of Non-Detect Data	13
		Percent Non-Detects	19.12%

Raw Statistics

Minimum Detected	5.1
Maximum Detected	34000
Mean of Detected	1109.184
SD of Detected	4827.945
Minimum Non-Detect	370
Maximum Non-Detect	430

Log-transformed Statistics

Minimum Detected	1.6292405
Maximum Detected	10.434116
Mean of Detected	4.4615759
SD of Detected	1.8114994
Minimum Non-Detect	5.913503
Maximum Non-Detect	6.0637852

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	60
Number treated as Detected	8
Single DL Non-Detect Percentage	88.24%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.427028
5% Lilliefors Critical Value	0.119468

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	934.2662
SD	4349.459
95% DL/2 (t) UCL	1814.008
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.156794
5% Lilliefors Critical Value	0.1194682

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	4.6157311
SD	1.6574933
95% H-Stat (DL/2) UCL	720.01693
Log ROS Method	
Mean in Log Scale	4.3814909
SD in Log Scale	1.662331
Mean in Original Scale	910.70841
SD in Original Scale	4353.8455
95% Percentile Bootstrap UCL	1834.5418
95% BCA Bootstrap UCL	2559.4105

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.271551
Theta Star	4084.619
nu star	29.87065
A-D Test Statistic	8.021163
5% A-D Critical Value	0.874565
K-S Test Statistic	0.874565
5% K-S Critical Value	0.130969

Data not Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	911.40931
SD	4321.6416
SE of Mean	528.9237

95% KM (t) UCL	1793.6097
95% KM (z) UCL	1781.4114
95% KM (jackknife) UCL	1792.0535
95% KM (bootstrap t) UCL	3640.8935
95% KM (BCA) UCL	1895.426
95% KM (Percentile Bootstrap) UCL	1889.4981
95% KM (Chebyshev) UCL	3216.9343
97.5% KM (Chebyshev) UCL	4214.5368
99% KM (Chebyshev) UCL	6174.1337

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	5.1
Maximum	34000
Mean	1127.791
Median	120
SD	4335.105
k star	0.324244
Theta star	3478.22
Nu star	44.09713
AppChi2	29.86756
95% Gamma Approximate UCL	1665.095
95% Adjusted Gamma UCL	1679.356

Potential UCLs to Use

97.5% KM (Chebyshev) UCL 4214.5368

Note: DL/2 is not a recommended method.

Benzo(b)fluoranthene

General Statistics

Number of Valid Data	68	Number of Detected Data	59
Number of Distinct Detected Data	48	Number of Non-Detect Data	9
		Percent Non-Detects	13.24%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	7.2	Minimum Detected	1.974081
Maximum Detected	37500	Maximum Detected	10.532096
Mean of Detected	1141.834	Mean of Detected	4.6213927
SD of Detected	5139.836	SD of Detected	1.688575
Minimum Non-Detect	370	Minimum Non-Detect	5.913503
Maximum Non-Detect	430	Maximum Non-Detect	6.0637852

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	60
Number treated as Detected	8
Single DL Non-Detect Percentage	88.24%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.436431
5% Lilliefors Critical Value	0.115347

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.1641075
5% Lilliefors Critical Value	0.1153474

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	1016.775
SD	4793.048
95% DL/2 (t) UCL	1986.239
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	4.7087388
SD	1.5872805
95% H-Stat (DL/2) UCL	682.1278
Log ROS Method	
Mean in Log Scale	4.5748478
SD in Log Scale	1.5913944
Mean in Original Scale	1001.9978
SD in Original Scale	4795.7963
95% Percentile Bootstrap UCL	2128.1471
95% BCA Bootstrap UCL	2711.2098

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.283812
Theta Star	4023.212
nu star	33.48976
A-D Test Statistic	9.309096
5% A-D Critical Value	0.869168
K-S Test Statistic	0.869168
5% K-S Critical Value	0.125962

Data not Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	7.2
Maximum	37500
Mean	1136.206
Median	100
SD	4782.25
k star	0.319841
Theta star	3552.403

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	1002.0976
SD	4760.4266
SE of Mean	582.25282
95% KM (t) UCL	1973.2464
95% KM (z) UCL	1959.8182
95% KM (jackknife) UCL	1972.141
95% KM (bootstrap t) UCL	4507.063
95% KM (BCA) UCL	2209.7578
95% KM (Percentile Bootstrap) UCL	2082.2686
95% KM (Chebyshev) UCL	3540.0788
97.5% KM (Chebyshev) UCL	4638.2653
99% KM (Chebyshev) UCL	6795.44

Nu star	43.49843
AppChi2	29.37461
95% Gamma Approximate UCL	1682.513
95% Adjusted Gamma UCL	1697.036

Potential UCLs to Use
97.5% KM (Chebyshev) UCL 4638.2653

Note: DL/2 is not a recommended method.

Benzo(k)fluoranthene

General Statistics

Number of Valid Data	68	Number of Detected Data	53
Number of Distinct Detected Data	45	Number of Non-Detect Data	15
		Percent Non-Detects	22.06%

Raw Statistics

Minimum Detected	5.2
Maximum Detected	24500
Mean of Detected	825.3915
SD of Detected	3514.255
Minimum Non-Detect	370
Maximum Non-Detect	450

Log-transformed Statistics

Minimum Detected	1.6486586
Maximum Detected	10.106428
Mean of Detected	4.4204299
SD of Detected	1.7287075
Minimum Non-Detect	5.913503
Maximum Non-Detect	6.1092476

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	60
Number treated as Detected	8
Single DL Non-Detect Percentage	88.24%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.421417
5% Lilliefors Critical Value	0.121702

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	687.4375
SD	3106.985
95% DL/2 (t) UCL	1315.87
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.1550999
5% Lilliefors Critical Value	0.1217015

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	4.6135536
SD	1.5665844
95% H-Stat (DL/2) UCL	622.6615
Log ROS Method	
Mean in Log Scale	4.3294523
SD in Log Scale	1.5635157
Mean in Original Scale	658.16498
SD in Original Scale	3112.1915
95% Percentile Bootstrap UCL	1337.366
95% BCA Bootstrap UCL	1764.5111

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.295929
Theta Star	2789.158
nu star	31.36843
A-D Test Statistic	7.09819
5% A-D Critical Value	0.862574
K-S Test Statistic	0.862574
5% K-S Critical Value	0.132571

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	5.2
Maximum	24500
Mean	844.4579
Median	110
SD	3097.301
k star	0.364521
Theta star	2316.625
Nu star	49.57482
AppChi2	34.40952
95% Gamma Approximate UCL	1216.636
95% Adjusted Gamma UCL	1226.384

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	659.55475
SD	3089.0903
SE of Mean	378.22316
95% KM (t) UCL	1290.3992
95% KM (z) UCL	1281.6765
95% KM (jackknife) UCL	1289.0678
95% KM (bootstrap t) UCL	5858.6957
95% KM (BCA) UCL	1372.2304
95% KM (Percentile Bootstrap) UCL	1374.4627
95% KM (Chebyshev) UCL	2308.1913
97.5% KM (Chebyshev) UCL	3021.5576
99% KM (Chebyshev) UCL	4422.8276

Potential UCLs to Use
97.5% KM (Chebyshev) UCL 3021.5576

Chrysene

General Statistics

APPENDIX K, TABLE K-4
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Number of Valid Data	68	Number of Detected Data	62
Number of Distinct Detected Data	50	Number of Non-Detect Data	6
		Percent Non-Detects	8.82%

Raw Statistics

Minimum Detected	6.6
Maximum Detected	36500
Mean of Detected	1133.236
SD of Detected	5039.29
Minimum Non-Detect	370
Maximum Non-Detect	400

Log-transformed Statistics

Minimum Detected	1.8870696
Maximum Detected	10.505068
Mean of Detected	4.5604295
SD of Detected	1.6769174
Minimum Non-Detect	5.913503
Maximum Non-Detect	5.9914645

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	59
Number treated as Detected	9
Single DL Non-Detect Percentage	86.76%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.437882
5% Lilliefors Critical Value	0.112522

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	1050.267
SD	4815.861
95% DL/2 (t) UCL	2024.345
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.1733393
5% Lilliefors Critical Value	0.1125221

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	4.6223098
SD	1.6125998
95% H-Stat (DL/2) UCL	623.49194
Log ROS Method	
Mean in Log Scale	4.5315751
SD in Log Scale	1.60969
Mean in Original Scale	1040.0995
SD in Original Scale	4817.8223
95% Percentile Bootstrap UCL	2094.7882
95% BCA Bootstrap UCL	2604.5975

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.278888
Theta Star	4063.406
nu star	34.58215
A-D Test Statistic	10.37271
5% A-D Critical Value	0.872157
K-S Test Statistic	0.872157
5% K-S Critical Value	0.12317

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	36500
Mean	1063.224
Median	68
SD	4815.849
k star	0.19462
Theta star	5463.077
Nu star	26.46831
AppChi2	15.74045
95% Gamma Approximate UCL	1787.862
95% Adjusted Gamma UCL	1808.487

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	1040.3214
SD	4782.2491
SE of Mean	584.67258
95% KM (t) UCL	2015.5062
95% KM (z) UCL	2002.0222
95% KM (jackknife) UCL	2014.8021
95% KM (bootstrap t) UCL	3833.6733
95% KM (BCA) UCL	2223.1433
95% KM (Percentile Bootstrap) UCL	2160.5384
95% KM (Chebyshev) UCL	3588.8501
97.5% KM (Chebyshev) UCL	4691.6005
99% KM (Chebyshev) UCL	6857.7401

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	4691.6005

Dibenz(a,h)anthracene

General Statistics

Number of Valid Data	65	Number of Detected Data	26
Number of Distinct Detected Data	24	Number of Non-Detect Data	39
Number of Missing Values	3	Percent Non-Detects	60.00%

Raw Statistics

Minimum Detected	1.7
Maximum Detected	2805
Mean of Detected	145.6039
SD of Detected	548.9867
Minimum Non-Detect	350

Log-transformed Statistics

Minimum Detected	0.5306283
Maximum Detected	7.9391588
Mean of Detected	2.6260741
SD of Detected	1.841409
Minimum Non-Detect	5.8579332

Maximum Non-Detect	20000	Maximum Non-Detect	9.9034876
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	65
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.278474	Shapiro Wilk Test Statistic	0.8919849
5% Shapiro Wilk Critical Value	0.92	5% Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	332.6262	Mean	4.297811
SD	1266.034	SD	1.8614192
95% DL/2 (t) UCL	594.7149	95% H-Stat (DL/2) UCL	1205.5447
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	2.4666559
		SD in Log Scale	1.3971778
		Mean in Original Scale	68.447033
		SD in Original Scale	349.23924
		95% Percentile Bootstrap UCL	150.90272
		95% BCA Bootstrap UCL	234.69123

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.285565	Data do not follow a Discernable Distribution (0.05)	
Theta Star	509.8802		
nu star	14.84937		
A-D Test Statistic	3.341025	**Nonparametric Statistics**	
5% A-D Critical Value	0.854195	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.854195	Mean	74.055957
5% K-S Critical Value	0.186	SD	349.76811
Data not Gamma Distributed at 5% Significance Level		SE of Mean	44.998265
		95% KM (t) UCL	149.15865
Assuming Gamma Distribution		95% KM (z) UCL	148.07152
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	148.34383
Minimum	1.7	95% KM (bootstrap t) UCL	484.60724
Maximum	2805	95% KM (BCA) UCL	169.93417
Mean	150.7054	95% KM (Percentile Bootstrap) UCL	157.17234
Median	136.6463	95% KM (Chebyshev) UCL	270.19885
SD	344.3885	97.5% KM (Chebyshev) UCL	355.07003
k star	0.612714	99% KM (Chebyshev) UCL	521.78304
Theta star	245.9638		
Nu star	79.65275	Potential UCLs to Use	
AppChi2	60.08958	95% KM (Chebyshev) UCL	270.19885
95% Gamma Approximate UCL	199.77		
95% Adjusted Gamma UCL	201.0568		

Note: DL/2 is not a recommended method.

Indeno(1,2,3-cd)pyrene

General Statistics

Number of Valid Data	68	Number of Detected Data	45
Number of Distinct Detected Data	41	Number of Non-Detect Data	23
		Percent Non-Detects	33.82%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	4.4	Minimum Detected	1.4816045
Maximum Detected	13800	Maximum Detected	9.5324239
Mean of Detected	635.5767	Mean of Detected	4.1242322
SD of Detected	2337.827	SD of Detected	1.7342013
Minimum Non-Detect	350	Minimum Non-Detect	5.8579332
Maximum Non-Detect	740	Maximum Non-Detect	6.6066502
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	65
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	95.59%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.302505	Shapiro Wilk Test Statistic	0.8914367
5% Shapiro Wilk Critical Value	0.945	5% Shapiro Wilk Critical Value	0.945

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	489.2052
SD	1905.855
95% DL/2 (t) UCL	874.692
Maximum Likelihood Estimate(MLE) Method	N/A

MLE yields a negative mean

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	4.5218099
SD	1.5153681
95% H-Stat (DL/2) UCL	557.19545
Log ROS Method	
Mean in Log Scale	4.0030159
SD in Log Scale	1.492024
Mean in Original Scale	440.37178
SD in Original Scale	1914.5964
95% Percentile Bootstrap UCL	850.46073
95% BCA Bootstrap UCL	1103.5878

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.291532
Theta Star	2180.127
nu star	26.23787
A-D Test Statistic	6.751825
5% A-D Critical Value	0.86344
K-S Test Statistic	0.86344
5% K-S Critical Value	0.14333

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	4.4
Maximum	13800
Mean	646.8413
Median	107
SD	1895.964
k star	0.412269
Theta star	1568.979
Nu star	56.06859
AppChi2	39.8592
95% Gamma Approximate UCL	909.8897
95% Adjusted Gamma UCL	916.6907

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	439.97892
SD	1900.6394
SE of Mean	233.14455
95% KM (t) UCL	828.84447
95% KM (z) UCL	823.46758
95% KM (jackknife) UCL	827.36291
95% KM (bootstrap t) UCL	1955.5308
95% KM (BCA) UCL	893.90024
95% KM (Percentile Bootstrap) UCL	897.09538
95% KM (Chebyshev) UCL	1456.2325
97.5% KM (Chebyshev) UCL	1895.9662
99% KM (Chebyshev) UCL	2759.7379

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	1895.9662

Naphthalene

General Statistics

Number of Valid Data	48	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	44
Number of Missing Values	20	Percent Non-Detects	91.67%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	4.15	Minimum Detected	1.4231083
Maximum Detected	8375	Maximum Detected	9.0330064
Mean of Detected	2120.863	Mean of Detected	4.1797353
SD of Detected	4169.662	SD of Detected	3.5419422
Minimum Non-Detect	200	Minimum Non-Detect	5.2983174
Maximum Non-Detect	20000	Maximum Non-Detect	9.9034876

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.637899
5% Shapiro Wilk Critical Value	0.748

Data not Normal at 5% Significance Level

Assuming Normal Distribution

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.8694729
5% Shapiro Wilk Critical Value	0.748

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

APPENDIX K, TABLE K-4
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

DL/2 Substitution Method	
Mean	592.7802
SD	1829.609
95% DL/2 (t) UCL	1035.889
Maximum Likelihood Estimate(MLE) Method	N/A
MLE method failed to converge properly	

DL/2 Substitution Method	
Mean	5.3166383
SD	1.1646521
95% H-Stat (DL/2) UCL	574.26404
Log ROS Method	
Mean in Log Scale	2.729544
SD in Log Scale	1.7879932
Mean in Original Scale	214.74033
SD in Original Scale	1205.7519
95% Percentile Bootstrap UCL	561.70501
95% BCA Bootstrap UCL	749.85737

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.219139
Theta Star	9678.175
nu star	1.75311
A-D Test Statistic	0.53782
5% A-D Critical Value	0.729713
K-S Test Statistic	0.729713
5% K-S Critical Value	0.423765

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	8375
Mean	2118.635
Median	2511.872
SD	1362.699
k star	0.320293
Theta star	6614.667
Nu star	30.74817
AppChi2	19.08195
95% Gamma Approximate UCL	3413.914
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	213.57234
SD	1204.1399
SE of Mean	204.74255
95% KM (t) UCL	557.11535
95% KM (z) UCL	550.34387
95% KM (jackknife) UCL	517.83353
95% KM (bootstrap t) UCL	2280.3206
95% KM (BCA) UCL	8375
95% KM (Percentile Bootstrap) UCL	723.8526
95% KM (Chebyshev) UCL	1106.0244
97.5% KM (Chebyshev) UCL	1492.1892
99% KM (Chebyshev) UCL	2250.735

Potential UCLs to Use

95% KM (t) UCL	557.11535

Phenanthrene

General Statistics

Number of Valid Data	68
Number of Distinct Detected Data	51
Number of Detected Data	64
Number of Non-Detect Data	4
Percent Non-Detects	5.88%

Raw Statistics

Minimum Detected	6.05
Maximum Detected	151000
Mean of Detected	3660.624
SD of Detected	19713.18
Minimum Non-Detect	385
Maximum Non-Detect	400

Log-transformed Statistics

Minimum Detected	1.8000583
Maximum Detected	11.925035
Mean of Detected	4.6441076
SD of Detected	1.9073762
Minimum Non-Detect	5.9532433
Maximum Non-Detect	5.9914645

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	59
Number treated as Detected	9
Single DL Non-Detect Percentage	86.76%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.477113
5% Lilliefors Critical Value	0.11075

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	3456.874
SD	19133.29
95% DL/2 (t) UCL	7326.861
Maximum Likelihood Estimate(MLE) Method	N/A
MLE yields a negative mean	

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic	0.1951618
5% Lilliefors Critical Value	0.11075

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	4.6816561
SD	1.8557468
95% H-Stat (DL/2) UCL	1113.6991
Log ROS Method	
Mean in Log Scale	4.6237461
SD in Log Scale	1.8551075
Mean in Original Scale	3450.134
SD in Original Scale	19134.482

APPENDIX K, TABLE K-4
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

95% Percentile Bootstrap UCL	7814.3642
95% BCA Bootstrap UCL	11023.544

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.206506
Theta Star	17726.45
nu star	26.43282
A-D Test Statistic	13.38382
5% A-D Critical Value	0.907201
K-S Test Statistic	0.907201
5% K-S Critical Value	0.123323

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	151000
Mean	3455.399
Median	79
SD	19133.69
k star	0.16747
Theta star	20633
Nu star	22.77587
AppChi2	12.92162
95% Gamma Approximate UCL	6090.546
95% Adjusted Gamma UCL	6167.45

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	3450.3842
SD	18993.227
SE of Mean	2321.4759
95% KM (t) UCL	7322.4114
95% KM (z) UCL	7268.8724
95% KM (jackknife) UCL	7320.605
95% KM (bootstrap t) UCL	16702.736
95% KM (BCA) UCL	8272.2464
95% KM (Percentile Bootstrap) UCL	7851.1347
95% KM (Chebyshev) UCL	13569.463
97.5% KM (Chebyshev) UCL	17947.997
99% KM (Chebyshev) UCL	26548.778

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	17947.997

APPENDIX K, TABLE K-5
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

	General UCL Statistics for Data Sets with Non-Detects
User Selected Options	
From File	C:\willow_grove\WGSite3\Site3_2010\ProUCL\ProUCL WSTs and Excel Outputs\wgs3soProUCL.wst
Full Precision	ON
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Total 2,3,7,8-TCDD Equiv.

General Statistics

Number of Valid Data	3	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	0
Number of Missing Values	115	Percent Non-Detects	0.00%

Warning: This data set only has 3 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Total 2,3,7,8-TCDD Equiv. was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Aluminum

General Statistics

Number of Valid Data	115	Number of Detected Data	115
Number of Distinct Detected Data	89	Number of Non-Detect Data	0
Number of Missing Values	3	Percent Non-Detects	0.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	8200	Minimum Detected	9.011889
Maximum Detected	74700	Maximum Detected	11.22124
Mean of Detected	18565.52	Mean of Detected	9.76607
SD of Detected	8038.812	SD of Detected	0.334701
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.152916	Lilliefors Test Statistic	0.099723
5% Lilliefors Critical Value	0.08262	5% Lilliefors Critical Value	0.08262
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	18565.52	Mean	9.76607
SD	8038.812	SD	0.334701
95% DL/2 (t) UCL	19808.64	95% H-Stat (DL/2) UCL	19477.21
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	7.895163	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	2351.506		
nu star	1815.888		
A-D Test Statistic	2.252793	**Nonparametric Statistics**	
5% A-D Critical Value	0.752996	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.752996	Mean	18565.52
5% K-S Critical Value	0.085603	SD	8003.785
Data not Gamma Distributed at 5% Significance Level		SE of Mean	749.6231
		95% KM (t) UCL	19808.64
Assuming Gamma Distribution		95% KM (z) UCL	19798.54
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	19808.64
Minimum	8200	95% KM (bootstrap t) UCL	20038.46
Maximum	74700	95% KM (BCA) UCL	19847.44
Mean	18565.52	95% KM (Percentile Bootstrap) UCL	19843.3

Median	16200	95% KM (Chebyshev) UCL	21833.05
SD	8038.812	97.5% KM (Chebyshev) UCL	23246.92
k star	7.895163	99% KM (Chebyshev) UCL	26024.18
Theta star	2351.506		
Nu star	1815.888	**Potential UCLs to Use**	
AppChi2	1717.912	95% KM (BCA) UCL	19847.44
95% Gamma Approximate UCL	19624.35		
95% Adjusted Gamma UCL	19638.01		
Note: DL/2 is not a recommended method.			

Antimony

General Statistics

Number of Valid Data	90	Number of Detected Data	41
Number of Distinct Detected Data	38	Number of Non-Detect Data	49
Number of Missing Values	28	Percent Non-Detects	54.44%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.1625	Minimum Detected	-1.817077
Maximum Detected	250.5	Maximum Detected	5.523459
Mean of Detected	21.25902	Mean of Detected	1.416003
SD of Detected	45.87484	SD of Detected	1.91147
Minimum Non-Detect	0.2	Minimum Non-Detect	-1.609438
Maximum Non-Detect	10.3	Maximum Non-Detect	2.332144
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	73
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	17
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	81.11%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.510125	Shapiro Wilk Test Statistic	0.935027
5% Shapiro Wilk Critical Value	0.941	5% Shapiro Wilk Critical Value	0.941
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	11.02031	Mean	0.690318
SD	32.20038	SD	1.848475
95% DL/2 (t) UCL	16.66202	95% H-Stat (DL/2) UCL	19.98742
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.264566
		SD in Log Scale	2.195882
		Mean in Original Scale	9.876433
		SD in Original Scale	32.48931
		95% Percentile Bootstrap UCL	15.95278
		95% BCA Bootstrap UCL	18.59596
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.387832	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	54.8151		
nu star	31.80219		
A-D Test Statistic	2.073447	**Nonparametric Statistics**	
5% A-D Critical Value	0.835648	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.835648	Mean	9.985768
5% K-S Critical Value	0.147836	SD	32.28146
Data not Gamma Distributed at 5% Significance Level		SE of Mean	3.445984
		95% KM (t) UCL	15.71353
Assuming Gamma Distribution		95% KM (z) UCL	15.65391
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	15.65944
Minimum	1E-09	95% KM (bootstrap t) UCL	20.63092
Maximum	250.5	95% KM (BCA) UCL	16.41639
Mean	15.90167	95% KM (Percentile Bootstrap) UCL	16.55904
Median	1.65	95% KM (Chebyshev) UCL	25.00646
SD	33.68933	97.5% KM (Chebyshev) UCL	31.50593
k star	0.115811	99% KM (Chebyshev) UCL	44.27288
Theta star	137.3071		
Nu star	20.84598	**Potential UCLs to Use**	
AppChi2	11.47714	95% KM (Chebyshev) UCL	25.00646
95% Gamma Approximate UCL	28.88228		
95% Adjusted Gamma UCL	29.17035		
Note: DL/2 is not a recommended method.			

APPENDIX K, TABLE K-5
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Arsenic

General Statistics

Number of Valid Data	108	Number of Detected Data	108
Number of Distinct Detected Data	70	Number of Non-Detect Data	0
Number of Missing Values	10	Percent Non-Detects	0.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.37	Minimum Detected	-0.994252
Maximum Detected	32.4	Maximum Detected	3.478158
Mean of Detected	5.523056	Mean of Detected	1.547784
SD of Detected	3.825118	SD of Detected	0.578338
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.173779	Lilliefors Test Statistic	0.107944
5% Lilliefors Critical Value	0.085255	5% Lilliefors Critical Value	0.085255
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.523056	Mean	1.547784
SD	3.825118	SD	0.578338
95% DL/2 (t) UCL	6.133768	95% H-Stat (DL/2) UCL	6.172817
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	3.175561	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	1.739238		
nu star	685.9212		
A-D Test Statistic	1.817379	**Nonparametric Statistics**	
5% A-D Critical Value	0.758094	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.758094	Mean	5.523056
5% K-S Critical Value	0.087915	SD	3.807368
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.368072
		95% KM (t) UCL	6.133768
Assuming Gamma Distribution		95% KM (z) UCL	6.12848
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	6.133768
Minimum	0.37	95% KM (bootstrap t) UCL	6.331645
Maximum	32.4	95% KM (BCA) UCL	6.205926
Mean	5.523056	95% KM (Percentile Bootstrap) UCL	6.157685
Median	4.7	95% KM (Chebyshev) UCL	7.127445
SD	3.825118	97.5% KM (Chebyshev) UCL	7.821665
k star	3.175561	99% KM (Chebyshev) UCL	9.185327
Theta star	1.739238		
Nu star	685.9212	**Potential UCLs to Use**	
AppChi2	626.1565	95% KM (BCA) UCL	6.205926
95% Gamma Approximate UCL	6.050214		
95% Adjusted Gamma UCL	6.057608		

Note: DL/2 is not a recommended method.

Cadmium

General Statistics

Number of Valid Data	90	Number of Detected Data	49
Number of Distinct Detected Data	42	Number of Non-Detect Data	41
Number of Missing Values	28	Percent Non-Detects	45.56%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.365	Minimum Detected	-1.007858
Maximum Detected	300	Maximum Detected	5.703783
Mean of Detected	29.27806	Mean of Detected	1.938765
SD of Detected	60.6086	SD of Detected	1.619983

Minimum Non-Detect	0.03	Minimum Non-Detect	-3.506558
Maximum Non-Detect	1.4	Maximum Non-Detect	0.336472
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	44
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	46
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	48.89%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.529238	Shapiro Wilk Test Statistic	0.888089
5% Shapiro Wilk Critical Value	0.947	5% Shapiro Wilk Critical Value	0.947
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	16.09534	Mean	0.332606
SD	46.8104	SD	2.283046
95% DL/2 (t) UCL	24.29683	95% H-Stat (DL/2) UCL	23.22806
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	0.126399
		SD in Log Scale	2.368765
		Mean in Original Scale	16.01426
		SD in Original Scale	46.83785
		95% Percentile Bootstrap UCL	24.60467
		95% BCA Bootstrap UCL	27.86077
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.435283	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	67.26218		
nu star	42.6577		
A-D Test Statistic	4.344605	**Nonparametric Statistics**	
5% A-D Critical Value	0.826349	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.826349	Mean	16.10939
5% K-S Critical Value	0.134725	SD	46.54461
Data not Gamma Distributed at 5% Significance Level		SE of Mean	4.957079
		95% KM (t) UCL	24.34882
Assuming Gamma Distribution		95% KM (z) UCL	24.26305
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	24.08919
Minimum	1E-09	95% KM (bootstrap t) UCL	29.64475
Maximum	300	95% KM (BCA) UCL	25.01871
Mean	21.85768	95% KM (Percentile Bootstrap) UCL	24.60544
Median	3.9	95% KM (Chebyshev) UCL	37.71679
SD	46.54768	97.5% KM (Chebyshev) UCL	47.06633
k star	0.198138	99% KM (Chebyshev) UCL	65.43169
Theta star	110.3154		
Nu star	35.66486	**Potential UCLs to Use**	
AppChi2	22.99908	97.5% KM (Chebyshev) UCL	47.06633
95% Gamma Approximate UCL	33.89489		
95% Adjusted Gamma UCL	34.14058		
Note: DL/2 is not a recommended method.			
Chromium			
General Statistics			
Number of Valid Data	115	Number of Detected Data	114
Number of Distinct Detected Data	100	Number of Non-Detect Data	1
Number of Missing Values	3	Percent Non-Detects	0.87%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	4.2	Minimum Detected	1.435085
Maximum Detected	348	Maximum Detected	5.852203
Mean of Detected	32.25395	Mean of Detected	3.135391
SD of Detected	44.19264	SD of Detected	0.695805
Minimum Non-Detect	17	Minimum Non-Detect	2.833213
Maximum Non-Detect	17	Maximum Non-Detect	2.833213
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.363582	Lilliefors Test Statistic	0.215415
5% Lilliefors Critical Value	0.082982	5% Lilliefors Critical Value	0.082982
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	

APPENDIX K, TABLE K-5
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	32.04739	Mean	3.126736
SD	44.0541	SD	0.698937
95% DL/2 (t) UCL	38.85992	95% H-Stat (DL/2) UCL	33.02556
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	25.06872	Mean in Log Scale	3.128238
SD	50.67368	SD in Log Scale	0.696981
95% MLE (t) UCL	32.90491	Mean in Original Scale	32.06133
95% MLE (Tiku) UCL	32.7801	SD in Original Scale	44.04684
		95% Percentile Bootstrap UCL	39.0935
		95% BCA Bootstrap UCL	41.2213
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	1.587943	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	20.31177		
nu star	362.0511		
A-D Test Statistic	11.087	**Nonparametric Statistics**	
5% A-D Critical Value	0.768807	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.768807	Mean	32.07426
5% K-S Critical Value	0.087319	SD	43.85002
Data not Gamma Distributed at 5% Significance Level		SE of Mean	4.107221
		95% KM (t) UCL	38.88538
Assuming Gamma Distribution		95% KM (z) UCL	38.83003
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	38.88514
Minimum	0.18474	95% KM (bootstrap t) UCL	43.26293
Maximum	348	95% KM (BCA) UCL	39.36087
Mean	31.97509	95% KM (Percentile Bootstrap) UCL	39.37892
Median	20.3	95% KM (Chebyshev) UCL	49.97722
SD	44.09989	97.5% KM (Chebyshev) UCL	57.72384
k star	1.457502	99% KM (Chebyshev) UCL	72.94059
Theta star	21.93828		
Nu star	335.2255	**Potential UCLs to Use**	
AppChi2	293.8021	95% KM (BCA) UCL	39.36087
95% Gamma Approximate UCL	36.48327		
95% Adjusted Gamma UCL	36.54392		

Note: DL/2 is not a recommended method.

Cobalt

General Statistics

Number of Valid Data	115	Number of Detected Data	115
Number of Distinct Detected Data	71	Number of Non-Detect Data	0
Number of Missing Values	3	Percent Non-Detects	0.00%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	2.5	Minimum Detected	0.916291
Maximum Detected	82.8	Maximum Detected	4.416428
Mean of Detected	10.67826	Mean of Detected	2.229423
SD of Detected	9.833534	SD of Detected	0.431367
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.334161	Lilliefors Test Statistic	0.181305
5% Lilliefors Critical Value	0.08262	5% Lilliefors Critical Value	0.08262
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	10.67826	Mean	2.229423
SD	9.833534	SD	0.431367
95% DL/2 (t) UCL	12.19892	95% H-Stat (DL/2) UCL	10.96924
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	3.668879	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	2.910497		
nu star	843.8421		
A-D Test Statistic	11.90341	**Nonparametric Statistics**	
5% A-D Critical Value	0.756965	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.756965	Mean	10.67826
5% K-S Critical Value	0.08596	SD	9.790686
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.916982
		95% KM (t) UCL	12.19892
Assuming Gamma Distribution		95% KM (z) UCL	12.18656
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	12.19892
Minimum	2.5	95% KM (bootstrap t) UCL	14.49833
Maximum	82.8	95% KM (BCA) UCL	12.25696
Mean	10.67826	95% KM (Percentile Bootstrap) UCL	12.21826
Median	8.6	95% KM (Chebyshev) UCL	14.67529
SD	9.833534	97.5% KM (Chebyshev) UCL	16.40481
k star	3.668879	99% KM (Chebyshev) UCL	19.80211
Theta star	2.910497		
Nu star	843.8421	**Potential UCLs to Use**	
AppChi2	777.4251	95% KM (BCA) UCL	12.25696
95% Gamma Approximate UCL	11.59053		
95% Adjusted Gamma UCL	11.60247		
Note: DL/2 is not a recommended method.			

Copper

General Statistics			
Number of Valid Observations	115	Number of Distinct Observations	107
Raw Statistics		**Log-transformed Statistics**	
Minimum	7.1	Minimum of Log Data	1.960095
Maximum	9230	Maximum of Log Data	9.130214
Mean	311.1226	Mean of log Data	3.761874
Median	24.3	SD of log Data	1.589276
SD	1125.709		
Coefficient of Variation	3.618217		
Skewness	6.130193		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.393552	Lilliefors Test Statistic	0.194684
Lilliefors Critical Value	0.08262	Lilliefors Critical Value	0.08262
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	485.2023	95% H-UCL	232.0548
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	285.7838
95% Adjusted-CLT UCL	547.9061	97.5% Chebyshev (MVUE) UCL	345.1825
95% Modified-t UCL	495.2035	99% Chebyshev (MVUE) UCL	461.8598
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.338195	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	919.9508		
MLE of Mean	311.1226		
MLE of Standard Deviation	534.993		
nu star	77.78481		
Approximate Chi Square Value (.05)	58.46722	**Nonparametric Statistics**	
Adjusted Level of Significance	0.047913	95% CLT UCL	483.7877
Adjusted Chi Square Value	58.2556	95% Jackknife UCL	485.2023
		95% Standard Bootstrap UCL	479.3665
Anderson-Darling Test Statistic	17.21973	95% Bootstrap-t UCL	685.7707
Anderson-Darling 5% Critical Value	0.857722	95% Hall's Bootstrap UCL	1067.717
Kolmogorov-Smirnov Test Statistic	0.304179	95% Percentile Bootstrap UCL	501.7965
Kolmogorov-Smirnov 5% Critical Value	0.092398	95% BCA Bootstrap UCL	564.7896
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	768.6889
		97.5% Chebyshev(Mean, Sd) UCL	966.6782
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1355.59
95% Approximate Gamma UCL	413.9177		
95% Adjusted Gamma UCL	415.4212		
Potential UCL to Use		Use 97.5% Chebyshev (Mean, Sd) UCL	966.6782

Iron

APPENDIX K, TABLE K-5
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

General Statistics			
Number of Valid Data	115	Number of Detected Data	115
Number of Distinct Detected Data	92	Number of Non-Detect Data	0
Number of Missing Values	3	Percent Non-Detects	0.00%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	9570	Minimum Detected	9.166389
Maximum Detected	193000	Maximum Detected	12.17045
Mean of Detected	28981.13	Mean of Detected	10.07309
SD of Detected	28348.99	SD of Detected	0.532621
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.343722	Lilliefors Test Statistic	0.206562
5% Lilliefors Critical Value	0.08262	5% Lilliefors Critical Value	0.08262
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	28981.13	Mean	10.07309
SD	28348.99	SD	0.532621
95% DL/2 (t) UCL	33365.02	95% H-Stat (DL/2) UCL	29955.53
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	2.575481	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	11252.7		
nu star	592.3607		
A-D Test Statistic	11.29699	**Nonparametric Statistics**	
5% A-D Critical Value	0.761142	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.761142	Mean	28981.13
5% K-S Critical Value	0.086366	SD	28225.47
Data not Gamma Distributed at 5% Significance Level		SE of Mean	2643.557
		95% KM (t) UCL	33365.02
Assuming Gamma Distribution		95% KM (z) UCL	33329.4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	33365.02
Minimum	9570	95% KM (bootstrap t) UCL	35481.1
Maximum	193000	95% KM (BCA) UCL	33618.61
Mean	28981.13	95% KM (Percentile Bootstrap) UCL	33453.83
Median	21800	95% KM (Chebyshev) UCL	40504.13
SD	28348.99	97.5% KM (Chebyshev) UCL	45490.14
k star	2.575481	99% KM (Chebyshev) UCL	55284.19
Theta star	11252.7		
Nu star	592.3607	**Potential UCLs to Use**	
AppChi2	536.9048	95% KM (BCA) UCL	33618.61
95% Gamma Approximate UCL	31974.54		
95% Adjusted Gamma UCL	32014.07		
Note: DL/2 is not a recommended method.			

Lead

General Statistics			
Number of Valid Data	115	Number of Detected Data	115
Number of Distinct Detected Data	109	Number of Non-Detect Data	0
Number of Missing Values	3	Percent Non-Detects	0.00%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	2.2	Minimum Detected	0.788457
Maximum Detected	4640	Maximum Detected	8.44247
Mean of Detected	322.0222	Mean of Detected	3.769519
SD of Detected	820.4157	SD of Detected	1.750075
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A

UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.436953	Lilliefors Test Statistic	0.192685
5% Lilliefors Critical Value	0.08262	5% Lilliefors Critical Value	0.08262
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	322.0222	Mean	3.769519
SD	820.4157	SD	1.750075
95% DL/2 (t) UCL	448.8913	95% H-Stat (DL/2) UCL	329.1874
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.334373	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	963.0628		
nu star	76.90578		
A-D Test Statistic	16.09377	**Nonparametric Statistics**	
5% A-D Critical Value	0.858684	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.858684	Mean	322.0222
5% K-S Critical Value	0.092444	SD	816.8409
Data not Gamma Distributed at 5% Significance Level		SE of Mean	76.50416
		95% KM (t) UCL	448.8913
Assuming Gamma Distribution		95% KM (z) UCL	447.8603
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	448.8913
Minimum	2.2	95% KM (bootstrap t) UCL	495.7549
Maximum	4640	95% KM (BCA) UCL	454.8135
Mean	322.0222	95% KM (Percentile Bootstrap) UCL	452.6087
Median	27.55	95% KM (Chebyshev) UCL	655.4961
SD	820.4157	97.5% KM (Chebyshev) UCL	799.7905
k star	0.334373	99% KM (Chebyshev) UCL	1083.229
Theta star	963.0628		
Nu star	76.90578	**Potential UCLs to Use**	
AppChi2	57.70478	97.5% KM (Chebyshev) UCL	799.7905
95% Gamma Approximate UCL	429.1736		
95% Adjusted Gamma UCL	430.7424		
Note: DL/2 is not a recommended method.			
Manganese			
General Statistics			
Number of Valid Data	115	Number of Detected Data	115
Number of Distinct Detected Data	110	Number of Non-Detect Data	0
Number of Missing Values	3	Percent Non-Detects	0.00%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	41.6	Minimum Detected	3.7281
Maximum Detected	20000	Maximum Detected	9.903488
Mean of Detected	946.0574	Mean of Detected	6.521635
SD of Detected	1862.005	SD of Detected	0.678224
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.342465	Lilliefors Test Statistic	0.122192
5% Lilliefors Critical Value	0.08262	5% Lilliefors Critical Value	0.08262
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	946.0574	Mean	6.521635
SD	1862.005	SD	0.678224
95% DL/2 (t) UCL	1233.998	95% H-Stat (DL/2) UCL	968.4319

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	1.621698	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	583.3745		
nu star	372.9906		
A-D Test Statistic	8.07356	**Nonparametric Statistics**	
5% A-D Critical Value	0.768494	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.768494	Mean	946.0574
5% K-S Critical Value	0.087025	SD	1853.891
Data not Gamma Distributed at 5% Significance Level		SE of Mean	173.6328
		95% KM (t) UCL	1233.998
Assuming Gamma Distribution		95% KM (z) UCL	1231.658
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1233.998
Minimum	41.6	95% KM (bootstrap t) UCL	1912.725
Maximum	20000	95% KM (BCA) UCL	1317.184
Mean	946.0574	95% KM (Percentile Bootstrap) UCL	1279.553
Median	670	95% KM (Chebyshev) UCL	1702.905
SD	1862.005	97.5% KM (Chebyshev) UCL	2030.394
k star	1.621698	99% KM (Chebyshev) UCL	2673.682
Theta star	583.3745		
Nu star	372.9906	**Potential UCLs to Use**	
AppChi2	329.2307	95% KM (BCA) UCL	1317.184
95% Gamma Approximate UCL	1071.803		
95% Adjusted Gamma UCL	1073.488		
Note: DL/2 is not a recommended method.			

Mercury

General Statistics

Number of Valid Data	115	Number of Detected Data	68
Number of Distinct Detected Data	57	Number of Non-Detect Data	47
Number of Missing Values	3	Percent Non-Detects	40.87%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.021	Minimum Detected	-3.863233
Maximum Detected	7.1	Maximum Detected	1.960095
Mean of Detected	0.682074	Mean of Detected	-1.828221
SD of Detected	1.576645	SD of Detected	1.528346
Minimum Non-Detect	0.017	Minimum Non-Detect	-4.074542
Maximum Non-Detect	0.14	Maximum Non-Detect	-1.966113
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	82
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	33
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	71.30%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.350124	Lilliefors Test Statistic	0.147544
5% Lilliefors Critical Value	0.107443	5% Lilliefors Critical Value	0.107443
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.424887	Mean	-2.295492
SD	1.248013	SD	1.314372
95% DL/2 (t) UCL	0.61788	95% H-Stat (DL/2) UCL	0.339235
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-2.441775
		SD in Log Scale	1.500506
		Mean in Original Scale	0.423456
		SD in Original Scale	1.248626
		95% Percentile Bootstrap UCL	0.624691
		95% BCA Bootstrap UCL	0.6895
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	

k star (bias corrected)	0.437234	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	1.559973		
nu star	59.46386		
A-D Test Statistic	6.243676	**Nonparametric Statistics**	
5% A-D Critical Value	0.829435	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.829435	Mean	0.421994
5% K-S Critical Value	0.11515	SD	1.243509
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.116835
		95% KM (t) UCL	0.615745
Assuming Gamma Distribution		95% KM (z) UCL	0.614171
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.615137
Minimum	0.021	95% KM (bootstrap t) UCL	0.690833
Maximum	7.1	95% KM (BCA) UCL	0.632435
Mean	0.666155	95% KM (Percentile Bootstrap) UCL	0.625384
Median	0.379991	95% KM (Chebyshev) UCL	0.931267
SD	1.220508	97.5% KM (Chebyshev) UCL	1.15163
k star	0.67143	99% KM (Chebyshev) UCL	1.584491
Theta star	0.992144		
Nu star	154.4289	**Potential UCLs to Use**	
AppChi2	126.7025	97.5% KM (Chebyshev) UCL	1.15163
95% Gamma Approximate UCL	0.81193		
95% Adjusted Gamma UCL	0.813963		
Note: DL/2 is not a recommended method.			

Nickel

General Statistics

Number of Valid Data	115	Number of Detected Data	115
Number of Distinct Detected Data	81	Number of Non-Detect Data	0
Number of Missing Values	3	Percent Non-Detects	0.00%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	5.8	Minimum Detected	1.757858
Maximum Detected	296	Maximum Detected	5.69036
Mean of Detected	28.55652	Mean of Detected	2.807925
SD of Detected	49.60092	SD of Detected	0.816015
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.395323	Lilliefors Test Statistic	0.302235
5% Lilliefors Critical Value	0.08262	5% Lilliefors Critical Value	0.08262
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	28.55652	Mean	2.807925
SD	49.60092	SD	0.816015
95% DL/2 (t) UCL	36.22681	95% H-Stat (DL/2) UCL	27.06336
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	1.032919	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	27.64644		
nu star	237.5713		
A-D Test Statistic	19.99915	**Nonparametric Statistics**	
5% A-D Critical Value	0.781669	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.781669	Mean	28.55652
5% K-S Critical Value	0.088042	SD	49.38479
Data not Gamma Distributed at 5% Significance Level		SE of Mean	4.625309
		95% KM (t) UCL	36.22681
Assuming Gamma Distribution		95% KM (z) UCL	36.16448
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	36.22681
Minimum	5.8	95% KM (bootstrap t) UCL	39.61633

Maximum	296	95% KM (BCA) UCL	37.40826
Mean	28.55652	95% KM (Percentile Bootstrap) UCL	36.22522
Median	12.5	95% KM (Chebyshev) UCL	48.71778
SD	49.60092	97.5% KM (Chebyshev) UCL	57.44157
k star	1.032919	99% KM (Chebyshev) UCL	74.57777
Theta star	27.64644		
Nu star	237.5713	**Potential UCLs to Use**	
AppChi2	202.8896	95% KM (BCA) UCL	37.40826
95% Gamma Approximate UCL	33.43793		
95% Adjusted Gamma UCL	33.50454		
Note: DL/2 is not a recommended method.			
Silver			
General Statistics			
Number of Valid Data	110	Number of Detected Data	34
Number of Distinct Detected Data	33	Number of Non-Detect Data	76
Number of Missing Values	8	Percent Non-Detects	69.09%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.2	Minimum Detected	-1.609438
Maximum Detected	233	Maximum Detected	5.451039
Mean of Detected	18.42794	Mean of Detected	1.571543
SD of Detected	40.81644	SD of Detected	1.740859
Minimum Non-Detect	0.035	Minimum Non-Detect	-3.352407
Maximum Non-Detect	1.6	Maximum Non-Detect	0.470004
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	86
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	24
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	78.18%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.450294	Shapiro Wilk Test Statistic	0.971186
5% Shapiro Wilk Critical Value	0.933	5% Shapiro Wilk Critical Value	0.933
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.002496	Mean	-0.576855
SD	23.96139	SD	2.172055
95% DL/2 (t) UCL	9.792589	95% H-Stat (DL/2) UCL	9.446163
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.858843
		SD in Log Scale	2.900883
		Mean in Original Scale	5.777587
		SD in Original Scale	24.01367
		95% Percentile Bootstrap UCL	10.1873
		95% BCA Bootstrap UCL	12.11079
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.454269	**Data appear Lognormal at 5% Significance Level**	
Theta Star	40.56616		
nu star	30.89028		
A-D Test Statistic	1.012089	**Nonparametric Statistics**	
5% A-D Critical Value	0.816777	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.816777	Mean	5.87853
5% K-S Critical Value	0.160041	SD	23.88047
Data not Gamma Distributed at 5% Significance Level		SE of Mean	2.311272
		95% KM (t) UCL	9.712823
Assuming Gamma Distribution		95% KM (z) UCL	9.680234
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	9.612093
Minimum	1E-09	95% KM (bootstrap t) UCL	14.87908
Maximum	233	95% KM (BCA) UCL	10.23738
Mean	17.61675	95% KM (Percentile Bootstrap) UCL	10.25751
Median	7.071869	95% KM (Chebyshev) UCL	15.95313
SD	28.43204	97.5% KM (Chebyshev) UCL	20.31242
k star	0.145002	99% KM (Chebyshev) UCL	28.8754
Theta star	121.4928		
Nu star	31.90052	**Potential UCLs to Use**	
AppChi2	19.99316	95% KM (Chebyshev) UCL	15.95313
95% Gamma Approximate UCL	28.10878		
95% Adjusted Gamma UCL	28.2858		

Note: DL/2 is not a recommended method.			
Thallium			
General Statistics			
Number of Valid Data	89	Number of Detected Data	36
Number of Distinct Detected Data	31	Number of Non-Detect Data	53
Number of Missing Values	29	Percent Non-Detects	59.55%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.26	Minimum Detected	-1.347074
Maximum Detected	48.5	Maximum Detected	3.881564
Mean of Detected	5.531319	Mean of Detected	0.157056
SD of Detected	11.77943	SD of Detected	1.633289
Minimum Non-Detect	0.15	Minimum Non-Detect	-1.89712
Maximum Non-Detect	13.9	Maximum Non-Detect	2.631889
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	86
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	96.63%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.508012	Shapiro Wilk Test Statistic	0.787577
5% Shapiro Wilk Critical Value	0.935	5% Shapiro Wilk Critical Value	0.935
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.428174	Mean	-0.938615
SD	7.893972	SD	1.474853
95% DL/2 (t) UCL	3.819164	95% H-Stat (DL/2) UCL	1.536341
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.833777
		SD in Log Scale	2.084932
		Mean in Original Scale	2.276314
		SD in Original Scale	7.903642
		95% Percentile Bootstrap UCL	3.73557
		95% BCA Bootstrap UCL	4.230805
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.403765	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	13.69935		
nu star	29.07109		
A-D Test Statistic	4.421201	**Nonparametric Statistics**	
5% A-D Critical Value	0.830069	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.830069	Mean	2.413596
5% K-S Critical Value	0.156867	SD	7.826088
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.841835
		95% KM (t) UCL	3.813024
Assuming Gamma Distribution		95% KM (z) UCL	3.798292
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3.797002
Minimum	0.26	95% KM (bootstrap t) UCL	5.036724
Maximum	48.5	95% KM (BCA) UCL	3.989391
Mean	4.845429	95% KM (Percentile Bootstrap) UCL	3.961395
Median	2.00395	95% KM (Chebyshev) UCL	6.083071
SD	7.915485	97.5% KM (Chebyshev) UCL	7.670856
k star	0.726934	99% KM (Chebyshev) UCL	10.78975
Theta star	6.66557		
Nu star	129.3942	**Potential UCLs to Use**	
AppChi2	104.1185	95% KM (Chebyshev) UCL	6.083071
95% Gamma Approximate UCL	6.021705		
95% Adjusted Gamma UCL	6.04325		
Note: DL/2 is not a recommended method.			
Vanadium			
General Statistics			
Number of Valid Data	115	Number of Detected Data	115
Number of Distinct Detected Data	92	Number of Non-Detect Data	0
Number of Missing Values	3	Percent Non-Detects	0.00%

APPENDIX K, TABLE K-5
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Raw Statistics		Log-transformed Statistics	
Minimum Detected	11.8	Minimum Detected	2.4681
Maximum Detected	559	Maximum Detected	6.32615
Mean of Detected	34.68957	Mean of Detected	3.391544
SD of Detected	50.10177	SD of Detected	0.391572
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.397855	Lilliefors Test Statistic	0.153266
5% Lilliefors Critical Value	0.08262	5% Lilliefors Critical Value	0.08262
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	34.68957	Mean	3.391544
SD	50.10177	SD	0.391572
95% DL/2 (t) UCL	42.43731	95% H-Stat (DL/2) UCL	34.24051
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	3.303055	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	10.50227		
nu star	759.7027		
A-D Test Statistic	8.7E+28	**Nonparametric Statistics**	
5% A-D Critical Value	0.757882	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.757882	Mean	34.68957
5% K-S Critical Value	0.086063	SD	49.88346
Data not Gamma Distributed at 5% Significance Level		SE of Mean	4.672014
		95% KM (t) UCL	42.43731
Assuming Gamma Distribution		95% KM (z) UCL	42.37435
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	42.43731
Minimum	11.8	95% KM (bootstrap t) UCL	73.18153
Maximum	559	95% KM (BCA) UCL	44.49435
Mean	34.68957	95% KM (Percentile Bootstrap) UCL	43.9413
Median	29.8	95% KM (Chebyshev) UCL	55.0544
SD	50.10177	97.5% KM (Chebyshev) UCL	63.86629
k star	3.303055	99% KM (Chebyshev) UCL	81.17552
Theta star	10.50227		
Nu star	759.7027	**Potential UCLs to Use**	
AppChi2	696.744	95% KM (BCA) UCL	44.49435
95% Gamma Approximate UCL	37.82416		
95% Adjusted Gamma UCL	37.86529		

Note: DL/2 is not a recommended method.

Zinc

General Statistics

Number of Valid Data	115	Number of Detected Data	115
Number of Distinct Detected Data	109	Number of Non-Detect Data	0
Number of Missing Values	3	Percent Non-Detects	0.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	10.6	Minimum Detected	2.360854
Maximum Detected	10135	Maximum Detected	9.22375
Mean of Detected	522.6461	Mean of Detected	4.449946
SD of Detected	1464.071	SD of Detected	1.562272
Minimum Non-Detect	N/A	Minimum Non-Detect	N/A
Maximum Non-Detect	N/A	Maximum Non-Detect	N/A

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.394112	Lilliefors Test Statistic	0.298553
5% Lilliefors Critical Value	0.08262	5% Lilliefors Critical Value	0.08262

APPENDIX K, TABLE K-5
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	522.6461	Mean	4.449946
SD	1464.071	SD	1.562272
95% DL/2 (t) UCL	749.0501	95% H-Stat (DL/2) UCL	437.3833
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.364789	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	1432.736		
nu star	83.90145		
A-D Test Statistic	19.23518	**Nonparametric Statistics**	
5% A-D Critical Value	0.851024	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.851024	Mean	522.6461
5% K-S Critical Value	0.092074	SD	1457.692
Data not Gamma Distributed at 5% Significance Level		SE of Mean	136.5253
		95% KM (t) UCL	749.0501
Assuming Gamma Distribution		95% KM (z) UCL	747.2103
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	749.0501
Minimum	10.6	95% KM (bootstrap t) UCL	874.9674
Maximum	10135	95% KM (BCA) UCL	797.117
Mean	522.6461	95% KM (Percentile Bootstrap) UCL	768.7839
Median	44.8	95% KM (Chebyshev) UCL	1117.746
SD	1464.071	97.5% KM (Chebyshev) UCL	1375.247
k star	0.364789	99% KM (Chebyshev) UCL	1881.056
Theta star	1432.736		
Nu star	83.90145	**Potential UCLs to Use**	
AppChi2	63.79027	97.5% KM (Chebyshev) UCL	1375.247
95% Gamma Approximate UCL	687.4209		
95% Adjusted Gamma UCL	689.8162		
Note: DL/2 is not a recommended method.			

4,4'-DDD

General Statistics			
Number of Valid Data	114	Number of Detected Data	30
Number of Distinct Detected Data	26	Number of Non-Detect Data	84
Number of Missing Values	4	Percent Non-Detects	73.68%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.83	Minimum Detected	-0.18633
Maximum Detected	72000	Maximum Detected	11.18442
Mean of Detected	2412.826	Mean of Detected	2.277451
SD of Detected	13142.93	SD of Detected	2.067328
Minimum Non-Detect	2	Minimum Non-Detect	0.693147
Maximum Non-Detect	190	Maximum Non-Detect	5.247024
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	113
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	99.12%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.187922	Shapiro Wilk Test Statistic	0.753091
5% Shapiro Wilk Critical Value	0.927	5% Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	641.7036	Mean	1.737044
SD	6742.478	SD	1.452877
95% DL/2 (t) UCL	1689	95% H-Stat (DL/2) UCL	26.91027
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.699795

		SD in Log Scale	1.70556
		Mean in Original Scale	636.4893
		SD in Original Scale	6742.96
		95% Percentile Bootstrap UCL	1899.265
		95% BCA Bootstrap UCL	2532.324
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.148893	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	16205.15		
nu star	8.933552		
A-D Test Statistic	8.477	**Nonparametric Statistics**	
5% A-D Critical Value	0.927589	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.927589	Mean	636.8012
5% K-S Critical Value	0.179394	SD	6713.291
Data not Gamma Distributed at 5% Significance Level		SE of Mean	639.5062
		95% KM (t) UCL	1697.39
Assuming Gamma Distribution		95% KM (z) UCL	1688.695
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1684.168
Minimum	1E-09	95% KM (bootstrap t) UCL	541840.3
Maximum	72000	95% KM (BCA) UCL	1900.426
Mean	2272.012	95% KM (Percentile Bootstrap) UCL	1899.547
Median	2410.772	95% KM (Chebyshev) UCL	3424.344
SD	6684.889	97.5% KM (Chebyshev) UCL	4630.516
k star	0.262038	99% KM (Chebyshev) UCL	6999.808
Theta star	8670.544		
Nu star	59.74465	**Potential UCLs to Use**	
AppChi2	42.97117	97.5% KM (Chebyshev) UCL	4630.516
95% Gamma Approximate UCL	3158.875		
95% Adjusted Gamma UCL	3172.278		
Note: DL/2 is not a recommended method.			

4,4'-DDE

General Statistics			
Number of Valid Data	107	Number of Detected Data	30
Number of Distinct Detected Data	28	Number of Non-Detect Data	77
Number of Missing Values	11	Percent Non-Detects	71.96%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.43	Minimum Detected	-0.84397
Maximum Detected	8700	Maximum Detected	9.071078
Mean of Detected	310.755	Mean of Detected	2.073891
SD of Detected	1585.002	SD of Detected	2.043422
Minimum Non-Detect	2	Minimum Non-Detect	0.693147
Maximum Non-Detect	190	Maximum Non-Detect	5.247024
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	106
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	99.07%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.20076	Shapiro Wilk Test Statistic	0.898737
5% Shapiro Wilk Critical Value	0.927	5% Shapiro Wilk Critical Value	0.927
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	94.29463	Mean	1.777013
SD	840.1875	SD	1.434813
95% DL/2 (t) UCL	229.0742	95% H-Stat (DL/2) UCL	26.63407
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.665373
		SD in Log Scale	1.724497
		Mean in Original Scale	88.80183
		SD in Original Scale	840.6504
		95% Percentile Bootstrap UCL	251.1585
		95% BCA Bootstrap UCL	414.1673
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.202838	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	1532.039		
nu star	12.17025		

A-D Test Statistic	5.716149	**Nonparametric Statistics**	
5% A-D Critical Value	0.89733	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.89733	Mean	89.0686
5% K-S Critical Value	0.177166	SD	836.692
Data not Gamma Distributed at 5% Significance Level		SE of Mean	82.27047
		95% KM (t) UCL	225.5846
Assuming Gamma Distribution		95% KM (z) UCL	224.3915
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	223.9218
Minimum	1E-09	95% KM (bootstrap t) UCL	4831.079
Maximum	8700	95% KM (BCA) UCL	252.1824
Mean	321.767	95% KM (Percentile Bootstrap) UCL	251.0072
Median	344.0911	95% KM (Chebyshev) UCL	447.6773
SD	837.4146	97.5% KM (Chebyshev) UCL	602.8475
k star	0.22562	99% KM (Chebyshev) UCL	907.6495
Theta star	1426.149		
Nu star	48.28258	**Potential UCLs to Use**	
AppChi2	33.33313	97.5% KM (Chebyshev) UCL	602.8475
95% Gamma Approximate UCL	466.0751		
95% Adjusted Gamma UCL	468.4537		
Note: DL/2 is not a recommended method.			

4,4'-DDT

General Statistics

Number of Valid Data	114	Number of Detected Data	37
Number of Distinct Detected Data	34	Number of Non-Detect Data	77
Number of Missing Values	4	Percent Non-Detects	67.54%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.39	Minimum Detected	-0.941609
Maximum Detected	270000	Maximum Detected	12.50618
Mean of Detected	7340.788	Mean of Detected	2.749615
SD of Detected	44380.45	SD of Detected	2.36916
Minimum Non-Detect	2	Minimum Non-Detect	0.693147
Maximum Non-Detect	190	Maximum Non-Detect	5.247024
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	111
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	97.37%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.168697	Shapiro Wilk Test Statistic	0.864448
5% Shapiro Wilk Critical Value	0.936	5% Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2389.131	Mean	1.973447
SD	25285.91	SD	1.721002
95% DL/2 (t) UCL	6316.742	95% H-Stat (DL/2) UCL	58.2856
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	0.860519
		SD in Log Scale	2.169082
		Mean in Original Scale	2383.947
		SD in Original Scale	25286.4
		95% Percentile Bootstrap UCL	7120.627
		95% BCA Bootstrap UCL	11853.33
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.135464	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	54190.1		
nu star	10.02431		
A-D Test Statistic	9.3778	**Nonparametric Statistics**	
5% A-D Critical Value	0.941924	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.941924	Mean	2384.3
5% K-S Critical Value	0.163206	SD	25175.21
Data not Gamma Distributed at 5% Significance Level		SE of Mean	2390.399
		95% KM (t) UCL	6348.657
Assuming Gamma Distribution		95% KM (z) UCL	6316.156
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	6311.983
Minimum	0.39	95% KM (bootstrap t) UCL	1975950

Maximum	270000	95% KM (BCA) UCL	7123.567
Mean	7746.165	95% KM (Percentile Bootstrap) UCL	7122.193
Median	6854.933	95% KM (Chebyshev) UCL	12803.81
SD	25170.33	97.5% KM (Chebyshev) UCL	17312.34
k star	0.331694	99% KM (Chebyshev) UCL	26168.47
Theta star	23353.37		
Nu star	75.62617	**Potential UCLs to Use**	
AppChi2	56.59609	97.5% KM (Chebyshev) UCL	17312.34
95% Gamma Approximate UCL	10350.76		
95% Adjusted Gamma UCL	10389.29		
Note: DL/2 is not a recommended method.			
Aroclor-1248			
General Statistics			
Number of Valid Data	115	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	113
Number of Missing Values	3	Percent Non-Detects	98.26%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	92	Minimum Detected	4.521789
Maximum Detected	560	Maximum Detected	6.327937
Mean of Detected	326	Mean of Detected	5.424863
SD of Detected	330.926	SD of Detected	1.27714
Minimum Non-Detect	19.5	Minimum Non-Detect	2.970415
Maximum Non-Detect	940	Maximum Non-Detect	6.84588
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	115
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: Data set has only 2 Distinct Detected Values.			
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.			
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	49.62609	Mean	3.299187
SD	84.52788	SD	0.979323
95% DL/2 (t) UCL	62.69749	95% H-Stat (DL/2) UCL	54.21479
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	N/A	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	**Nonparametric Statistics**	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	96.14159
5% K-S Critical Value	N/A	SD	43.8305
Data not Gamma Distributed at 5% Significance Level		SE of Mean	5.831123

		95% KM (t) UCL	105.8115
Assuming Gamma Distribution		95% KM (z) UCL	105.7329
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	398.9262
Minimum	N/A	95% KM (bootstrap t) UCL	96.23431
Maximum	N/A	95% KM (BCA) UCL	560
Mean	N/A	95% KM (Percentile Bootstrap) UCL	560
Median	N/A	95% KM (Chebyshev) UCL	121.5589
SD	N/A	97.5% KM (Chebyshev) UCL	132.5569
k star	N/A	99% KM (Chebyshev) UCL	154.1605
Theta star	N/A		
Nu star	N/A	**Potential UCLs to Use**	
AppChi2	N/A	95% KM (BCA) UCL	560
95% Gamma Approximate UCL	N/A		
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			
Aroclor-1254			
General Statistics			
Number of Valid Data	115	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	106
Number of Missing Values	3	Percent Non-Detects	92.17%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	13	Minimum Detected	2.564949
Maximum Detected	4000	Maximum Detected	8.29405
Mean of Detected	728.1667	Mean of Detected	5.327422
SD of Detected	1261.102	SD of Detected	1.877943
Minimum Non-Detect	19.5	Minimum Non-Detect	2.970415
Maximum Non-Detect	1900	Maximum Non-Detect	7.549609
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	114
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	99.13%
Warning: There are only 9 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.59505	Shapiro Wilk Test Statistic	0.947136
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	122.8826	Mean	3.649633
SD	399.5095	SD	1.325196
95% DL/2 (t) UCL	184.6628	95% H-Stat (DL/2) UCL	120.8132
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	1.863066
		SD in Log Scale	1.706372
		Mean in Original Scale	66.73857
		SD in Original Scale	386.4183
		95% Percentile Bootstrap UCL	133.8856
		95% BCA Bootstrap UCL	174.3699
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.409064	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	1780.079		
nu star	7.363157		
A-D Test Statistic	0.38757	**Nonparametric Statistics**	
5% A-D Critical Value	0.770499	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.770499	Mean	70.66107
5% K-S Critical Value	0.294032	SD	384.422
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	38.08432
		95% KM (t) UCL	133.8174
Assuming Gamma Distribution		95% KM (z) UCL	133.3042
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	124.6854

Minimum	13	95% KM (bootstrap t) UCL	270.0803
Maximum	4000	95% KM (BCA) UCL	491.0697
Mean	959.1719	95% KM (Percentile Bootstrap) UCL	162.1582
Median	886.5955	95% KM (Chebyshev) UCL	236.6668
SD	448.0978	97.5% KM (Chebyshev) UCL	308.4976
k star	3.621397	99% KM (Chebyshev) UCL	449.5953
Theta star	264.8624		
Nu star	832.9212	**Potential UCLs to Use**	
AppChi2	766.9431	95% KM (t) UCL	133.8174
95% Gamma Approximate UCL	1041.687		
95% Adjusted Gamma UCL	1042.768		
Note: DL/2 is not a recommended method.			
Aroclor-1260			
General Statistics			
Number of Valid Data	115	Number of Detected Data	11
Number of Distinct Detected Data	11	Number of Non-Detect Data	104
Number of Missing Values	3	Percent Non-Detects	90.43%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	13	Minimum Detected	2.564949
Maximum Detected	600	Maximum Detected	6.39693
Mean of Detected	173.4546	Mean of Detected	4.417467
SD of Detected	218.3271	SD of Detected	1.284899
Minimum Non-Detect	19.5	Minimum Non-Detect	2.970415
Maximum Non-Detect	1900	Maximum Non-Detect	7.549609
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	115
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.717847	Shapiro Wilk Test Statistic	0.927157
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	85.71304	Mean	3.667551
SD	147.8238	SD	1.21045
95% DL/2 (t) UCL	108.5725	95% H-Stat (DL/2) UCL	113.0685
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	2.054496
		SD in Log Scale	1.276063
		Mean in Original Scale	25.33781
		SD in Original Scale	81.47809
		95% Percentile Bootstrap UCL	39.22501
		95% BCA Bootstrap UCL	46.2142
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.644802	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	269.0042		
nu star	14.18565		
A-D Test Statistic	0.705005	**Nonparametric Statistics**	
5% A-D Critical Value	0.760183	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.760183	Mean	31.38668
5% K-S Critical Value	0.264395	SD	81.44949
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	8.242751
		95% KM (t) UCL	45.05588
Assuming Gamma Distribution		95% KM (z) UCL	44.9448
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	42.0616
Minimum	2.778989	95% KM (bootstrap t) UCL	54.08185
Maximum	1072.498	95% KM (BCA) UCL	67.08405
Mean	365.5021	95% KM (Percentile Bootstrap) UCL	57.2737
Median	339.3556	95% KM (Chebyshev) UCL	67.316
SD	252.9433	97.5% KM (Chebyshev) UCL	82.86265
k star	1.353027	99% KM (Chebyshev) UCL	113.401
Theta star	270.1366		
Nu star	311.1962	**Potential UCLs to Use**	
AppChi2	271.3288	95% KM (t) UCL	45.05588
95% Gamma Approximate UCL	419.2067		

95% Adjusted Gamma UCL	419.9313		
Note: DL/2 is not a recommended method.			
Dieldrin			
General Statistics			
Number of Valid Data	114	Number of Detected Data	88
Number of Distinct Detected Data	75	Number of Non-Detect Data	26
Number of Missing Values	4	Percent Non-Detects	22.81%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.24	Minimum Detected	-1.427116
Maximum Detected	10000	Maximum Detected	9.21034
Mean of Detected	196.0932	Mean of Detected	3.543992
SD of Detected	1063.298	SD of Detected	1.730227
Minimum Non-Detect	2	Minimum Non-Detect	0.693147
Maximum Non-Detect	93	Maximum Non-Detect	4.5326
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	88
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	26
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	77.19%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.426931	Lilliefors Test Statistic	0.072342
5% Lilliefors Critical Value	0.094448	5% Lilliefors Critical Value	0.094448
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	153.3807	Mean	3.096753
SD	936.3306	SD	1.820211
95% DL/2 (t) UCL	298.8191	95% H-Stat (DL/2) UCL	144.1018
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	2.956048
		SD in Log Scale	1.920926
		Mean in Original Scale	152.2538
		SD in Original Scale	936.4985
		95% Percentile Bootstrap UCL	325.2333
		95% BCA Bootstrap UCL	431.6268
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.376713	**Data appear Lognormal at 5% Significance Level**	
Theta Star	520.5379		
nu star	66.30142		
A-D Test Statistic	5.577155	**Nonparametric Statistics**	
5% A-D Critical Value	0.847281	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.847281	Mean	152.5013
5% K-S Critical Value	0.102373	SD	932.3505
Data not Gamma Distributed at 5% Significance Level		SE of Mean	87.82371
		95% KM (t) UCL	298.1525
Assuming Gamma Distribution		95% KM (z) UCL	296.9585
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	297.9621
Minimum	0.24	95% KM (bootstrap t) UCL	1203.874
Maximum	10000	95% KM (BCA) UCL	335.3964
Mean	186.1767	95% KM (Percentile Bootstrap) UCL	325.8023
Median	79.25	95% KM (Chebyshev) UCL	535.316
SD	933.1789	97.5% KM (Chebyshev) UCL	700.9602
k star	0.469312	99% KM (Chebyshev) UCL	1026.336
Theta star	396.7017		
Nu star	107.0031	**Potential UCLs to Use**	
AppChi2	84.13003	97.5% KM (Chebyshev) UCL	700.9602
95% Gamma Approximate UCL	236.7939		
95% Adjusted Gamma UCL	237.5229		
Note: DL/2 is not a recommended method.			
Heptachlor Epoxide			
General Statistics			
Number of Valid Data	114	Number of Detected Data	24
Number of Distinct Detected Data	20	Number of Non-Detect Data	90
Number of Missing Values	4	Percent Non-Detects	78.95%

APPENDIX K, TABLE K-5
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.55	Minimum Detected	-0.597837
Maximum Detected	390	Maximum Detected	5.966147
Mean of Detected	21.555	Mean of Detected	1.433043
SD of Detected	78.64235	SD of Detected	1.409701
Minimum Non-Detect	2	Minimum Non-Detect	0.693147
Maximum Non-Detect	94	Maximum Non-Detect	4.543295
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	113
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	99.12%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.25846	Shapiro Wilk Test Statistic	0.896312
5% Shapiro Wilk Critical Value	0.916	5% Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	8.268816	Mean	1.068671
SD	36.749	SD	1.100242
95% DL/2 (t) UCL	13.97697	95% H-Stat (DL/2) UCL	7.572
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.453626
		SD in Log Scale	1.00965
		Mean in Original Scale	5.708812
		SD in Original Scale	36.42852
		95% Percentile Bootstrap UCL	12.45974
		95% BCA Bootstrap UCL	16.29798
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.379163	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	56.84885		
nu star	18.19984		
A-D Test Statistic	3.286209	**Nonparametric Statistics**	
5% A-D Critical Value	0.82842	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.82842	Mean	5.784863
5% K-S Critical Value	0.190615	SD	36.2709
Data not Gamma Distributed at 5% Significance Level		SE of Mean	3.474589
		95% KM (t) UCL	11.5473
Assuming Gamma Distribution		95% KM (z) UCL	11.50005
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	11.45194
Minimum	1E-09	95% KM (bootstrap t) UCL	50.65948
Maximum	390	95% KM (BCA) UCL	12.75933
Mean	19.95938	95% KM (Percentile Bootstrap) UCL	12.57264
Median	18.7564	95% KM (Chebyshev) UCL	20.93025
SD	36.74682	97.5% KM (Chebyshev) UCL	27.48367
k star	0.282508	99% KM (Chebyshev) UCL	40.35659
Theta star	70.65075		
Nu star	64.41175	**Potential UCLs to Use**	
AppChi2	46.94671	95% KM (BCA) UCL	12.75933
95% Gamma Approximate UCL	27.38464		
95% Adjusted Gamma UCL	27.49606		
Note: DL/2 is not a recommended method.			
Benz(a)anthracene			
General Statistics			
Number of Valid Data	111	Number of Detected Data	72
Number of Distinct Detected Data	58	Number of Non-Detect Data	39
Number of Missing Values	7	Percent Non-Detects	35.14%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	4.2	Minimum Detected	1.435085
Maximum Detected	44500	Maximum Detected	10.70324
Mean of Detected	1574.583	Mean of Detected	4.590672
SD of Detected	5941.757	SD of Detected	2.06649
Minimum Non-Detect	9.9	Minimum Non-Detect	2.292535
Maximum Non-Detect	2300	Maximum Non-Detect	7.740664
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	105

For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	6
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	94.59%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.417372	Lilliefors Test Statistic	0.170394
5% Lilliefors Critical Value	0.104416	5% Lilliefors Critical Value	0.104416
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1113.04	Mean	4.866115
SD	4816.222	SD	1.757751
95% DL/2 (t) UCL	1871.347	95% H-Stat (DL/2) UCL	1078.746
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	22436.48	Mean in Log Scale	4.340237
SD	12885.19	SD in Log Scale	1.795893
95% MLE (t) UCL	24465.24	Mean in Original Scale	1047.172
95% MLE (Tiku) UCL	30940.77	SD in Original Scale	4827.758
		95% Percentile Bootstrap UCL	1880.981
		95% BCA Bootstrap UCL	2310.507
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.254051	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	6197.905		
nu star	36.58331		
A-D Test Statistic	9.285391	**Nonparametric Statistics**	
5% A-D Critical Value	0.885264	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.885264	Mean	1046.959
5% K-S Critical Value	0.115193	SD	4806.208
Data not Gamma Distributed at 5% Significance Level		SE of Mean	459.4301
		95% KM (t) UCL	1809.073
Assuming Gamma Distribution		95% KM (z) UCL	1802.655
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1807.196
Minimum	4.2	95% KM (bootstrap t) UCL	3016.87
Maximum	44500	95% KM (BCA) UCL	2020.544
Mean	1613.118	95% KM (Percentile Bootstrap) UCL	1846.771
Median	260	95% KM (Chebyshev) UCL	3049.569
SD	4777.076	97.5% KM (Chebyshev) UCL	3916.099
k star	0.365282	99% KM (Chebyshev) UCL	5618.231
Theta star	4416.084		
Nu star	81.09269	**Potential UCLs to Use**	
AppChi2	61.34218	97.5% KM (Chebyshev) UCL	3916.099
95% Gamma Approximate UCL	2132.498		
95% Adjusted Gamma UCL	2140.347		
Note: DL/2 is not a recommended method.			
Benzo(a)pyrene			
General Statistics			
Number of Valid Data	112	Number of Detected Data	73
Number of Distinct Detected Data	61	Number of Non-Detect Data	39
Number of Missing Values	6	Percent Non-Detects	34.82%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	5.1	Minimum Detected	1.629241
Maximum Detected	34000	Maximum Detected	10.43412
Mean of Detected	1171.356	Mean of Detected	4.605234
SD of Detected	4361.549	SD of Detected	1.956693
Minimum Non-Detect	9.9	Minimum Non-Detect	2.292535
Maximum Non-Detect	2300	Maximum Non-Detect	7.740664
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	106
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	6
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	94.64%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.394583	Lilliefors Test Statistic	0.159009
5% Lilliefors Critical Value	0.103699	5% Lilliefors Critical Value	0.103699
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	

DL/2 Substitution Method		DL/2 Substitution Method	
Mean	854.3429	Mean	4.873146
SD	3541.289	SD	1.676095
95% DL/2 (t) UCL	1409.377	95% H-Stat (DL/2) UCL	928.5667
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	4.361158
		SD in Log Scale	1.711729
		Mean in Original Scale	789.0524
		SD in Original Scale	3552.015
		95% Percentile Bootstrap UCL	1396.252
		95% BCA Bootstrap UCL	1679.591
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.280429	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	4177.015		
nu star	40.94261		
A-D Test Statistic	8.514005	**Nonparametric Statistics**	
5% A-D Critical Value	0.873043	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.873043	Mean	789.784
5% K-S Critical Value	0.113836	SD	3536.284
Data not Gamma Distributed at 5% Significance Level		SE of Mean	336.5217
		95% KM (t) UCL	1347.972
Assuming Gamma Distribution		95% KM (z) UCL	1343.313
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1346.63
Minimum	5.1	95% KM (bootstrap t) UCL	2191.223
Maximum	34000	95% KM (BCA) UCL	1433.614
Mean	1169.097	95% KM (Percentile Bootstrap) UCL	1430.094
Median	285	95% KM (Chebyshev) UCL	2256.648
SD	3512.753	97.5% KM (Chebyshev) UCL	2891.361
k star	0.403839	99% KM (Chebyshev) UCL	4138.132
Theta star	2894.956		
Nu star	90.46001	**Potential UCLs to Use**	
AppChi2	69.52958	97.5% KM (Chebyshev) UCL	2891.361
95% Gamma Approximate UCL	1521.029		
95% Adjusted Gamma UCL	1526.254		
Note: DL/2 is not a recommended method.			

Benzo(b)fluoranthene

General Statistics			
Number of Valid Data	113	Number of Detected Data	77
Number of Distinct Detected Data	61	Number of Non-Detect Data	36
Number of Missing Values	5	Percent Non-Detects	31.86%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	7.2	Minimum Detected	1.974081
Maximum Detected	37500	Maximum Detected	10.5321
Mean of Detected	1264.989	Mean of Detected	4.756218
SD of Detected	4730.047	SD of Detected	1.868828
Minimum Non-Detect	9.9	Minimum Non-Detect	2.292535
Maximum Non-Detect	2300	Maximum Non-Detect	7.740664
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	106
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	7
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	93.81%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.40123	Lilliefors Test Statistic	0.160857
5% Lilliefors Critical Value	0.100969	5% Lilliefors Critical Value	0.100969
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	947.1159	Mean	4.957178
SD	3925.724	SD	1.626368
95% DL/2 (t) UCL	1559.629	95% H-Stat (DL/2) UCL	901.4718
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	4.550339
		SD in Log Scale	1.661456
		Mean in Original Scale	890.1868
		SD in Original Scale	3935.345

		95% Percentile Bootstrap UCL	1578.17
		95% BCA Bootstrap UCL	1893.499
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.287801	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	4395.367		
nu star	44.32128		
A-D Test Statistic	9.910211	**Nonparametric Statistics**	
5% A-D Critical Value	0.869433	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.869433	Mean	888.8394
5% K-S Critical Value	0.11072	SD	3918.315
Data not Gamma Distributed at 5% Significance Level		SE of Mean	371.0672
		95% KM (t) UCL	1504.281
Assuming Gamma Distribution		95% KM (z) UCL	1499.191
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1502.998
Minimum	7.2	95% KM (bootstrap t) UCL	2388.525
Maximum	37500	95% KM (BCA) UCL	1648.032
Mean	1295.856	95% KM (Percentile Bootstrap) UCL	1577.246
Median	180	95% KM (Chebyshev) UCL	2506.284
SD	3900.351	97.5% KM (Chebyshev) UCL	3206.153
k star	0.396508	99% KM (Chebyshev) UCL	4580.912
Theta star	3268.173		
Nu star	89.61077	**Potential UCLs to Use**	
AppChi2	68.78471	97.5% KM (Chebyshev) UCL	3206.153
95% Gamma Approximate UCL	1688.205		
95% Adjusted Gamma UCL	1693.981		
Note: DL/2 is not a recommended method.			

Benzo(k)fluoranthene

General Statistics

Number of Valid Data	111	Number of Detected Data	66
Number of Distinct Detected Data	56	Number of Non-Detect Data	45
Number of Missing Values	7	Percent Non-Detects	40.54%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	5	Minimum Detected	1.609438
Maximum Detected	24500	Maximum Detected	10.10643
Mean of Detected	958.4242	Mean of Detected	4.573127
SD of Detected	3319.46	SD of Detected	1.934346
Minimum Non-Detect	9.9	Minimum Non-Detect	2.292535
Maximum Non-Detect	2300	Maximum Non-Detect	7.740664
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	105
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	6
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	94.59%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.387892	Lilliefors Test Statistic	0.151727
5% Lilliefors Critical Value	0.109059	5% Lilliefors Critical Value	0.109059
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	682.914	Mean	4.920076
SD	2577.002	SD	1.614422
95% DL/2 (t) UCL	1088.659	95% H-Stat (DL/2) UCL	856.6225
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	12784.8	Mean in Log Scale	4.277904
SD	7146.658	SD in Log Scale	1.646872
95% MLE (t) UCL	13910.03	Mean in Original Scale	597.451
95% MLE (Tiku) UCL	17477.67	SD in Original Scale	2589.455
		95% Percentile Bootstrap UCL	1032.312
		95% BCA Bootstrap UCL	1293.096
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.297151	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	3225.382		
nu star	39.22388		
A-D Test Statistic	6.880622	**Nonparametric Statistics**	
5% A-D Critical Value	0.864551	Kaplan-Meier (KM) Method	

K-S Test Statistic	0.864551	Mean	599.918
5% K-S Critical Value	0.119165	SD	2577.842
Data not Gamma Distributed at 5% Significance Level		SE of Mean	246.66
		95% KM (t) UCL	1009.084
Assuming Gamma Distribution		95% KM (z) UCL	1005.638
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1007.819
Minimum	5	95% KM (bootstrap t) UCL	1591.222
Maximum	24500	95% KM (BCA) UCL	1073.581
Mean	982.1418	95% KM (Percentile Bootstrap) UCL	1038.789
Median	530	95% KM (Chebyshev) UCL	1675.084
SD	2555.66	97.5% KM (Chebyshev) UCL	2140.309
k star	0.459897	99% KM (Chebyshev) UCL	3054.154
Theta star	2135.571		
Nu star	102.0971	**Potential UCLs to Use**	
AppChi2	79.78334	97.5% KM (Chebyshev) UCL	2140.309
95% Gamma Approximate UCL	1256.826		
95% Adjusted Gamma UCL	1260.905		
Note: DL/2 is not a recommended method.			

Chrysene

General Statistics

Number of Valid Data	113	Number of Detected Data	81
Number of Distinct Detected Data	64	Number of Non-Detect Data	32
Number of Missing Values	5	Percent Non-Detects	28.32%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	6.6	Minimum Detected	1.88707
Maximum Detected	36500	Maximum Detected	10.50507
Mean of Detected	1371.504	Mean of Detected	4.742996
SD of Detected	5119.305	SD of Detected	1.832815
Minimum Non-Detect	9.9	Minimum Non-Detect	2.292535
Maximum Non-Detect	2300	Maximum Non-Detect	7.740664
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	106
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	7
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	93.81%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.418491	Lilliefors Test Statistic	0.172205
5% Lilliefors Critical Value	0.098444	5% Lilliefors Critical Value	0.098444
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1061.078	Mean	4.928145
SD	4356.233	SD	1.635417
95% DL/2 (t) UCL	1740.761	95% H-Stat (DL/2) UCL	832.4349
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	4.571174
		SD in Log Scale	1.652962
		Mean in Original Scale	1008.378
		SD in Original Scale	4365.53
		95% Percentile Bootstrap UCL	1763.951
		95% BCA Bootstrap UCL	2048.073
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.278787	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	4919.55		
nu star	45.16342		
A-D Test Statistic	11.72593	**Nonparametric Statistics**	
5% A-D Critical Value	0.873824	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.873824	Mean	1007.154
5% K-S Critical Value	0.108114	SD	4346.569
Data not Gamma Distributed at 5% Significance Level		SE of Mean	411.4744
		95% KM (t) UCL	1689.614
Assuming Gamma Distribution		95% KM (z) UCL	1683.969
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1688.411
Minimum	6.6	95% KM (bootstrap t) UCL	2572.569
Maximum	36500	95% KM (BCA) UCL	1810.816
Mean	1405.759	95% KM (Percentile Bootstrap) UCL	1749.804
Median	150	95% KM (Chebyshev) UCL	2800.729

SD	4330.961	97.5% KM (Chebyshev) UCL	3576.81
k star	0.367417	99% KM (Chebyshev) UCL	5101.272
Theta star	3826.061		
Nu star	83.0362	**Potential UCLs to Use**	
AppChi2	63.03547	97.5% KM (Chebyshev) UCL	3576.81
95% Gamma Approximate UCL	1851.797		
95% Adjusted Gamma UCL	1858.404		
Note: DL/2 is not a recommended method.			

Dibenz(a,h)anthracene

General Statistics

Number of Valid Data	107	Number of Detected Data	35
Number of Distinct Detected Data	33	Number of Non-Detect Data	72
Number of Missing Values	11	Percent Non-Detects	67.29%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	1.3	Minimum Detected	0.262364
Maximum Detected	2805	Maximum Detected	7.939159
Mean of Detected	172.1429	Mean of Detected	2.921642
SD of Detected	503.6653	SD of Detected	2.078914
Minimum Non-Detect	9.9	Minimum Non-Detect	2.292535
Maximum Non-Detect	20000	Maximum Non-Detect	9.903488
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	107
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.382834	Shapiro Wilk Test Statistic	0.915045
5% Shapiro Wilk Critical Value	0.934	5% Shapiro Wilk Critical Value	0.934
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	317.7799	Mean	4.617471
SD	997.5497	SD	1.780453
95% DL/2 (t) UCL	477.8028	95% H-Stat (DL/2) UCL	1242.305
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	2.601995
		SD in Log Scale	1.506007
		Mean in Original Scale	70.0556
		SD in Original Scale	294.7614
		95% Percentile Bootstrap UCL	118.1363
		95% BCA Bootstrap UCL	162.711
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.300927	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	572.042		
nu star	21.06489		
A-D Test Statistic	2.784119	**Nonparametric Statistics**	
5% A-D Critical Value	0.854614	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.854614	Mean	84.49808
5% K-S Critical Value	0.161146	SD	298.7553
Data not Gamma Distributed at 5% Significance Level		SE of Mean	31.22779
		95% KM (t) UCL	136.3161
Assuming Gamma Distribution		95% KM (z) UCL	135.8632
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	135.9899
Minimum	1.3	95% KM (bootstrap t) UCL	193.1039
Maximum	2805	95% KM (BCA) UCL	137.2592
Mean	164.0931	95% KM (Percentile Bootstrap) UCL	138.5536
Median	141.9681	95% KM (Chebyshev) UCL	220.6168
SD	288.0997	97.5% KM (Chebyshev) UCL	279.5155
k star	0.772177	99% KM (Chebyshev) UCL	395.2106
Theta star	212.5073		
Nu star	165.2458	**Potential UCLs to Use**	
AppChi2	136.5227	97.5% KM (Chebyshev) UCL	279.5155
95% Gamma Approximate UCL	198.6168		
95% Adjusted Gamma UCL	199.133		
Note: DL/2 is not a recommended method.			

Indeno(1,2,3-cd)pyrene

General Statistics

Number of Valid Data	113	Number of Detected Data	62
Number of Distinct Detected Data	54	Number of Non-Detect Data	51
Number of Missing Values	5	Percent Non-Detects	45.13%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	4.4	Minimum Detected	1.481605
Maximum Detected	13800	Maximum Detected	9.532424
Mean of Detected	646.7927	Mean of Detected	4.285586
SD of Detected	2068.959	SD of Detected	1.851491
Minimum Non-Detect	9.9	Minimum Non-Detect	2.292535
Maximum Non-Detect	2300	Maximum Non-Detect	7.740664
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	108
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	5
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	95.58%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.390054	Lilliefors Test Statistic	0.154327
5% Lilliefors Critical Value	0.112522	5% Lilliefors Critical Value	0.112522
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	474.8991	Mean	4.787219
SD	1544.407	SD	1.546121
95% DL/2 (t) UCL	715.8659	95% H-Stat (DL/2) UCL	771.2881
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	8485.532	Mean in Log Scale	4.02427
SD	4102	SD in Log Scale	1.531334
95% MLE (t) UCL	9125.548	Mean in Original Scale	381.8042
95% MLE (Tiku) UCL	11442.43	SD in Original Scale	1555.258
		95% Percentile Bootstrap UCL	634.0687
		95% BCA Bootstrap UCL	735.5084
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.308776	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	2094.697		
nu star	38.28827		
A-D Test Statistic	7.107568	**Nonparametric Statistics**	
5% A-D Critical Value	0.860611	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.860611	Mean	382.3728
5% K-S Critical Value	0.122489	SD	1548.97
Data not Gamma Distributed at 5% Significance Level		SE of Mean	147.0593
		95% KM (t) UCL	626.2814
Assuming Gamma Distribution		95% KM (z) UCL	624.2639
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	625.3922
Minimum	4.4	95% KM (bootstrap t) UCL	953.2261
Maximum	13800	95% KM (BCA) UCL	671.3534
Mean	639.5337	95% KM (Percentile Bootstrap) UCL	635.3881
Median	581.9777	95% KM (Chebyshev) UCL	1023.39
SD	1527.33	97.5% KM (Chebyshev) UCL	1300.758
k star	0.516814	99% KM (Chebyshev) UCL	1845.595
Theta star	1237.454		
Nu star	116.8	**Potential UCLs to Use**	
AppChi2	92.84738	97.5% KM (Chebyshev) UCL	1300.758
95% Gamma Approximate UCL	804.5198		
95% Adjusted Gamma UCL	806.9031		

Note: DL/2 is not a recommended method.

Naphthalene

General Statistics

Number of Valid Data	89	Number of Detected Data	15
Number of Distinct Detected Data	15	Number of Non-Detect Data	74
Number of Missing Values	29	Percent Non-Detects	83.15%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	4.15	Minimum Detected	1.423108
Maximum Detected	14000	Maximum Detected	9.546813

Mean of Detected	2223.71	Mean of Detected	5.146826
SD of Detected	4237.726	SD of Detected	2.718802
Minimum Non-Detect	200	Minimum Non-Detect	5.298317
Maximum Non-Detect	20000	Maximum Non-Detect	9.903488
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	89
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.603339	Shapiro Wilk Test Statistic	0.940108
5% Shapiro Wilk Critical Value	0.881	5% Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	704.0242	Mean	5.428033
SD	2105.347	SD	1.230119
95% DL/2 (t) UCL	1075.006	95% H-Stat (DL/2) UCL	788.3397
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.686583
		SD in Log Scale	1.716611
		Mean in Original Scale	425.1153
		SD in Original Scale	1877.722
		95% Percentile Bootstrap UCL	812.9331
		95% BCA Bootstrap UCL	924.6573
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.263202	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	8448.678		
nu star	7.896064		
A-D Test Statistic	0.837491	**Nonparametric Statistics**	
5% A-D Critical Value	0.84646	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.84646	Mean	430.404
5% K-S Critical Value	0.241364	SD	1877.402
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	208.0737
		95% KM (t) UCL	776.2962
Assuming Gamma Distribution		95% KM (z) UCL	772.6549
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	766.8117
Minimum	1.280378	95% KM (bootstrap t) UCL	1878.336
Maximum	14000	95% KM (BCA) UCL	794.9777
Mean	2206.626	95% KM (Percentile Bootstrap) UCL	793.6517
Median	2435.176	95% KM (Chebyshev) UCL	1337.376
SD	1789.729	97.5% KM (Chebyshev) UCL	1729.824
k star	1.001925	99% KM (Chebyshev) UCL	2500.711
Theta star	2202.386		
Nu star	178.3427	**Potential UCLs to Use**	
AppChi2	148.4557	95% KM (t) UCL	776.2962
95% Gamma Approximate UCL	2650.863		
95% Adjusted Gamma UCL	2658.85		
Note: DL/2 is not a recommended method.			
Phenanthrene			
General Statistics			
Number of Valid Data	111	Number of Detected Data	82
Number of Distinct Detected Data	68	Number of Non-Detect Data	29
Number of Missing Values	7	Percent Non-Detects	26.13%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	5.8	Minimum Detected	1.757858
Maximum Detected	151000	Maximum Detected	11.92504
Mean of Detected	3899.247	Mean of Detected	4.80079
SD of Detected	18671.31	SD of Detected	2.041257
Minimum Non-Detect	9.9	Minimum Non-Detect	2.292535
Maximum Non-Detect	2300	Maximum Non-Detect	7.740664
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	104
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	7
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	93.69%
UCL Statistics			

APPENDIX K, TABLE K-5
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.461516	Lilliefors Test Statistic	0.169575
5% Lilliefors Critical Value	0.097842	5% Lilliefors Critical Value	0.097842
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2960.66	Mean	4.969494
SD	16100.91	SD	1.832483
95% DL/2 (t) UCL	5495.726	95% H-Stat (DL/2) UCL	1312.066
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	4.640041
		SD in Log Scale	1.849031
		Mean in Original Scale	2906.623
		SD in Original Scale	16109.73
		95% Percentile Bootstrap UCL	5660.676
		95% BCA Bootstrap UCL	7992.462
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.210949	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	18484.36		
nu star	34.59555		
A-D Test Statistic	15.09309	**Nonparametric Statistics**	
5% A-D Critical Value	0.905866	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.905866	Mean	2905.396
5% K-S Critical Value	0.109041	SD	16037.24
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1531.567
		95% KM (t) UCL	5445.996
Assuming Gamma Distribution		95% KM (z) UCL	5424.6
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	5441.91
Minimum	5.8	95% KM (bootstrap t) UCL	10351.2
Maximum	151000	95% KM (BCA) UCL	5900.192
Mean	3906.963	95% KM (Percentile Bootstrap) UCL	5727.531
Median	150	95% KM (Chebyshev) UCL	9581.341
SD	16022.2	97.5% KM (Chebyshev) UCL	12470.03
k star	0.271911	99% KM (Chebyshev) UCL	18144.29
Theta star	14368.52		
Nu star	60.36429	**Potential UCLs to Use**	
AppChi2	43.49746	97.5% KM (Chebyshev) UCL	12470.03
95% Gamma Approximate UCL	5421.95		
95% Adjusted Gamma UCL	5445.454		
Note: DL/2 is not a recommended method.			

Ethylbenzene

General Statistics

Number of Valid Data	106	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	103
Number of Missing Values	12	Percent Non-Detects	97.17%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	465	Minimum Detected	6.142037
Maximum Detected	7000	Maximum Detected	8.853665
Mean of Detected	2781.667	Mean of Detected	7.258542
SD of Detected	3659.072	SD of Detected	1.417759
Minimum Non-Detect	4.7	Minimum Non-Detect	1.547563
Maximum Non-Detect	30	Maximum Non-Detect	3.401197
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	103
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	97.17%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only

APPENDIX K, TABLE K-5
UCL AND DISTRIBUTION STASTISTICS - SITE 3 LANDFILL AREA TOTAL SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Shapiro Wilk Test Statistic	0.797409	Shapiro Wilk Test Statistic	0.914508
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	81.88868	Mean	1.313474
SD	685.0867	SD	1.065021
95% DL/2 (t) UCL	192.314	95% H-Stat (DL/2) UCL	7.305171
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4612.739	Mean in Log Scale	-7.161461
SD	2987.62	SD in Log Scale	4.796768
95% MLE (t) UCL	5094.297	Mean in Original Scale	79.06654
95% MLE (Tiku) UCL	7398.396	SD in Original Scale	685.4168
		95% Percentile Bootstrap UCL	206.5934
		95% BCA Bootstrap UCL	293.7423
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	N/A	**Data appear Normal at 5% Significance Level**	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	**Nonparametric Statistics**	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	530.566
5% K-S Critical Value	N/A	SD	632.6253
Data not Gamma Distributed at 5% Significance Level		SE of Mean	75.25568
		95% KM (t) UCL	655.4525
Assuming Gamma Distribution		95% KM (z) UCL	654.3506
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	805.3316
Minimum	N/A	95% KM (bootstrap t) UCL	1239.179
Maximum	N/A	95% KM (BCA) UCL	7000
Mean	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Median	N/A	95% KM (Chebyshev) UCL	858.5979
SD	N/A	97.5% KM (Chebyshev) UCL	1000.538
k star	N/A	99% KM (Chebyshev) UCL	1279.351
Theta star	N/A		
Nu star	N/A	**Potential UCLs to Use**	
AppChi2	N/A	95% KM (t) UCL	655.4525
95% Gamma Approximate UCL	N/A	95% KM (Percentile Bootstrap) UCL	N/A
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			

APPENDIX K, TABLE K-6
UCL AND DISTRIBUTION STASTISTICS - SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

	General UCL Statistics for Data Sets with Non-Detects		
User Selected Options			
From File	S:\ritchiem\Willow Grove\Site 3 Risk Assessment\ProUCL\S3SW.wst		
Full Precision	ON		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
Benzo(a)pyrene			
General Statistics			
Number of Valid Data	6	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	3
		Percent Non-Detects	50.00%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.013	Minimum Detected	-4.342806
Maximum Detected	0.047	Maximum Detected	-3.057608
Mean of Detected	0.026	Mean of Detected	-3.805932
SD of Detected	0.0183576	SD of Detected	0.6681821
Minimum Non-Detect	0.2	Minimum Non-Detect	-1.609438
Maximum Non-Detect	0.21	Maximum Non-Detect	-1.560648
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 3 Distinct Detected Values in this data set			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.8575503	Shapiro Wilk Test Statistic	0.9248733
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0638333	Mean	-3.046127
SD	0.0430786	SD	0.9336323
95% DL/2 (t) UCL	0.0992715	95% H-Stat (DL/2) UCL	8.6326403
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-3.805932
		SD in Log Scale	0.4959292
		Mean in Original Scale	0.0247522

		SD in Original Scale	0.0131291
		95% Percentile Bootstrap UCL	0.0333717
		95% BCA Bootstrap UCL	0.0350869
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	N/A	**Data appear Normal at 5% Significance Level**	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	**Nonparametric Statistics**	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.026
5% K-S Critical Value	N/A	SD	0.0149889
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0105987
		95% KM (t) UCL	0.047357
Assuming Gamma Distribution		95% KM (z) UCL	0.0434334
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0498778
Minimum	N/A	95% KM (bootstrap t) UCL	0.1256282
Maximum	N/A	95% KM (BCA) UCL	0.047
Mean	N/A	95% KM (Percentile Bootstrap) UCL	0.047
Median	N/A	95% KM (Chebyshev) UCL	0.0721988
SD	N/A	97.5% KM (Chebyshev) UCL	0.0921891
k star	N/A	99% KM (Chebyshev) UCL	0.1314562
Theta star	N/A		
Nu star	N/A	**Potential UCLs to Use**	
AppChi2	N/A	95% KM (t) UCL	0.047357
95% Gamma Approximate UCL	N/A	95% KM (Percentile Bootstrap) UCL	0.047
95% Adjusted Gamma UCL	N/A		
Warning: Recommended UCL exceeds the maximum observation			
Note: DL/2 is not a recommended method.			

	General UCL Statistics for Data Sets with Non-Detects
User Selected Options	
From File	C:\willow_grove\WGSite3\Site3_2010\ProUCL\ProUCL WSTs and Excel Outputs\S3CRSW.wst
Full Precision	ON
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chromium

General Statistics			
Number of Valid Data	6	Number of Detected Data	4
Number of Distinct Detected Data	3	Number of Non-Detect Data	2
		Percent Non-Detects	33.33%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.7675	Minimum Detected	-0.264617
Maximum Detected	1.3	Maximum Detected	0.2623643
Mean of Detected	1.066875	Mean of Detected	0.047092
SD of Detected	0.2207315	SD of Detected	0.222227
Minimum Non-Detect	0.87	Minimum Non-Detect	-0.139262

APPENDIX K, TABLE K-6
UCL AND DISTRIBUTION STASTISTICS - SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Maximum Non-Detect	0.87	Maximum Non-Detect	-0.139262

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.9161269	Shapiro Wilk Test Statistic	0.8852001
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.85625	Mean	-0.246075
SD	0.3683807	SD	0.485699
95% DL/2 (t) UCL	1.1592948	95% H-Stat (DL/2) UCL	1.3025552
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.9083746	Mean in Log Scale	-0.053046
SD	0.2924304	SD in Log Scale	0.2366086
95% MLE (t) UCL	1.1489396	Mean in Original Scale	0.9707287
95% MLE (Tiku) UCL	1.2043718	SD in Original Scale	0.2297812
		95% Percentile Bootstrap UCL	1.1228626
		95% BCA Bootstrap UCL	1.1228626
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	7.2935074	**Data appear Normal at 5% Significance Level**	
Theta Star	0.1462774		
nu star	58.348059		
A-D Test Statistic	0.4168847	**Nonparametric Statistics**	
5% A-D Critical Value	0.6567639	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.6567639	Mean	0.9670833
5% K-S Critical Value	0.3941209	SD	0.2104233
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0991945
		95% KM (t) UCL	1.166965
Assuming Gamma Distribution		95% KM (z) UCL	1.1302437
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.2051957
Minimum	0.7675	95% KM (bootstrap t) UCL	1.0862286
Maximum	1.3	95% KM (BCA) UCL	1.2
Mean	1.0458801	95% KM (Percentile Bootstrap) UCL	1.1666667
Median	1.0886203	95% KM (Chebyshev) UCL	1.399462
SD	0.1801206	97.5% KM (Chebyshev) UCL	1.5865527
k star	19.333573	99% KM (Chebyshev) UCL	1.9540559
Theta star	0.0540966		

APPENDIX K, TABLE K-6
UCL AND DISTRIBUTION STASTISTICS - SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Nu star	232.00287	**Potential UCLs to Use**	
AppChi2	197.74434	95% KM (t) UCL	1.166965
95% Gamma Approximate UCL	1.2270754	95% KM (Percentile Bootstrap) UCL	1.1666667
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			

APPENDIX K, TABLE K-7
UCL AND DISTRIBUTION STASTISTICS - SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

	General UCL Statistics for Data Sets with Non-Detects		
User Selected Options			
From File	S:\ritchiem\Willow Grove\Site 3 Risk Assessment\ProUCL\S3SD.wst		
Full Precision	ON		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		

Arsenic

General Statistics

Number of Valid Observations	3	Number of Distinct Observations	3

Warning: This data set only has 3 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Arsenic was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Chromium

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		**Log-transformed Statistics**	
Minimum	8.9	Minimum of Log Data	2.1860513
Maximum	34.8	Maximum of Log Data	3.5496174
Mean	16.258333	Mean of log Data	2.6846228
Median	12.825	SD of log Data	0.4655552
SD	9.3793612		
Coefficient of Variation	0.5768956		
Skewness	2.114497		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.7277563	Shapiro Wilk Test Statistic	0.8602824
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788

APPENDIX K, TABLE K-7
UCL AND DISTRIBUTION STASTISTICS - SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	23.974171	95% H-UCL	27.811249
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29.277085
95% Adjusted-CLT UCL	26.088565	97.5% Chebyshev (MVUE) UCL	35.01372
95% Modified-t UCL	24.525078	99% Chebyshev (MVUE) UCL	46.282229
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.5956744	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	6.2636258		
MLE of Mean	16.258333		
MLE of Standard Deviation	10.091388		
nu star	31.148093		
Approximate Chi Square Value (.05)	19.397677	**Nonparametric Statistics**	
Adjusted Level of Significance	0.01222	95% CLT UCL	22.556656
Adjusted Chi Square Value	16.14097	95% Jackknife UCL	23.974171
		95% Standard Bootstrap UCL	21.966395
Anderson-Darling Test Statistic	0.6433803	95% Bootstrap-t UCL	41.523541
Anderson-Darling 5% Critical Value	0.6981096	95% Hall's Bootstrap UCL	57.712573
Kolmogorov-Smirnov Test Statistic	0.286172	95% Percentile Bootstrap UCL	22.4
Kolmogorov-Smirnov 5% Critical Value	0.3328132	95% BCA Bootstrap UCL	24.883333
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	32.949029
		97.5% Chebyshev(Mean, Sd) UCL	40.171106
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	54.357479
95% Approximate Gamma UCL	26.107048		
95% Adjusted Gamma UCL	31.374576		
Potential UCL to Use		Use 95% Approximate Gamma UCL	26.107048

Benzo(a)pyrene

General Statistics			
Number of Valid Observations	6	Number of Distinct Observations	6
Raw Statistics		**Log-transformed Statistics**	
Minimum	75	Minimum of Log Data	4.3174881
Maximum	1400	Maximum of Log Data	7.2442275
Mean	542.5	Mean of log Data	5.8592555
Median	280	SD of log Data	1.065844
SD	527.52014		
Coefficient of Variation	0.9723874		
Skewness	1.1237027		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data

APPENDIX K, TABLE K-7
UCL AND DISTRIBUTION STASTISTICS - SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Note: It should be noted that even though bootstrap methods may be performed on this data set,			
the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.8237916	Shapiro Wilk Test Statistic	0.9399061
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	976.4592	95% H-UCL	4938.9013
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1563.1207
95% Adjusted-CLT UCL	1002.2993	97.5% Chebyshev (MVUE) UCL	2002.8006
95% Modified-t UCL	992.92519	99% Chebyshev (MVUE) UCL	2866.4667
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.7538343	**Data appear Normal at 5% Significance Level**	
Theta Star	719.65415		
MLE of Mean	542.5		
MLE of Standard Deviation	624.82988		
nu star	9.0460119		
Approximate Chi Square Value (.05)	3.3547691	**Nonparametric Statistics**	
Adjusted Level of Significance	0.01222	95% CLT UCL	896.73435
Adjusted Chi Square Value	2.2319445	95% Jackknife UCL	976.4592
		95% Standard Bootstrap UCL	867.12176
Anderson-Darling Test Statistic	0.3891188	95% Bootstrap-t UCL	2430.2117
Anderson-Darling 5% Critical Value	0.7109268	95% Hall's Bootstrap UCL	4576.529
Kolmogorov-Smirnov Test Statistic	0.2740056	95% Percentile Bootstrap UCL	900
Kolmogorov-Smirnov 5% Critical Value	0.338909	95% BCA Bootstrap UCL	948.33333
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1481.229
		97.5% Chebyshev(Mean, Sd) UCL	1887.4177
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2685.2969
95% Approximate Gamma UCL	1462.8314		
95% Adjusted Gamma UCL	2198.7381		
Potential UCL to Use		Use 95% Student's-t UCL	976.4592
Benzo(b)fluoranthene			
General Statistics			
Number of Valid Observations	6	Number of Distinct Observations	5
Raw Statistics		**Log-transformed Statistics**	
Minimum	80	Minimum of Log Data	4.3820266
Maximum	2500	Maximum of Log Data	7.824046
Mean	917.5	Mean of log Data	6.1660177
Median	320	SD of log Data	1.3092451
SD	1048.0064		
Coefficient of Variation	1.1422414		

Skewness	1.0332689		
Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!			
It is suggested to collect at least 8 to 10 observations using these statistical methods!			
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
Warning: There are only 6 Values in this data			
Note: It should be noted that even though bootstrap methods may be performed on this data set,			
the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.7559804	Shapiro Wilk Test Statistic	0.8889897
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1779.6321	95% H-UCL	23549.206
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2965.0219
95% Adjusted-CLT UCL	1814.0896	97.5% Chebyshev (MVUE) UCL	3851.77
95% Modified-t UCL	1809.7119	99% Chebyshev (MVUE) UCL	5593.615
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.5574053	**Data Follow Appr. Gamma Distribution at 5% Significance Level**	
Theta Star	1646.0194		
MLE of Mean	917.5		
MLE of Standard Deviation	1228.9112		
nu star	6.6888642		
Approximate Chi Square Value (.05)	2.0014471	**Nonparametric Statistics**	
Adjusted Level of Significance	0.01222	95% CLT UCL	1621.2454
Adjusted Chi Square Value	1.2081628	95% Jackknife UCL	1779.6321
		95% Standard Bootstrap UCL	1560.8678
Anderson-Darling Test Statistic	0.5950312	95% Bootstrap-t UCL	7736.309
Anderson-Darling 5% Critical Value	0.7176306	95% Hall's Bootstrap UCL	12534.136
Kolmogorov-Smirnov Test Statistic	0.3477018	95% Percentile Bootstrap UCL	1600.8333
Kolmogorov-Smirnov 5% Critical Value	0.3419671	95% BCA Bootstrap UCL	1644.1667
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2782.4411
		97.5% Chebyshev(Mean, Sd) UCL	3589.4026
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	5174.5223
95% Approximate Gamma UCL	3066.2979		
95% Adjusted Gamma UCL	5079.6405		
Potential UCL to Use		Use 95% Approximate Gamma UCL	3066.2979
Recommended UCL exceeds the maximum observation			
Dibenz(a,h)anthracene			

APPENDIX K, TABLE K-7
UCL AND DISTRIBUTION STASTISTICS - SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

General Statistics			
Number of Valid Observations	5	Number of Distinct Observations	5
Raw Statistics		**Log-transformed Statistics**	
Minimum	50	Minimum of Log Data	3.912023
Maximum	380	Maximum of Log Data	5.9401713
Mean	165.8	Mean of log Data	4.7773488
Median	76	SD of log Data	0.9105284
SD	147.30648		
Coefficient of Variation	0.8884589		
Skewness	0.9516315		
Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!			
It is suggested to collect at least 8 to 10 observations using these statistical methods!			
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
Warning: There are only 5 Values in this data			
Note: It should be noted that even though bootstrap methods may be performed on this data set,			
the resulting calculations may not be reliable enough to draw conclusions			
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.			
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.8204347	Shapiro Wilk Test Statistic	0.8612051
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	306.24066	95% H-UCL	1409.2093
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	442.02136
95% Adjusted-CLT UCL	304.11597	97.5% Chebyshev (MVUE) UCL	562.8468
95% Modified-t UCL	310.91337	99% Chebyshev (MVUE) UCL	800.18498
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.7919267	**Data appear Normal at 5% Significance Level**	
Theta Star	209.36281		
MLE of Mean	165.8		
MLE of Standard Deviation	186.31252		
nu star	7.9192669		
Approximate Chi Square Value (.05)	2.6883554	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0086	95% CLT UCL	274.15878
Adjusted Chi Square Value	1.5477258	95% Jackknife UCL	306.24066
		95% Standard Bootstrap UCL	262.38374
Anderson-Darling Test Statistic	0.5166201	95% Bootstrap-t UCL	1402.2693
Anderson-Darling 5% Critical Value	0.6858216	95% Hall's Bootstrap UCL	1619.6136
Kolmogorov-Smirnov Test Statistic	0.3293435	95% Percentile Bootstrap UCL	268.6
Kolmogorov-Smirnov 5% Critical Value	0.3613184	95% BCA Bootstrap UCL	271.2

APPENDIX K, TABLE K-7
UCL AND DISTRIBUTION STASTISTICS - SITE 3 SEDIMENT
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Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	452.9532
		97.5% Chebyshev(Mean, Sd) UCL	577.20462
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	821.27247
95% Approximate Gamma UCL	488.40806		
95% Adjusted Gamma UCL	848.35081		
Potential UCL to Use		Use 95% Student's-t UCL	306.24066

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

1				**General Background Statistics for Data Sets with Non-Detects**									
2			**User Selected Options**										
3			From File	C:\willow_grove\WGSite3\Site3_2010\BackgroundComparison\WGBMSODB_ProUCL_input.wst									
4			Full Precision	ON									
5			Confidence Coefficient	95%									
6			Coverage	95%									
7			Different or Future K Values	1									
8			Number of Bootstrap Operations	2000									
9													
10													
11	**Aluminum**												
12													
13							**General Statistics**						
14						Total Number of Observations	12				Number of Distinct Observations	11		
15													
16						**Raw Statistics**					**Log-Transformed Statistics**		
17						Minimum	9090				Minimum	9.1149302	
18						Maximum	15000				Maximum	9.6158055	
19						Second Largest	12800				Second Largest	9.4572004	
20						First Quartile	9726.25				First Quartile	9.1820182	
21						Median	11300				Median	9.3311463	
22						Third Quartile	12225				Third Quartile	9.4111814	
23						Mean	11272.083				Mean	9.3197992	
24						SD	1715.7975				SD	0.1488235	
25						Coefficient of Variation	0.1522165						
26						Skewness	0.6857721						
27													
28							**Background Statistics**						
29						**Normal Distribution Test**					**Lognormal Distribution Test**		
30						Shapiro Wilk Test Statistic	0.9352812				Shapiro Wilk Test Statistic	0.950984	
31						Shapiro Wilk Critical Value	0.859				Shapiro Wilk Critical Value	0.859	
32						**Data appear Normal at 5% Significance Level**					**Data appear Lognormal at 5% Significance Level**		
33													
34						**Assuming Normal Distribution**					**Assuming Lognormal Distribution**		
35						95% UTL with 95% Coverage	15966.505				95% UTL with 95% Coverage	16763.852	
36						95% UPL (t)	14479.28				95% UPL (t)	14735.023	
37						90% Percentile (z)	13470.966				90% Percentile (z)	13501.069	
38						95% Percentile (z)	14094.319				95% Percentile (z)	14251.138	
39						99% Percentile (z)	15263.625				99% Percentile (z)	15772.36	
40													
41						**Gamma Distribution Test**					**Data Distribution Test**		
42						k star	36.640104				**Data appear Normal at 5% Significance Level**		
43						Theta Star	307.64332						
44						MLE of Mean	11272.083						
45						MLE of Standard Deviation	1862.1979						
46						nu star	879.3625						
47													
48						A-D Test Statistic	0.303405				**Nonparametric Statistics**		
49						5% A-D Critical Value	0.7297207				90% Percentile	14340	
50						K-S Test Statistic	0.1662545				95% Percentile	15000	
51						5% K-S Critical Value	0.2449602				99% Percentile	15000	
52						**Data appear Gamma Distributed at 5% Significance Level**							
53													
54						**Assuming Gamma Distribution**					95% UTL with 95% Coverage	15000	
55						90% Percentile	13714.73				95% Percentile Bootstrap UTL with 95% Coverage	15000	

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
56					95% Percentile	14499.812			95% BCA Bootstrap UTL with	95% Coverage		15000
57					99% Percentile	16050.372					95% UPL	15000
58											95% Chebyshev UPL	19056.461
59					95% WH Approx. Gamma UPL	14633.657					Upper Threshold Limit Based upon IQR	15973.125
60					95% HW Approx. Gamma UPL	14657.275						
61			95% WH Approx. Gamma UTL with		95% Coverage	16442.454						
62			95% HW Approx. Gamma UTL with		95% Coverage	16516.457						
63												
64	**Note: UPL represents a preferred estimate of BTV**											
65												
66												
67	**Arsenic**											
68												
69	**General Statistics**											
70					Total Number of Observations	12				Number of Distinct Observations		10
71												
72	**Raw Statistics**						**Log-Transformed Statistics**					
73					Minimum	3.7					Minimum	1.3083328
74					Maximum	10.6					Maximum	2.360854
75					Second Largest	8					Second Largest	2.0794415
76					First Quartile	5.6					First Quartile	1.7227666
77					Median	6.425					Median	1.8600073
78					Third Quartile	7.875					Third Quartile	2.0633069
79					Mean	6.6458333					Mean	1.8583245
80					SD	1.8324671					SD	0.282804
81					Coefficient of Variation	0.2757317						
82					Skewness	0.5045596						
83												
84	**Background Statistics**											
85	**Normal Distribution Test**						**Lognormal Distribution Test**					
86					Shapiro Wilk Test Statistic	0.9638704					Shapiro Wilk Test Statistic	0.9706171
87					Shapiro Wilk Critical Value	0.859					Shapiro Wilk Critical Value	0.859
88	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
89												
90	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
91					95% UTL with	95% Coverage	11.659463			95% UTL with	95% Coverage	13.902603
92					95% UPL (t)	10.07111					95% UPL (t)	10.880218
93					90% Percentile (z)	8.9942344					90% Percentile (z)	9.2142607
94					95% Percentile (z)	9.6599735					95% Percentile (z)	10.211307
95					99% Percentile (z)	10.908789					99% Percentile (z)	12.381766
96												
97	**Gamma Distribution Test**						**Data Distribution Test**					
98					k star	10.693382	**Data appear Normal at 5% Significance Level**					
99					Theta Star	0.6214903						
100					MLE of Mean	6.6458333						
101					MLE of Standard Deviation	2.0323192						
102					nu star	256.64116						
103												
104					A-D Test Statistic	0.2175539	**Nonparametric Statistics**					
105					5% A-D Critical Value	0.7309527					90% Percentile	9.82
106					K-S Test Statistic	0.1289335					95% Percentile	10.6
107					5% K-S Critical Value	0.2453047					99% Percentile	10.6
108	**Data appear Gamma Distributed at 5% Significance Level**											
109												
110	**Assuming Gamma Distribution**									95% UTL with	95% Coverage	10.6

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
111					90% Percentile	9.3469257			95% Percentile Bootstrap UTL with		95% Coverage	10.6
112					95% Percentile	10.303142			95% BCA Bootstrap UTL with		95% Coverage	10.6
113					99% Percentile	12.26141					95% UPL	10.6
114											95% Chebyshev UPL	14.959527
115					95% WH Approx. Gamma UPL	10.507517					Upper Threshold Limit Based upon IQR	11.2875
116					95% HW Approx. Gamma UPL	10.587859						
117			95% WH Approx. Gamma UTL with		95% Coverage	12.828225						
118			95% HW Approx. Gamma UTL with		95% Coverage	13.051842						
119												
120	**Note: UPL represents a preferred estimate of BTV**											
121												
122												
123	**Barium**											
124												
125	**General Statistics**											
126					Total Number of Observations	12				Number of Distinct Observations		10
127												
128	**Raw Statistics**						**Log-Transformed Statistics**					
129					Minimum	77.8					Minimum	4.3541414
130					Maximum	111					Maximum	4.7095302
131					Second Largest	111					Second Largest	4.7095302
132					First Quartile	85.2					First Quartile	4.4445469
133					Median	94.6					Median	4.5494764
134					Third Quartile	110.25					Third Quartile	4.7026805
135					Mean	95.733333					Mean	4.5539199
136					SD	12.294221					SD	0.1295717
137					Coefficient of Variation	0.1284215						
138					Skewness	0.0181918						
139												
140	**Background Statistics**											
141	**Normal Distribution Test**						**Lognormal Distribution Test**					
142					Shapiro Wilk Test Statistic	0.9053608					Shapiro Wilk Test Statistic	0.9109708
143					Shapiro Wilk Critical Value	0.859					Shapiro Wilk Critical Value	0.859
144	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
145												
146	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
147					95% UTL with	95% Coverage 129.37032					95% UTL with	95% Coverage 135.42636
148					95% UPL (t)	118.71389					95% UPL (t)	121.03956
149					90% Percentile (z)	111.48901					90% Percentile (z)	112.16519
150					95% Percentile (z)	115.95553					95% Percentile (z)	117.57147
151					99% Percentile (z)	124.33397					99% Percentile (z)	128.42547
152												
153	**Gamma Distribution Test**						**Data Distribution Test**					
154					k star	49.221485	**Data appear Normal at 5% Significance Level**					
155					Theta Star	1.9449501						
156					MLE of Mean	95.733333						
157					MLE of Standard Deviation	13.645386						
158					nu star	1181.3156						
159												
160					A-D Test Statistic	0.4279524	**Nonparametric Statistics**					
161					5% A-D Critical Value	0.7301184					90% Percentile	111
162					K-S Test Statistic	0.1834513					95% Percentile	111
163					5% K-S Critical Value	0.24495					99% Percentile	111
164	**Data appear Gamma Distributed at 5% Significance Level**											
165												

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
166	**Assuming Gamma Distribution**										95% UTL with	95% Coverage 111
167					90% Percentile	113.58401					95% Percentile Bootstrap UTL with	95% Coverage 111
168					95% Percentile	119.22819					95% BCA Bootstrap UTL with	95% Coverage 111
169					99% Percentile	130.30413						95% UPL 111
170												95% Chebyshev UPL 151.51081
171					95% WH Approx. Gamma UPL	120.16051					Upper Threshold Limit Based upon IQR	147.825
172					95% HW Approx. Gamma UPL	120.36917						
173			95% WH Approx. Gamma UTL with		95% Coverage	133.05383						
174			95% HW Approx. Gamma UTL with		95% Coverage	133.60704						
175												
176	**Note: UPL represents a preferred estimate of BTV**											
177												
178												
179	**Beryllium**											
180												
181	**General Statistics**											
182					Total Number of Observations	12					Number of Distinct Observations	9
183												
184	**Raw Statistics**						**Log-Transformed Statistics**					
185					Minimum	0.75					Minimum	-0.287682
186					Maximum	1.3					Maximum	0.2623643
187					Second Largest	1.2					Second Largest	0.1823216
188					First Quartile	0.8025					First Quartile	-0.22038
189					Median	0.95					Median	-0.051792
190					Third Quartile	1.2					Third Quartile	0.1823216
191					Mean	0.9870833					Mean	-0.030106
192					SD	0.1922884					SD	0.1923925
193					Coefficient of Variation	0.1948046						
194					Skewness	0.4000136						
195												
196												
197	**Background Statistics**											
198	**Normal Distribution Test**						**Lognormal Distribution Test**					
199					Shapiro Wilk Test Statistic	0.897309					Shapiro Wilk Test Statistic	0.9110669
200					Shapiro Wilk Critical Value	0.859					Shapiro Wilk Critical Value	0.859
201	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
202												
203	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
204					95% UTL with	95% Coverage 1.5131843					95% UTL with	95% Coverage 1.6426
205					95% UPL (t)	1.3465118						95% UPL (t) 1.3902973
206					90% Percentile (z)	1.2335108						90% Percentile (z) 1.2416677
207					95% Percentile (z)	1.3033695						95% Percentile (z) 1.331561
208					99% Percentile (z)	1.4344129						99% Percentile (z) 1.5181103
209												
210	**Gamma Distribution Test**						**Data Distribution Test**					
211					k star	22.103555	**Data appear Normal at 5% Significance Level**					
212					Theta Star	0.0446572						
213					MLE of Mean	0.9870833						
214					MLE of Standard Deviation	0.2099533						
215					nu star	530.48531						
216												
217					A-D Test Statistic	0.521935	**Nonparametric Statistics**					
218					5% A-D Critical Value	0.7311615					90% Percentile	1.27
219					K-S Test Statistic	0.209318					95% Percentile	1.3
220					5% K-S Critical Value	0.2451217					99% Percentile	1.3

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
221	**Data appear Gamma Distributed at 5% Significance Level**											
222												
223	**Assuming Gamma Distribution**									95% UTL with	95% Coverage	1.3
224					90% Percentile	1.263891			95% Percentile Bootstrap UTL with		95% Coverage	1.3
225					95% Percentile	1.3558932			95% BCA Bootstrap UTL with		95% Coverage	1.3
226					99% Percentile	1.5399613					95% UPL	1.3
227											95% Chebyshev UPL	1.8594736
228					95% WH Approx. Gamma UPL	1.3729947				Upper Threshold Limit Based upon IQR		1.79625
229					95% HW Approx. Gamma UPL	1.3770185						
230			95% WH Approx. Gamma UTL with		95% Coverage	1.588878						
231			95% HW Approx. Gamma UTL with		95% Coverage	1.6010348						
232												
233	**Note: UPL represents a preferred estimate of BTV**											
234												
235												
236	**Calcium**											
237												
238	**General Statistics**											
239					Total Number of Observations	12			Number of Distinct Observations			12
240												
241	**Raw Statistics**						**Log-Transformed Statistics**					
242					Minimum	614					Minimum	6.4199949
243					Maximum	1600					Maximum	7.3777589
244					Second Largest	1530					Second Largest	7.333023
245					First Quartile	736.5					First Quartile	6.6017124
246					Median	926.5					Median	6.831323
247					Third Quartile	1415					Third Quartile	7.2489591
248					Mean	1017.0833					Mean	6.8727874
249					SD	351.52045					SD	0.3322834
250					Coefficient of Variation	0.3456162						
251					Skewness	0.7225774						
252												
253	**Background Statistics**											
254	**Normal Distribution Test**						**Lognormal Distribution Test**					
255					Shapiro Wilk Test Statistic	0.8719154					Shapiro Wilk Test Statistic	0.9156678
256					Shapiro Wilk Critical Value	0.859					Shapiro Wilk Critical Value	0.859
257	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
258												
259	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
260					95% UTL with	95% Coverage 1978.8433					95% UTL with	95% Coverage 2396.8599
261					95% UPL (t)	1674.1511					95% UPL (t)	1797.0414
262					90% Percentile (z)	1467.5749					90% Percentile (z)	1478.267
263					95% Percentile (z)	1595.283					95% Percentile (z)	1667.9406
264					99% Percentile (z)	1834.8422					99% Percentile (z)	2091.8292
265												
266	**Gamma Distribution Test**						**Data Distribution Test**					
267					k star	7.402806	**Data appear Normal at 5% Significance Level**					
268					Theta Star	137.3916						
269					MLE of Mean	1017.0833						
270					MLE of Standard Deviation	373.8164						
271					nu star	177.66734						
272												
273					A-D Test Statistic	0.5214817	**Nonparametric Statistics**					
274					5% A-D Critical Value	0.7303688					90% Percentile	1579
275					K-S Test Statistic	0.189862					95% Percentile	1600

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
276					5% K-S Critical Value	0.2454024					99% Percentile	1600
277	**Data appear Gamma Distributed at 5% Significance Level**											
278												
279	**Assuming Gamma Distribution**									95% UTL with	95% Coverage	1600
280					90% Percentile	1515.8541			95% Percentile Bootstrap UTL with		95% Coverage	1600
281					95% Percentile	1699.6583			95% BCA Bootstrap UTL with		95% Coverage	1600
282					99% Percentile	2081.4715					95% UPL	1600
283											95% Chebyshev UPL	2611.8915
284				95% WH Approx. Gamma UPL		1742.5808				Upper Threshold Limit Based upon IQR		2432.75
285				95% HW Approx. Gamma UPL		1754.521						
286			95% WH Approx. Gamma UTL with		95% Coverage	2199.1794						
287			95% HW Approx. Gamma UTL with		95% Coverage	2240.4992						
288												
289	**Note: UPL represents a preferred estimate of BTV**											
290												
291												
292	**Chromium**											
293												
294	**General Statistics**											
295					Total Number of Observations	12				Number of Distinct Observations		12
296												
297	**Raw Statistics**						**Log-Transformed Statistics**					
298					Minimum	12.4					Minimum	2.5176965
299					Maximum	20.8					Maximum	3.034953
300					Second Largest	17.9					Second Largest	2.8848007
301					First Quartile	13.575					First Quartile	2.6081844
302					Median	15.225					Median	2.7229267
303					Third Quartile	15.975					Third Quartile	2.7710213
304					Mean	15.345833					Mean	2.7214663
305					SD	2.2757075					SD	0.1407308
306					Coefficient of Variation	0.1482948						
307					Skewness	1.2344944						
308												
309	**Background Statistics**											
310	**Normal Distribution Test**						**Lognormal Distribution Test**					
311					Shapiro Wilk Test Statistic	0.9091733					Shapiro Wilk Test Statistic	0.9479538
312					Shapiro Wilk Critical Value	0.859					Shapiro Wilk Critical Value	0.859
313	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
314												
315	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
316					95% UTL with	95% Coverage	21.572169			95% UTL with	95% Coverage	22.342838
317					95% UPL (t)	19.599623					95% UPL (t)	19.777059
318					90% Percentile (z)	18.26227					90% Percentile (z)	18.207255
319					95% Percentile (z)	19.089039					95% Percentile (z)	19.162359
320					99% Percentile (z)	20.639921					99% Percentile (z)	21.091184
321												
322	**Gamma Distribution Test**						**Data Distribution Test**					
323					k star	40.168758	**Data appear Normal at 5% Significance Level**					
324					Theta Star	0.382034						
325					MLE of Mean	15.345833						
326					MLE of Standard Deviation	2.421287						
327					nu star	964.0502						
328												
329					A-D Test Statistic	0.3346253	**Nonparametric Statistics**					
330					5% A-D Critical Value	0.7297394					90% Percentile	19.93

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
331					K-S Test Statistic	0.1954262					95% Percentile	20.8
332					5% K-S Critical Value	0.24495					99% Percentile	20.8
333	**Data appear Gamma Distributed at 5% Significance Level**											
334												
335	**Assuming Gamma Distribution**									95% UTL with	95% Coverage	20.8
336					90% Percentile	18.519102			95% Percentile Bootstrap UTL with		95% Coverage	20.8
337					95% Percentile	19.533586			95% BCA Bootstrap UTL with		95% Coverage	20.8
338					99% Percentile	21.533045					95% UPL	20.8
339											95% Chebyshev UPL	25.670459
340					95% WH Approx. Gamma UPL	19.702995			Upper Threshold Limit Based upon IQR			19.575
341					95% HW Approx. Gamma UPL	19.719933						
342			95% WH Approx. Gamma UTL with		95% Coverage	22.03327						
343			95% HW Approx. Gamma UTL with		95% Coverage	22.104758						
344												
345	**Note: UPL represents a preferred estimate of BTV**											
346												
347												
348	**Cobalt**											
349												
350	**General Statistics**											
351					Total Number of Observations	12			Number of Distinct Observations			10
352												
353	**Raw Statistics**						**Log-Transformed Statistics**					
354					Minimum	6.8					Minimum	1.9169226
355					Maximum	9.3					Maximum	2.2300144
356					Second Largest	8.5					Second Largest	2.1400662
357					First Quartile	7.025					First Quartile	1.9494563
358					Median	8.175					Median	2.101076
359					Third Quartile	8.45					Third Quartile	2.1341135
360					Mean	7.9041667					Mean	2.0627819
361					SD	0.7875331					SD	0.1006189
362					Coefficient of Variation	0.0996352						
363					Skewness	-0.069607						
364												
365	**Background Statistics**											
366	**Normal Distribution Test**						**Lognormal Distribution Test**					
367					Shapiro Wilk Test Statistic	0.9093368					Shapiro Wilk Test Statistic	0.9023803
368					Shapiro Wilk Critical Value	0.859					Shapiro Wilk Critical Value	0.859
369	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
370												
371	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
372					95% UTL with	95% Coverage	10.058857			95% UTL with	95% Coverage	10.361273
373					95% UPL (t)	9.3762362					95% UPL (t)	9.4959016
374					90% Percentile (z)	8.9134309					90% Percentile (z)	8.9506857
375					95% Percentile (z)	9.1995433					95% Percentile (z)	9.2839322
376					99% Percentile (z)	9.7362425					99% Percentile (z)	9.9428766
377												
378	**Gamma Distribution Test**						**Data Distribution Test**					
379					k star	81.557584	**Data appear Normal at 5% Significance Level**					
380					Theta Star	0.0969152						
381					MLE of Mean	7.9041667						
382					MLE of Standard Deviation	0.8752335						
383					nu star	1957.382						
384												
385					A-D Test Statistic	0.6191875	**Nonparametric Statistics**					

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
386					5% A-D Critical Value	0.7312					90% Percentile	9.06
387					K-S Test Statistic	0.221221					95% Percentile	9.3
388					5% K-S Critical Value	0.24495					99% Percentile	9.3
389	**Data appear Gamma Distributed at 5% Significance Level**											
390												
391	**Assuming Gamma Distribution**									95% UTL with	95% Coverage	9.3
392					90% Percentile	9.0445234			95% Percentile Bootstrap UTL with		95% Coverage	9.3
393					95% Percentile	9.3967547			95% BCA Bootstrap UTL with		95% Coverage	9.3
394					99% Percentile	10.081537					95% UPL	9.3
395											95% Chebyshev UPL	11.477114
396					95% WH Approx. Gamma UPL	9.4516779				Upper Threshold Limit Based upon IQR		10.5875
397					95% HW Approx. Gamma UPL	9.4622848						
398			95% WH Approx. Gamma UTL with		95% Coverage	10.246388						
399			95% HW Approx. Gamma UTL with		95% Coverage	10.273581						
400												
401	**Note: UPL represents a preferred estimate of BTV**											
402												
403												
404	**Copper**											
405												
406	**General Statistics**											
407					Total Number of Observations	12				Number of Distinct Observations		10
408												
409	**Raw Statistics**						**Log-Transformed Statistics**					
410					Minimum	8					Minimum	2.0794415
411					Maximum	13.4					Maximum	2.5952547
412					Second Largest	12.7					Second Largest	2.541602
413					First Quartile	9.425					First Quartile	2.2431064
414					Median	10.7					Median	2.3702437
415					Third Quartile	11.85					Third Quartile	2.472301
416					Mean	10.695833					Mean	2.3602304
417					SD	1.5407286					SD	0.1455515
418					Coefficient of Variation	0.1440494						
419					Skewness	0.1378465						
420												
421	**Background Statistics**											
422	**Normal Distribution Test**						**Lognormal Distribution Test**					
423					Shapiro Wilk Test Statistic	0.9799339					Shapiro Wilk Test Statistic	0.9793332
424					Shapiro Wilk Critical Value	0.859					Shapiro Wilk Critical Value	0.859
425	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
426												
427	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
428					95% UTL with	95% Coverage	14.911267				95% UTL with	95% Coverage	15.775519
429					95% UPL (t)	13.575788					95% UPL (t)	13.905683
430					90% Percentile (z)	12.670357					90% Percentile (z)	12.765704
431					95% Percentile (z)	13.230106					95% Percentile (z)	13.45891
432					99% Percentile (z)	14.280104					99% Percentile (z)	14.862389
433												
434	**Gamma Distribution Test**						**Data Distribution Test**					
435					k star	39.145996	**Data appear Normal at 5% Significance Level**					
436					Theta Star	0.2732293						
437					MLE of Mean	10.695833						
438					MLE of Standard Deviation	1.7095073						
439					nu star	939.5039						
440												

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
441					A-D Test Statistic	0.1790196	**Nonparametric Statistics**					
442					5% A-D Critical Value	0.7296966					90% Percentile	13.19
443					K-S Test Statistic	0.1337224					95% Percentile	13.4
444					5% K-S Critical Value	0.24495					99% Percentile	13.4
445	**Data appear Gamma Distributed at 5% Significance Level**											
446												
447	**Assuming Gamma Distribution**									95% UTL with	95% Coverage	13.4
448					90% Percentile	12.9368			95% Percentile Bootstrap UTL with		95% Coverage	13.4
449					95% Percentile	13.654287			95% BCA Bootstrap UTL with		95% Coverage	13.4
450					99% Percentile	15.069208					95% UPL	13.4
451											95% Chebyshev UPL	17.685943
452					95% WH Approx. Gamma UPL	13.776082					Upper Threshold Limit Based upon IQR	15.4875
453					95% HW Approx. Gamma UPL	13.80633						
454			95% WH Approx. Gamma UTL with		95% Coverage	15.425791						
455			95% HW Approx. Gamma UTL with		95% Coverage	15.506071						
456												
457	**Note: UPL represents a preferred estimate of BTV**											
458												
459												
460	**Cyanide**											
461												
462	**General Statistics**											
463					Number of Valid Data	12				Number of Detected Data		2
464					Number of Distinct Detected Data	2				Number of Non-Detect Data		10
465										Percent Non-Detects		83.33%
466												
467	**Raw Statistics**						**Log-transformed Statistics**					
468					Minimum Detected	0.7				Minimum Detected		-0.356675
469					Maximum Detected	3.8				Maximum Detected		1.3350011
470					Mean of Detected	2.25				Mean of Detected		0.4891631
471					SD of Detected	2.192031				SD of Detected		1.1961956
472					Minimum Non-Detect	0.64				Minimum Non-Detect		-0.446287
473					Maximum Non-Detect	0.7				Maximum Non-Detect		-0.356675
474												
475	**Data with Multiple Detection Limits**						**Single Detection Limit Scenario**					
476	Note: Data have multiple DLs - Use of KM Method is recommended									Number treated as Non-Detect with Single DL		10
477	For all methods (except KM, DL/2, and ROS Methods),									Number treated as Detected with Single DL		2
478	Observations < Largest ND are treated as NDs									Single DL Non-Detect Percentage		83.33%
479												
480												
481	**Warning: Data set has only 2 Distinct Detected Values.**											
482	**This may not be adequate enough to compute meaningful and reliable test statistics and estimates.**											
483	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
484												
485	**Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.**											
486												
487	**The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.**											
488	**Those methods will return a 'N/A' value on your output display!**											
489												
490	**It is necessary to have 4 or more Distinct Values for bootstrap methods.**											
491	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
492	**It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.**											
493												
494	**Background Statistics**											
495	**Normal Distribution Test with Detected Values Only**						**Lognormal Distribution Test with Detected Values Only**					

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
496					Shapiro Wilk Test Statistic	N/A					Shapiro Wilk Test Statistic	N/A
497					5% Shapiro Wilk Critical Value	N/A					5% Shapiro Wilk Critical Value	N/A
498	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
499												
500	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
501					DL/2 Substitution Method						DL/2 Substitution Method	
502					Mean	0.6491667					Mean (Log Scale)	-0.845206
503					SD	0.998009					SD (Log Scale)	0.7205911
504				95% UTL	95% Coverage	3.3797193				95% UTL	95% Coverage	3.0843202
505					95% UPL (t)	2.5146612					95% UPL (t)	1.6515836
506					90% Percentile (z)	1.9281667					90% Percentile (z)	1.0814132
507					95% Percentile (z)	2.2907454					95% Percentile (z)	1.4050332
508					99% Percentile (z)	2.9708828					99% Percentile (z)	2.2959337
509												
510					Maximum Likelihood Estimate(MLE) Method	N/A					Log ROS Method	
511											Mean in Original Scale	N/A
512											SD in Original Scale	N/A
513											Mean in Log Scale	N/A
514											SD in Log Scale	N/A
515										95% UTL	95% Coverage	N/A
516											95% UPL (t)	N/A
517											90% Percentile (z)	N/A
518											95% Percentile (z)	N/A
519											99% Percentile (z)	N/A
520												
521	**Gamma Distribution Test with Detected Values Only**						**Data Distribution Test with Detected Values Only**					
522					k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)					
523					Theta Star	N/A						
524					nu star	N/A						
525												
526					A-D Test Statistic	N/A	**Nonparametric Statistics**					
527					5% A-D Critical Value	N/A					Kaplan-Meier (KM) Method	
528					K-S Test Statistic	N/A					Mean	0.9583333
529					5% K-S Critical Value	N/A					SD	0.8567947
530	**Data not Gamma Distributed at 5% Significance Level**										SE of Mean	0.349785
531										95% KM UTL with	95% Coverage	3.3025237
532	**Assuming Gamma Distribution**										95% KM Chebyshev UPL	4.8455133
533				Gamma ROS Statistics with Extrapolated Data							95% KM UPL (t)	2.5598679
534					Mean	N/A					90% Percentile (z)	2.05636
535					Median	N/A					95% Percentile (z)	2.3676353
536					SD	N/A					99% Percentile (z)	2.951536
537					k star	N/A						
538					Theta star	N/A	**Gamma ROS Limits with Extrapolated Data**					
539					Nu star	N/A				95% Wilson Hilferty (WH) Approx. Gamma UPL		N/A
540				95% Percentile of Chisquare (2k)		N/A				95% Hawkins Wixley (HW) Approx. Gamma UPL		N/A
541										95% WH Approx. Gamma UTL with	95% Coverage	N/A
542					90% Percentile	N/A				95% HW Approx. Gamma UTL with	95% Coverage	N/A
543					95% Percentile	N/A						
544					99% Percentile	N/A						
545												
546	**Note: UPL represents a preferred estimate of BTV**											
547	**For an Example: KM-UPL may be used when multiple detection limits are present**											
548	**Note: DL/2 is not a recommended method.**											
549												
550												

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

551	**Iron**											
552												
553	**General Statistics**											
554	Total Number of Observations					12	Number of Distinct Observations					11
555												
556	**Raw Statistics**						**Log-Transformed Statistics**					
557	Minimum					12350	Minimum					9.4214113
558	Maximum					17600	Maximum					9.7756542
559	Second Largest					16900	Second Largest					9.7350689
560	First Quartile					13225	First Quartile					9.4898589
561	Median					14800	Median					9.6012627
562	Third Quartile					16450	Third Quartile					9.707727
563	Mean					14812.5	Mean					9.5967493
564	SD					1760.1814	SD					0.1189206
565	Coefficient of Variation					0.1188308						
566	Skewness					0.1469457						
567												
568	**Background Statistics**											
569	**Normal Distribution Test**						**Lognormal Distribution Test**					
570	Shapiro Wilk Test Statistic					0.9360444	Shapiro Wilk Test Statistic					0.9377696
571	Shapiro Wilk Critical Value					0.859	Shapiro Wilk Critical Value					0.859
572	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
573												
574	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
575	95% UTL with 95% Coverage					19628.356	95% UTL with 95% Coverage					20376.064
576	95% UPL (t)					18102.66	95% UPL (t)					18380.354
577	90% Percentile (z)					17068.263	90% Percentile (z)					17139.692
578	95% Percentile (z)					17707.741	95% Percentile (z)					17896.427
579	99% Percentile (z)					18907.294	99% Percentile (z)					19407.213
580												
581	**Gamma Distribution Test**						**Data Distribution Test**					
582	k star					58.074034	**Data appear Normal at 5% Significance Level**					
583	Theta Star					255.06236						
584	MLE of Mean					14812.5						
585	MLE of Standard Deviation					1943.7364						
586	nu star					1393.7768						
587												
588	A-D Test Statistic					0.382915	**Nonparametric Statistics**					
589	5% A-D Critical Value					0.730489	90% Percentile					17390
590	K-S Test Statistic					0.169973	95% Percentile					17600
591	5% K-S Critical Value					0.24495	99% Percentile					17600
592	**Data appear Gamma Distributed at 5% Significance Level**											
593												
594	**Assuming Gamma Distribution**						95% UTL with 95% Coverage					17600
595	90% Percentile					17351.711	95% Percentile Bootstrap UTL with 95% Coverage					17600
596	95% Percentile					18147.973	95% BCA Bootstrap UTL with 95% Coverage					17600
597	99% Percentile					19705.419	95% UPL					17600
598							95% Chebyshev UPL					22798.242
599	95% WH Approx. Gamma UPL					18276.779	Upper Threshold Limit Based upon IQR					21287.5
600	95% HW Approx. Gamma UPL					18301.515						
601	95% WH Approx. Gamma UTL with 95% Coverage					20087.785						
602	95% HW Approx. Gamma UTL with 95% Coverage					20155.533						
603												
604	**Note: UPL represents a preferred estimate of BTV**											
605												

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

606												
607	**Lead**											
608												
609	**General Statistics**											
610					Total Number of Observations	12				Number of Distinct Observations		12
611												
612	**Raw Statistics**						**Log-Transformed Statistics**					
613					Minimum	16.3				Minimum		2.7911651
614					Maximum	64.7				Maximum		4.1697612
615					Second Largest	56.7				Second Largest		4.0377742
616					First Quartile	19.75				First Quartile		2.9829171
617					Median	27.1				Median		3.2970699
618					Third Quartile	32.975				Third Quartile		3.4953611
619					Mean	30.641667				Mean		3.3305784
620					SD	15.167277				SD		0.4277679
621					Coefficient of Variation	0.4949886						
622					Skewness	1.539711						
623												
624	**Background Statistics**											
625	**Normal Distribution Test**						**Lognormal Distribution Test**					
626					Shapiro Wilk Test Statistic	0.8041006				Shapiro Wilk Test Statistic		0.9161001
627					Shapiro Wilk Critical Value	0.859				Shapiro Wilk Critical Value		0.859
628	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
629												
630	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
631					95% UTL with 95% Coverage	72.139336				95% UTL with 95% Coverage		90.102817
632					95% UPL (t)	58.992586				95% UPL (t)		62.188439
633					90% Percentile (z)	50.079314				90% Percentile (z)		48.365417
634					95% Percentile (z)	55.589617				95% Percentile (z)		56.497365
635					99% Percentile (z)	65.926029				99% Percentile (z)		75.619591
636												
637	**Gamma Distribution Test**						**Data Distribution Test**					
638					k star	4.262331	**Data appear Gamma Distributed at 5% Significance Level**					
639					Theta Star	7.1889459						
640					MLE of Mean	30.641667						
641					MLE of Standard Deviation	14.841876						
642					nu star	102.29594						
643												
644					A-D Test Statistic	0.5902053	**Nonparametric Statistics**					
645					5% A-D Critical Value	0.7317841				90% Percentile		62.3
646					K-S Test Statistic	0.1947549				95% Percentile		64.7
647					5% K-S Critical Value	0.245863				99% Percentile		64.7
648	**Data appear Gamma Distributed at 5% Significance Level**											
649												
650	**Assuming Gamma Distribution**									95% UTL with 95% Coverage		64.7
651					90% Percentile	50.53017				95% Percentile Bootstrap UTL with 95% Coverage		64.7
652					95% Percentile	58.414384				95% BCA Bootstrap UTL with 95% Coverage		64.7
653					99% Percentile	75.201369				95% UPL		64.7
654										95% Chebyshev UPL		99.453871
655					95% WH Approx. Gamma UPL	60.43856				Upper Threshold Limit Based upon IQR		52.8125
656					95% HW Approx. Gamma UPL	60.78572						
657					95% WH Approx. Gamma UTL with 95% Coverage	80.801081						
658					95% HW Approx. Gamma UTL with 95% Coverage	82.633437						
659												
660	**Note: UPL represents a preferred estimate of BTV**											

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

661												
662												
663	**Magnesium**											
664												
665	**General Statistics**											
666	Total Number of Observations					12	Number of Distinct Observations					11
667												
668	**Raw Statistics**						**Log-Transformed Statistics**					
669	Minimum					1300	Minimum					7.1701195
670	Maximum					1940	Maximum					7.5704433
671	Second Largest					1670	Second Largest					7.4205789
672	First Quartile					1380	First Quartile					7.2297608
673	Median					1480	Median					7.2997974
674	Third Quartile					1545	Third Quartile					7.3427634
675	Mean					1500	Mean					7.3076339
676	SD					172.3105	SD					0.1083588
677	Coefficient of Variation					0.1148737						
678	Skewness					1.5640601						
679												
680	**Background Statistics**											
681	**Normal Distribution Test**						**Lognormal Distribution Test**					
682	Shapiro Wilk Test Statistic					0.8687381	Shapiro Wilk Test Statistic					0.9078715
683	Shapiro Wilk Critical Value					0.859	Shapiro Wilk Critical Value					0.859
684	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
685												
686	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
687	95% UTL with 95% Coverage					1971.4415	95% UTL with 95% Coverage					2006.4125
688	95% UPL (t)					1822.0856	95% UPL (t)					1826.5422
689	90% Percentile (z)					1720.8248	90% Percentile (z)					1713.8564
690	95% Percentile (z)					1783.4256	95% Percentile (z)					1782.6714
691	99% Percentile (z)					1900.8542	99% Percentile (z)					1919.2969
692												
693	**Gamma Distribution Test**						**Data Distribution Test**					
694	k star					67.306684	**Data appear Normal at 5% Significance Level**					
695	Theta Star					22.286048						
696	MLE of Mean					1500						
697	MLE of Standard Deviation					182.83619						
698	nu star					1615.3604						
699												
700	A-D Test Statistic					0.4718809	**Nonparametric Statistics**					
701	5% A-D Critical Value					0.7308756	90% Percentile					1859
702	K-S Test Statistic					0.1975096	95% Percentile					1940
703	5% K-S Critical Value					0.24495	99% Percentile					1940
704	**Data appear Gamma Distributed at 5% Significance Level**											
705												
706	**Assuming Gamma Distribution**						95% UTL with 95% Coverage					1940
707	90% Percentile					1738.5665	95% Percentile Bootstrap UTL with 95% Coverage					1940
708	95% Percentile					1812.866	95% BCA Bootstrap UTL with 95% Coverage					1940
709	99% Percentile					1957.7943	95% UPL					1940
710							95% Chebyshev UPL					2281.7531
711	95% WH Approx. Gamma UPL					1824.5183	Upper Threshold Limit Based upon IQR					1792.5
712	95% HW Approx. Gamma UPL					1824.969						
713	95% WH Approx. Gamma UTL with 95% Coverage					1992.8387						
714	95% HW Approx. Gamma UTL with 95% Coverage					1996.0268						
715												

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
716	**Note: UPL represents a preferred estimate of BTV**											
717												
718												
719	**Manganese**											
720												
721	**General Statistics**											
722	Total Number of Observations					12	Number of Distinct Observations					10
723												
724	**Raw Statistics**						**Log-Transformed Statistics**					
725	Minimum					429	Minimum					6.0614569
726	Maximum					1190	Maximum					7.0817086
727	Second Largest					844	Second Largest					6.7381525
728	First Quartile					517.25	First Quartile					6.2484676
729	Median					585.25	Median					6.3687694
730	Third Quartile					679.75	Third Quartile					6.5216659
731	Mean					642.29167	Mean					6.4264328
732	SD					206.27568	SD					0.2774892
733	Coefficient of Variation					0.3211558						
734	Skewness					1.8952158						
735												
736	**Background Statistics**											
737	**Normal Distribution Test**						**Lognormal Distribution Test**					
738	Shapiro Wilk Test Statistic					0.8095002	Shapiro Wilk Test Statistic					0.9090341
739	Shapiro Wilk Critical Value					0.859	Shapiro Wilk Critical Value					0.859
740	**Data not Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
741												
742	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
743	95% UTL with 95% Coverage					1206.6619	95% UTL with 95% Coverage					1320.3383
744	95% UPL (t)					1027.8655	95% UPL (t)					1038.0717
745	90% Percentile (z)					906.64459	90% Percentile (z)					881.87431
746	95% Percentile (z)					981.58497	95% Percentile (z)					975.41396
747	99% Percentile (z)					1122.1607	99% Percentile (z)					1178.4665
748												
749	**Gamma Distribution Test**						**Data Distribution Test**					
750	k star					9.8915001	**Data appear Gamma Distributed at 5% Significance Level**					
751	Theta Star					64.933697						
752	MLE of Mean					642.29167						
753	MLE of Standard Deviation					204.22138						
754	nu star					237.396						
755												
756	A-D Test Statistic					0.584845	**Nonparametric Statistics**					
757	5% A-D Critical Value					0.7307859	90% Percentile					1086.2
758	K-S Test Statistic					0.2070671	95% Percentile					1190
759	5% K-S Critical Value					0.2453239	99% Percentile					1190
760	**Data appear Gamma Distributed at 5% Significance Level**											
761												
762	**Assuming Gamma Distribution**						95% UTL with 95% Coverage					1190
763	90% Percentile					913.94894	95% Percentile Bootstrap UTL with 95% Coverage					1190
764	95% Percentile					1010.8913	95% BCA Bootstrap UTL with 95% Coverage					1190
765	99% Percentile					1209.9942	95% UPL					1190
766							95% Chebyshev UPL					1578.1409
767	95% WH Approx. Gamma UPL					1030.8744	Upper Threshold Limit Based upon IQR					923.5
768	95% HW Approx. Gamma UPL					1032.2317						
769	95% WH Approx. Gamma UTL with 95% Coverage					1266.895						
770	95% HW Approx. Gamma UTL with 95% Coverage					1278.2643						

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95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

771												
772	**Note: UPL represents a preferred estimate of BTV**											
773												
774												
775	**Nickel**											
776												
777	**General Statistics**											
778	Total Number of Observations					12	Number of Distinct Observations					10
779												
780	**Raw Statistics**						**Log-Transformed Statistics**					
781	Minimum					7.4	Minimum					2.00148
782	Maximum					11.2	Maximum					2.4159138
783	Second Largest					10.4	Second Largest					2.3418058
784	First Quartile					9.35	First Quartile					2.2353337
785	Median					9.95	Median					2.2974589
786	Third Quartile					10.4	Third Quartile					2.3418058
787	Mean					9.7916667	Mean					2.2767681
788	SD					0.9538995	SD					0.1044307
789	Coefficient of Variation					0.0974195						
790	Skewness					-1.323802						
791												
792	**Background Statistics**											
793	**Normal Distribution Test**						**Lognormal Distribution Test**					
794	Shapiro Wilk Test Statistic					0.8915729	Shapiro Wilk Test Statistic					0.8498483
795	Shapiro Wilk Critical Value					0.859	Shapiro Wilk Critical Value					0.859
796	**Data appear Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
797												
798	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
799	95% UTL with 95% Coverage					12.401536	95% UTL with 95% Coverage					12.968075
800	95% UPL (t)					11.574711	95% UPL (t)					11.84578
801	90% Percentile (z)					11.014138	90% Percentile (z)					11.140659
802	95% Percentile (z)					11.360692	95% Percentile (z)					11.571455
803	99% Percentile (z)					12.010769	99% Percentile (z)					12.424996
804												
805	**Gamma Distribution Test**						**Data Distribution Test**					
806	k star					78.90179	**Data appear Normal at 5% Significance Level**					
807	Theta Star					0.1240994						
808	MLE of Mean					9.7916667						
809	MLE of Standard Deviation					1.102334						
810	nu star					1893.643						
811												
812	A-D Test Statistic					0.6219576	**Nonparametric Statistics**					
813	5% A-D Critical Value					0.7312	90% Percentile					10.96
814	K-S Test Statistic					0.1723771	95% Percentile					11.2
815	5% K-S Critical Value					0.24495	99% Percentile					11.2
816	**Data appear Gamma Distributed at 5% Significance Level**											
817												
818	**Assuming Gamma Distribution**						95% UTL with 95% Coverage					11.2
819	90% Percentile					11.228266	95% Percentile Bootstrap UTL with 95% Coverage					11.2
820	95% Percentile					11.67261	95% BCA Bootstrap UTL with 95% Coverage					11.2
821	99% Percentile					12.536949	95% UPL					11.2
822							95% Chebyshev UPL					14.1194
823	95% WH Approx. Gamma UPL					11.741988	Upper Threshold Limit Based upon IQR					11.975
824	95% HW Approx. Gamma UPL					11.766486						
825	95% WH Approx. Gamma UTL with 95% Coverage					12.744934						

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95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
826					95% HW Approx. Gamma UTL with	95% Coverage 12.796851						
827												
828	**Note: UPL represents a preferred estimate of BTV**											
829												
830												
831	**Potassium**											
832												
833	**General Statistics**											
834					Number of Valid Data	12			Number of Detected Data	7		
835					Number of Distinct Detected Data	7			Number of Non-Detect Data	5		
836									Percent Non-Detects	41.67%		
837												
838	**Raw Statistics**						**Log-transformed Statistics**					
839					Minimum Detected	436			Minimum Detected	6.0776422		
840					Maximum Detected	771			Maximum Detected	6.6476884		
841					Mean of Detected	599			Mean of Detected	6.3741182		
842					SD of Detected	131.68397			SD of Detected	0.2233492		
843					Minimum Non-Detect	388			Minimum Non-Detect	5.9610053		
844					Maximum Non-Detect	433			Maximum Non-Detect	6.0707377		
845												
846	**Data with Multiple Detection Limits**						**Single Detection Limit Scenario**					
847	Note: Data have multiple DLs - Use of KM Method is recommended								Number treated as Non-Detect with Single DL	5		
848	For all methods (except KM, DL/2, and ROS Methods),								Number treated as Detected with Single DL	7		
849	Observations < Largest ND are treated as NDs								Single DL Non-Detect Percentage	41.67%		
850												
851												
852	**Warning: There are only 7 Detected Values in this data**											
853	**Note: It should be noted that even though bootstrap may be performed on this data set**											
854	**the resulting calculations may not be reliable enough to draw conclusions**											
855												
856	**It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.**											
857												
858	**Background Statistics**											
859	**Normal Distribution Test with Detected Values Only**						**Lognormal Distribution Test with Detected Values Only**					
860					Shapiro Wilk Test Statistic	0.9245662			Shapiro Wilk Test Statistic	0.9270608		
861					5% Shapiro Wilk Critical Value	0.803			5% Shapiro Wilk Critical Value	0.803		
862	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
863												
864	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
865					DL/2 Substitution Method				DL/2 Substitution Method			
866					Mean	433.75			Mean (Log Scale)	5.930549		
867					SD	226.25443			SD (Log Scale)	0.573001		
868					95% UTL 95% Coverage	1052.7821			95% UTL 95% Coverage	1804.9347		
869					95% UPL (t)	856.66845			95% UPL (t)	1098.402		
870					90% Percentile (z)	723.70672			90% Percentile (z)	784.36878		
871					95% Percentile (z)	805.90542			95% Percentile (z)	965.89172		
872					99% Percentile (z)	960.09652			99% Percentile (z)	1427.3125		
873												
874					Maximum Likelihood Estimate(MLE) Method				Log ROS Method			
875					Mean	472.49414			Mean in Original Scale	484.4784		
876					SD	189.37635			SD in Original Scale	171.72369		
877					95% UTL with 95% Coverage	990.62783			95% UTL with 95% Coverage	1183.8431		
878									95% BCA UTL with 95% Coverage	771		
879									95% Bootstrap (%) UTL with 95% Coverage	771		
880					95% UPL (t)	826.47947			95% UPL (t)	876.31736		

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881					90% Percentile (z)	715.18969					90% Percentile (z)	714.65205
882					95% Percentile (z)	783.99051					95% Percentile (z)	810.6769
883					99% Percentile (z)	913.04941					99% Percentile (z)	1026.9649
884												
885	**Gamma Distribution Test with Detected Values Only**						**Data Distribution Test with Detected Values Only**					
886					k star (bias corrected)	13.702959	Data appear Normal at 5% Significance Level					
887					Theta Star	43.713185						
888					nu star	191.84143						
889												
890					A-D Test Statistic	0.3010393	**Nonparametric Statistics**					
891					5% A-D Critical Value	0.7068058					Kaplan-Meier (KM) Method	
892					K-S Test Statistic	0.1719597					Mean	531.08333
893					5% K-S Critical Value	0.3114524					SD	122.99625
894	**Data appear Gamma Distributed at 5% Significance Level**										SE of Mean	38.350818
895										95% KM UTL with	95% Coverage	867.60106
896	**Assuming Gamma Distribution**										95% KM Chebyshev UPL	1089.1033
897			Gamma ROS Statistics with Extrapolated Data								95% KM UPL (t)	760.98991
898					Mean	572.20611					90% Percentile (z)	688.70936
899					Median	534.69466					95% Percentile (z)	733.39415
900					SD	102.7375					99% Percentile (z)	817.21539
901					k star	27.17709						
902					Theta star	21.054723	**Gamma ROS Limits with Extrapolated Data**					
903					Nu star	652.25016				95% Wilson Hilferty (WH) Approx. Gamma UPL		772.29531
904				95% Percentile of Chisquare (2k)		72.563623				95% Hawkins Wixley (HW) Approx. Gamma UPL		773.56978
905										95% WH Approx. Gamma UTL with	95% Coverage	882.36684
906					90% Percentile	716.60606				95% HW Approx. Gamma UTL with	95% Coverage	886.98835
907					95% Percentile	763.9035						
908					99% Percentile	858.0041						
909												
910	**Note: UPL represents a preferred estimate of BTV**											
911	**For an Example: KM-UPL may be used when multiple detection limits are present**											
912	**Note: DL/2 is not a recommended method.**											
913												
914												
915	**Sodium**											
916												
917	**General Statistics**											
918					Number of Valid Data	12					Number of Detected Data	2
919					Number of Distinct Detected Data	2					Number of Non-Detect Data	10
920											Percent Non-Detects	83.33%
921												
922	**Raw Statistics**						**Log-transformed Statistics**					
923					Minimum Detected	112					Minimum Detected	4.7184989
924					Maximum Detected	120					Maximum Detected	4.7874917
925					Mean of Detected	116					Mean of Detected	4.7529953
926					SD of Detected	5.6568542					SD of Detected	0.0487853
927					Minimum Non-Detect	103					Minimum Non-Detect	4.634729
928					Maximum Non-Detect	115					Maximum Non-Detect	4.7449321
929												
930	**Data with Multiple Detection Limits**						**Single Detection Limit Scenario**					
931	Note: Data have multiple DLs - Use of KM Method is recommended										Number treated as Non-Detect with Single DL	11
932	For all methods (except KM, DL/2, and ROS Methods),										Number treated as Detected with Single DL	1
933	Observations < Largest ND are treated as NDs										Single DL Non-Detect Percentage	91.67%
934												
935												

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
936	**Warning: Data set has only 2 Distinct Detected Values.**											
937	**This may not be adequate enough to compute meaningful and reliable test statistics and estimates.**											
938	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
939												
940	**Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.**											
941												
942	**The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.**											
943	**Those methods will return a 'N/A' value on your output display!**											
944												
945	**It is necessary to have 4 or more Distinct Values for bootstrap methods.**											
946	**However, results obtained using 4 to 9 distinct values may not be reliable.**											
947	**It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.**											
948												
949	**Background Statistics**											
950	**Normal Distribution Test with Detected Values Only**						**Lognormal Distribution Test with Detected Values Only**					
951	Shapiro Wilk Test Statistic					N/A	Shapiro Wilk Test Statistic					N/A
952	5% Shapiro Wilk Critical Value					N/A	5% Shapiro Wilk Critical Value					N/A
953	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
954												
955	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
956	DL/2 Substitution Method						DL/2 Substitution Method					
957	Mean					63.708333	Mean (Log Scale)					4.104232
958	SD					24.540744	SD (Log Scale)					0.3049247
959	95% UTL 95% Coverage					130.85181	95% UTL 95% Coverage					139.5616
960	95% UPL (t)					109.58029	95% UPL (t)					107.14706
961	90% Percentile (z)					95.158562	90% Percentile (z)					89.568957
962	95% Percentile (z)					104.07426	95% Percentile (z)					100.06186
963	99% Percentile (z)					120.79864	99% Percentile (z)					123.17339
964												
965	Maximum Likelihood Estimate(MLE) Method					N/A	Log ROS Method					
966							Mean in Original Scale					N/A
967							SD in Original Scale					N/A
968							Mean in Log Scale					N/A
969							SD in Log Scale					N/A
970							95% UTL 95% Coverage					N/A
971							95% UPL (t)					N/A
972							90% Percentile (z)					N/A
973							95% Percentile (z)					N/A
974							99% Percentile (z)					N/A
975												
976	**Gamma Distribution Test with Detected Values Only**						**Data Distribution Test with Detected Values Only**					
977	k star (bias corrected)					N/A	Data do not follow a Discernable Distribution (0.05)					
978	Theta Star					N/A						
979	nu star					N/A						
980												
981	A-D Test Statistic					N/A	**Nonparametric Statistics**					
982	5% A-D Critical Value					N/A	Kaplan-Meier (KM) Method					
983	K-S Test Statistic					N/A	Mean					112.66667
984	5% K-S Critical Value					N/A	SD					2.2110832
985	**Data not Gamma Distributed at 5% Significance Level**						SE of Mean					0.9026709
986							95% KM UTL with 95% Coverage					118.71619
987	**Assuming Gamma Distribution**						95% KM Chebyshev UPL					122.6981
988	Gamma ROS Statistics with Extrapolated Data						95% KM UPL (t)					116.79966
989	Mean					N/A	90% Percentile (z)					115.50028
990	Median					N/A	95% Percentile (z)					116.30357

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95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
991					SD	N/A					99% Percentile (z)	117.81042
992					k star	N/A						
993					Theta star	N/A	**Gamma ROS Limits with Extrapolated Data**					
994					Nu star	N/A				95% Wilson Hilferty (WH) Approx. Gamma UPL		N/A
995				95% Percentile of Chisquare (2k)		N/A				95% Hawkins Wixley (HW) Approx. Gamma UPL		N/A
996										95% WH Approx. Gamma UTL with 95% Coverage		N/A
997					90% Percentile	N/A				95% HW Approx. Gamma UTL with 95% Coverage		N/A
998					95% Percentile	N/A						
999					99% Percentile	N/A						
1000												
1001	**Note: UPL represents a preferred estimate of BTV**											
1002	**For an Example: KM-UPL may be used when multiple detection limits are present**											
1003	**Note: DL/2 is not a recommended method.**											
1004												
1005												
1006	**Thallium**											
1007												
1008	**General Statistics**											
1009					Number of Valid Data	12					Number of Detected Data	7
1010					Number of Distinct Detected Data	5					Number of Non-Detect Data	5
1011											Percent Non-Detects	41.67%
1012												
1013	**Raw Statistics**						**Log-transformed Statistics**					
1014					Minimum Detected	0.25					Minimum Detected	-1.386294
1015					Maximum Detected	0.34					Maximum Detected	-1.07881
1016					Mean of Detected	0.2914286					Mean of Detected	-1.236694
1017					SD of Detected	0.0273426					SD of Detected	0.0931681
1018					Minimum Non-Detect	0.26					Minimum Non-Detect	-1.347074
1019					Maximum Non-Detect	0.27					Maximum Non-Detect	-1.309333
1020												
1021	**Data with Multiple Detection Limits**						**Single Detection Limit Scenario**					
1022	Note: Data have multiple DLs - Use of KM Method is recommended										Number treated as Non-Detect with Single DL	6
1023	For all methods (except KM, DL/2, and ROS Methods),										Number treated as Detected with Single DL	6
1024	Observations < Largest ND are treated as NDs										Single DL Non-Detect Percentage	50.00%
1025												
1026												
1027	**Warning: There are only 7 Detected Values in this data**											
1028	**Note: It should be noted that even though bootstrap may be performed on this data set**											
1029	**the resulting calculations may not be reliable enough to draw conclusions**											
1030												
1031	**It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.**											
1032												
1033	**Background Statistics**											
1034	**Normal Distribution Test with Detected Values Only**						**Lognormal Distribution Test with Detected Values Only**					
1035					Shapiro Wilk Test Statistic	0.9407491					Shapiro Wilk Test Statistic	0.9482677
1036					5% Shapiro Wilk Critical Value	0.803					5% Shapiro Wilk Critical Value	0.803
1037	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1038												
1039	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1040					DL/2 Substitution Method						DL/2 Substitution Method	
1041					Mean	0.2258333					Mean (Log Scale)	-1.558917
1042					SD	0.0835527					SD (Log Scale)	0.4042417
1043					95% UTL 95% Coverage	0.4544336					95% UTL 95% Coverage	0.6357746
1044					95% UPL (t)	0.3820115					95% UPL (t)	0.447848
1045					90% Percentile (z)	0.3329105					90% Percentile (z)	0.3531509

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95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

1046					95% Percentile (z)	0.3632654					95% Percentile (z)	0.4090172
1047					99% Percentile (z)	0.4202061					99% Percentile (z)	0.5387467
1048												
1049				Maximum Likelihood Estimate(MLE) Method							Log ROS Method	
1050					Mean	0.2703827					Mean in Original Scale	0.2727071
1051					SD	0.034725					SD in Original Scale	0.0315958
1052				95% UTL with 95% Coverage		0.3653902					95% UTL with 95% Coverage	0.3696741
1053											95% BCA UTL with 95% Coverage	0.34
1054											95% Bootstrap (%) UTL with 95% Coverage	0.34
1055					95% UPL (t)	0.3352912					95% UPL (t)	0.3350735
1056					90% Percentile (z)	0.3148845					90% Percentile (z)	0.3134762
1057					95% Percentile (z)	0.3275002					95% Percentile (z)	0.3266577
1058					99% Percentile (z)	0.3511651					99% Percentile (z)	0.3528974
1059												
1060				**Gamma Distribution Test with Detected Values Only**							**Data Distribution Test with Detected Values Only**	
1061					k star (bias corrected)	76.722091					Data appear Normal at 5% Significance Level	
1062					Theta Star	0.0037985						
1063					nu star	1074.1093						
1064												
1065					A-D Test Statistic	0.3227564					**Nonparametric Statistics**	
1066					5% A-D Critical Value	0.70765					Kaplan-Meier (KM) Method	
1067					K-S Test Statistic	0.2143155					Mean	0.2741667
1068					5% K-S Critical Value	0.31132					SD	0.0281242
1069				**Data appear Gamma Distributed at 5% Significance Level**							SE of Mean	0.0087693
1070											95% KM UTL with 95% Coverage	0.3511146
1071				**Assuming Gamma Distribution**							95% KM Chebyshev UPL	0.4017631
1072				Gamma ROS Statistics with Extrapolated Data							95% KM UPL (t)	0.3267369
1073					Mean	0.2893677					90% Percentile (z)	0.3102093
1074					Median	0.2895114					95% Percentile (z)	0.3204269
1075					SD	0.0226552					99% Percentile (z)	0.3395934
1076					k star	135.15031						
1077					Theta star	0.0021411					**Gamma ROS Limits with Extrapolated Data**	
1078					Nu star	3243.6075					95% Wilson Hilferty (WH) Approx. Gamma UPL	0.3329447
1079				95% Percentile of Chisquare (2k)		309.64768					95% Hawkins Wixley (HW) Approx. Gamma UPL	0.3331202
1080											95% WH Approx. Gamma UTL with 95% Coverage	0.3548403
1081					90% Percentile	0.32169					95% HW Approx. Gamma UTL with 95% Coverage	0.3553385
1082					95% Percentile	0.3314903						
1083					99% Percentile	0.3504005						
1084												
1085						**Note: UPL represents a preferred estimate of BTV**							
1086						**For an Example: KM-UPL may be used when multiple detection limits are present**							
1087	**Note: DL/2 is not a recommended method.**											
1088												
1089												
1090	**Vanadium**											
1091												
1092						**General Statistics**							
1093					Total Number of Observations	12					Number of Distinct Observations	11
1094												
1095				**Raw Statistics**							**Log-Transformed Statistics**	
1096					Minimum	20.9					Minimum	3.0397492
1097					Maximum	28.2					Maximum	3.339322
1098					Second Largest	28.2					Second Largest	3.339322
1099					First Quartile	23.7125					First Quartile	3.1660019
1100					Median	24.65					Median	3.2047255

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
1101					Third Quartile	26.425					Third Quartile	3.2742984
1102					Mean	24.904167					Mean	3.2116492
1103					SD	2.1324824					SD	0.0861663
1104					Coefficient of Variation	0.0856275						
1105					Skewness	0.0229697						
1106												
1107	**Background Statistics**											
1108	**Normal Distribution Test**						**Lognormal Distribution Test**					
1109					Shapiro Wilk Test Statistic	0.9586657					Shapiro Wilk Test Statistic	0.9587056
1110					Shapiro Wilk Critical Value	0.859					Shapiro Wilk Critical Value	0.859
1111	**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**					
1112												
1113	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1114					95% UTL with 95% Coverage	30.738638					95% UTL with 95% Coverage	31.418599
1115					95% UPL (t)	28.890237					95% UPL (t)	29.15751
1116					90% Percentile (z)	27.637053					90% Percentile (z)	27.717824
1117					95% Percentile (z)	28.411788					95% Percentile (z)	28.599237
1118					99% Percentile (z)	29.865063					99% Percentile (z)	30.328924
1119												
1120	**Gamma Distribution Test**						**Data Distribution Test**					
1121					k star	110.93181	**Data appear Normal at 5% Significance Level**					
1122					Theta Star	0.2244998						
1123					MLE of Mean	24.904167						
1124					MLE of Standard Deviation	2.3645252						
1125					nu star	2662.3635						
1126												
1127					A-D Test Statistic	0.2509196	**Nonparametric Statistics**					
1128					5% A-D Critical Value	0.7312					90% Percentile	28.2
1129					K-S Test Statistic	0.1176315					95% Percentile	28.2
1130					5% K-S Critical Value	0.24495					99% Percentile	28.2
1131	**Data appear Gamma Distributed at 5% Significance Level**											
1132												
1133	**Assuming Gamma Distribution**										95% UTL with 95% Coverage	28.2
1134					90% Percentile	27.978425					95% Percentile Bootstrap UTL with 95% Coverage	28.2
1135					95% Percentile	28.916854					95% BCA Bootstrap UTL with 95% Coverage	28.2
1136					99% Percentile	30.732583					95% UPL	28.2
1137											95% Chebyshev UPL	34.578996
1138					95% WH Approx. Gamma UPL	29.058764					Upper Threshold Limit Based upon IQR	30.49375
1139					95% HW Approx. Gamma UPL	29.082453						
1140				95% WH Approx. Gamma UTL with	95% Coverage	31.162867						
1141				95% HW Approx. Gamma UTL with	95% Coverage	31.223687						
1142												
1143	**Note: UPL represents a preferred estimate of BTV**											
1144												
1145												
1146	**Zinc**											
1147												
1148	**General Statistics**											
1149					Total Number of Observations	12					Number of Distinct Observations	11
1150												
1151	**Raw Statistics**						**Log-Transformed Statistics**					
1152					Minimum	21.7					Minimum	3.0773123
1153					Maximum	597					Maximum	6.3919171
1154					Second Largest	54.2					Second Largest	3.9926809
1155					First Quartile	40.175					First Quartile	3.6913132

APPENDIX K, TABLE K-8
95 PERCENT UPPER TOLERANCE LIMITS ON BACKGROUND SOIL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	A	B	C	D	E	F	G	H	I	J	K	L
1156					Median	47.6					Median	3.8627975
1157					Third Quartile	52.1					Third Quartile	3.9527065
1158					Mean	90.058333					Mean	3.9743227
1159					SD	159.91544					SD	0.8039267
1160					Coefficient of Variation	1.7756873						
1161					Skewness	3.4427792						
1162												
1163	**Background Statistics**											
1164	**Normal Distribution Test**						**Lognormal Distribution Test**					
1165					Shapiro Wilk Test Statistic	0.3799622					Shapiro Wilk Test Statistic	0.6147671
1166					Shapiro Wilk Critical Value	0.859					Shapiro Wilk Critical Value	0.859
1167	**Data not Normal at 5% Significance Level**						**Data not Lognormal at 5% Significance Level**					
1168												
1169	**Assuming Normal Distribution**						**Assuming Lognormal Distribution**					
1170					95% UTL with 95% Coverage	527.58698					95% UTL with 95% Coverage	480.03846
1171					95% UPL (t)	388.97486					95% UPL (t)	239.13674
1172					90% Percentile (z)	294.99822					90% Percentile (z)	149.09687
1173					95% Percentile (z)	353.09583					95% Percentile (z)	199.6697
1174					99% Percentile (z)	462.07728					99% Percentile (z)	345.34224
1175												
1176	**Gamma Distribution Test**						**Data Distribution Test**					
1177					k star	0.8705734	**Data do not follow a Discernable Distribution (0.05)**					
1178					Theta Star	103.44714						
1179					MLE of Mean	90.058333						
1180					MLE of Standard Deviation	96.520863						
1181					nu star	20.893763						
1182												
1183					A-D Test Statistic	2.7934664	**Nonparametric Statistics**					
1184					5% A-D Critical Value	0.7547929					90% Percentile	434.16
1185					K-S Test Statistic	0.4778891					95% Percentile	597
1186					5% K-S Critical Value	0.2518593					99% Percentile	597
1187	**Data not Gamma Distributed at 5% Significance Level**											
1188												
1189	**Assuming Gamma Distribution**										95% UTL with 95% Coverage	597
1190					90% Percentile	214.53872					95% Percentile Bootstrap UTL with 95% Coverage	597
1191					95% Percentile	283.42243					95% BCA Bootstrap UTL with 95% Coverage	597
1192					99% Percentile	445.0312					95% UPL	597
1193											95% Chebyshev UPL	815.57643
1194					95% WH Approx. Gamma UPL	290.0949					Upper Threshold Limit Based upon IQR	69.9875
1195					95% HW Approx. Gamma UPL	276.60461						
1196			95% WH Approx. Gamma UTL with 95% Coverage			488.0013						
1197			95% HW Approx. Gamma UTL with 95% Coverage			483.57179						
1198												
1199	**Note: UPL represents a preferred estimate of BTV**											

Appendix K, Part 2

Lead Modeling Risks

NAS JRB Willow Grove, Pennsylvania

Appendix K, Table K-9
Calculations of Blood Lead Concentrations*, USEPA TRW Adult Lead Model, Version 05/19/05
Current/Future Industrial Worker, Landfill Area Total Soils at Site 3
Reasonable Maximum Exposure
NAS JRB Willow Grove, Willow Grove, Pennsylvania

Exposure Variable	Description of Exposure Variable	Units	Region GSDi and PbBo Data: Northeast/All Ethnic
PbS	Soil lead concentration	ug/g or ppm	322
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	2.0
PbB_0	Baseline PbB	ug/dL	2.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	250
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**3.0**
$PbB_{fetal,\ 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	8.6
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	10.0
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**3.1%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S.D}) + PbB_0$
$PbB_{fetal,\ 0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$
$P(PbB_{fetal} > PbB_t)$ =	$1\text{-}LOGNORMDIST(PbB_t, \mu=LOG_e(PbB_{adult}*R_{\text{-}fetal/maternal}), \sigma=LOG_e(GSD_i))$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Appendix K, Table K-10
Calculations of Blood Lead Concentrations*, USEPA TRW Adult Lead Model, Version 05/19/05
Future Construction Worker, Landfill Area Total Soils at Site 3
Reasonable Maximum Exposure
NAS JRB Willow Grove, Willow Grove, Pennsylvania

Exposure Variable	Description of Exposure Variable	Units	Region GSDi and PbBo Data: Northeast/All Ethnic
PbS	Soil lead concentration	ug/g or ppm	322
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	2.0
PbB_0	Baseline PbB	ug/dL	2.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.330
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	130
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**3.8**
$PbB_{fetal,\ 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	10.7
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	10.0
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**6.1%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S.D}) + PbB_0$
$PbB_{fetal,\ 0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$
$P(PbB_{fetal} > PbB_t)$ =	$1\text{-}LOGNORMDIST(PbB_t, \mu=LOG_e(PbB_{adult}*R_{\text{-}fetal/maternal}), \sigma=LOG_e(GSD_i))$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Appendix K, Table K-11
Calculations of Blood Lead Concentrations*, USEPA TRW Adult Lead Model, Version 05/19/05
Future Construction Worker, Landfill Area Total Soils at Site 3
Central Tendency Exposure
NAS JRB Willow Grove, Willow Grove, Pennsylvania

Exposure Variable	Description of Exposure Variable	Units	Region GSDi and PbBo Data: Northeast/All Ethnic
PbS	Soil lead concentration	ug/g or ppm	322
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	2.0
PbB_0	Baseline PbB	ug/dL	2.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.165
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	43
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**2.3**
$PbB_{fetal,\ 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	6.4
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	10.0
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**1.1%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S.D}) + PbB_0$
$PbB_{fetal,\ 0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$
$P(PbB_{fetal} > PbB_t)$ =	$1\text{-}LOGNORMDIST(PbB_t, \mu=LOG_e(PbB_{adult}*R_{\text{-}fetal/maternal}), \sigma=LOG_e(GSD_i))$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Appendix K, Part 2

Child Lead IEUBK Model Risks

NAS JRB Willow Grove, Pennsylvania

LEAD MODEL FOR WINDOWS Version 1.0

==========

Model Version: 1.0 Build 264
User Name: Tetra Tech NUS, Inc.
Date: 03/25/2010
Site Name: NAS JRB Willow Grove
Operable Unit: Site 3 Landfill Area Total Soil
Run Mode: Site Risk Assessment

Soil/Dust Data
Constant value = 322 ug/g = Average Pb Conc for Landfill Area Total Soil

==========

The time step used in this model run: 1 - Every 4 Hours (6 times a day).

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (ug Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 235.400 ug/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	322.000	235.400
1-2	322.000	235.400
2-3	322.000	235.400
3-4	322.000	235.400
4-5	322.000	235.400
5-6	322.000	235.400
6-7	322.000	235.400

****** Alternate Intake ******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

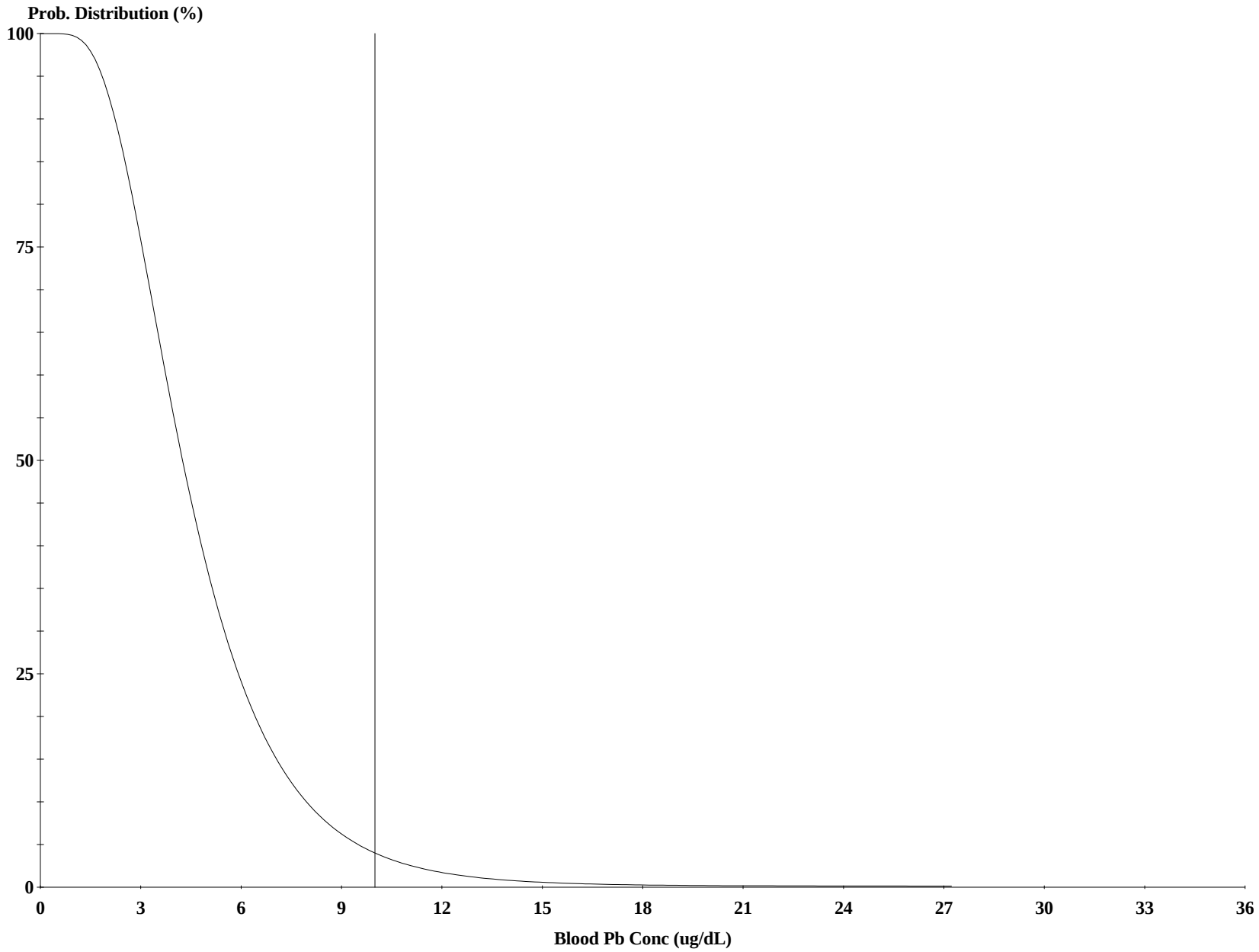
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 2.500 ug Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

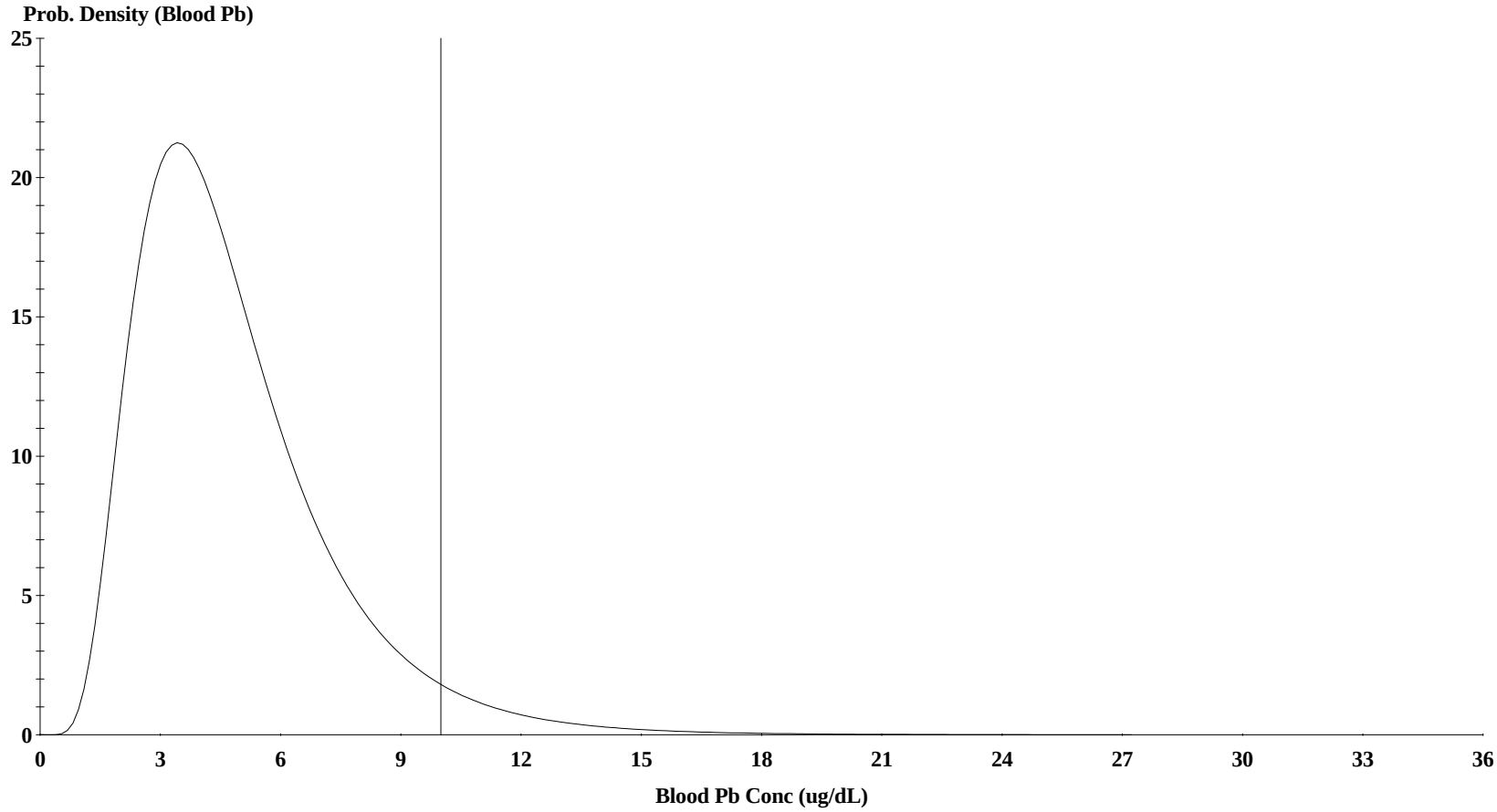
Year	Air (ug/day)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
.5-1	0.021	2.489	0.000	0.360
1-2	0.034	2.568	0.000	0.889
2-3	0.062	2.924	0.000	0.937
3-4	0.067	2.853	0.000	0.969
4-5	0.067	2.820	0.000	1.032
5-6	0.093	3.003	0.000	1.099
6-7	0.093	3.331	0.000	1.123

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	6.298	9.169	4.9
1-2	9.873	13.364	5.5
2-3	10.012	13.934	5.2
3-4	10.160	14.049	4.9
4-5	7.723	11.642	4.1
5-6	7.017	11.213	3.5
6-7	6.658	11.205	3.2



Cutoff = 10.000 ug/dl
Geo Mean = 4.454
GSD = 1.600
% Above = 4.264

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Site Risk Assessment



Cutoff = 10.000 ug/dl
Geo Mean = 4.454
GSD = 1.600
% Above = 4.264
% Below = 95.736

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Site Risk Assessment

LEAD MODEL FOR WINDOWS Version 1.0

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Model Version: 1.0 Build 264
User Name: Tetra Tech NUS, Inc.
Date: 03/25/2010
Site Name: NAS JRB Willow Grove
Operable Unit: Site 3 Landfill Area Total Soil
Run Mode: Site Risk Assessment

Soil/Dust Data
Constant value = 155 ug/g = Weighted concentration for child recreational receptor

==========

The time step used in this model run: 1 - Every 4 Hours (6 times a day).

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (ug Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 118.500 ug/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	155.000	118.500
1-2	155.000	118.500
2-3	155.000	118.500
3-4	155.000	118.500
4-5	155.000	118.500
5-6	155.000	118.500
6-7	155.000	118.500

****** Alternate Intake ******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

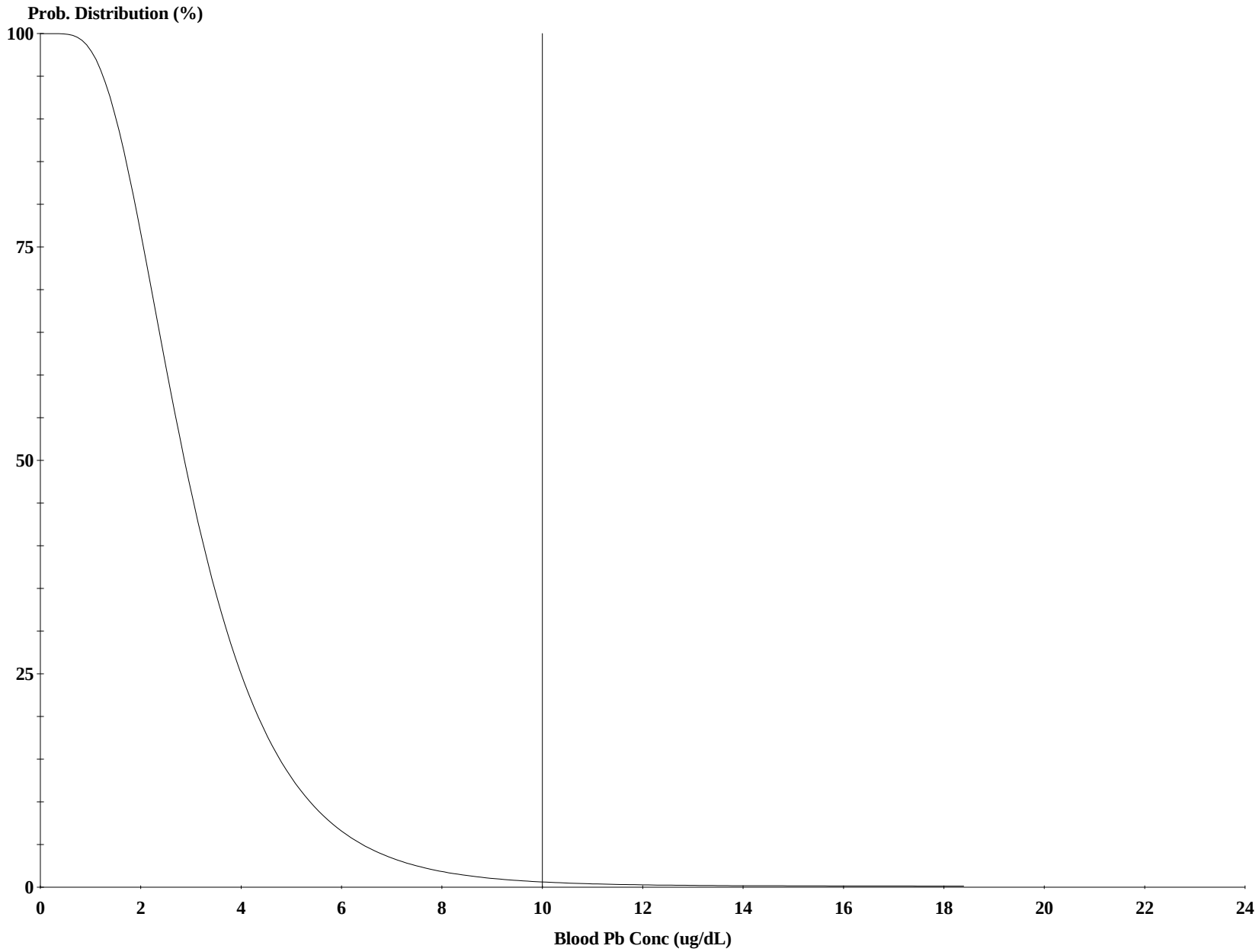
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 2.500 ug Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

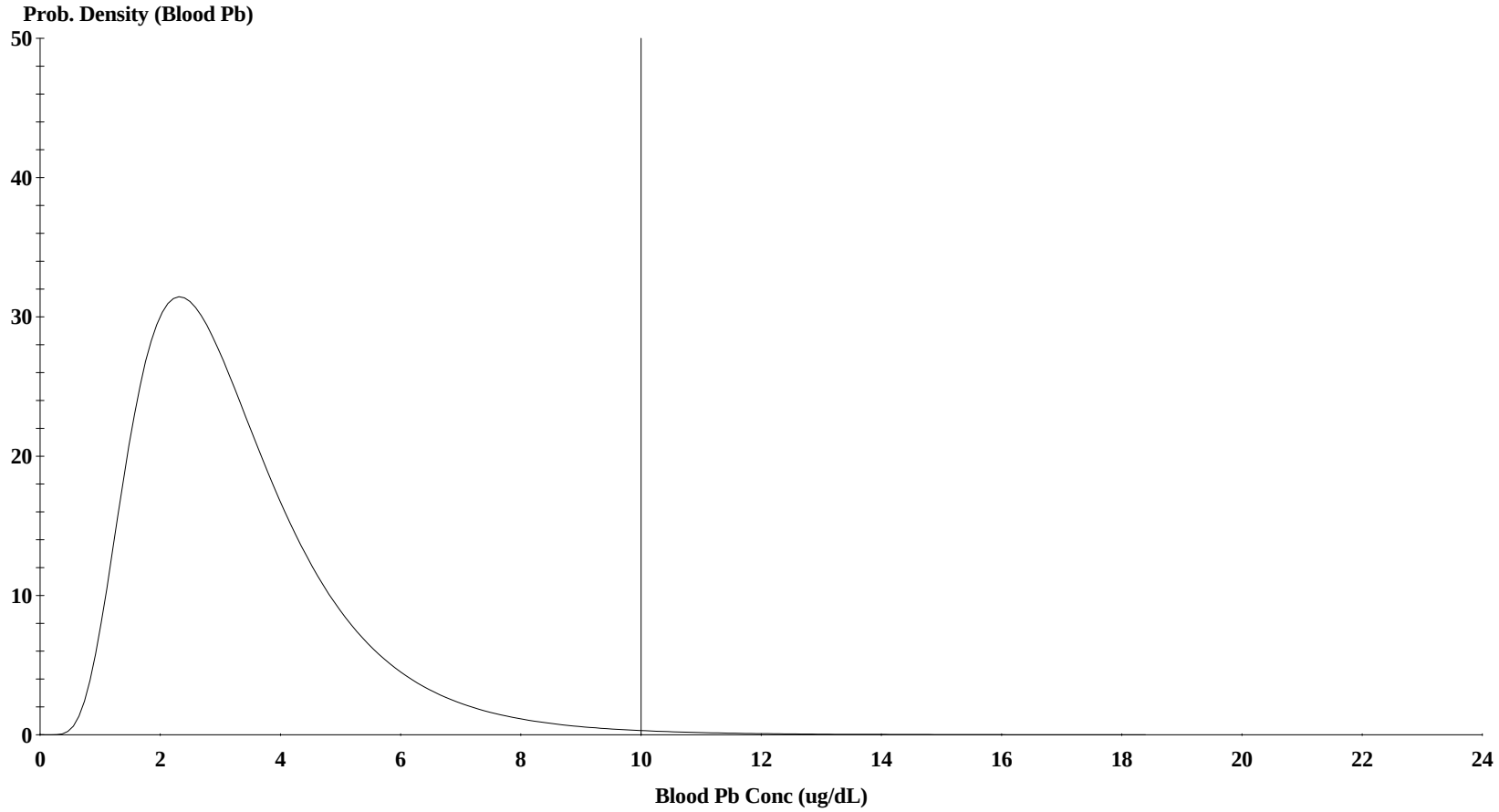
Year	Air (ug/day)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
.5-1	0.021	2.577	0.000	0.373
1-2	0.034	2.678	0.000	0.927
2-3	0.062	3.032	0.000	0.972
3-4	0.067	2.945	0.000	1.000
4-5	0.067	2.879	0.000	1.054
5-6	0.093	3.054	0.000	1.118
6-7	0.093	3.380	0.000	1.140

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	3.207	6.179	3.4
1-2	5.064	8.703	3.6
2-3	5.106	9.171	3.4
3-4	5.157	9.169	3.2
4-5	3.878	7.878	2.8
5-6	3.510	7.775	2.4
6-7	3.323	7.935	2.3



Cutoff = 10.000 ug/dl
Geo Mean = 3.009
GSD = 1.600
% Above = 0.531

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Site Risk Assessment



Cutoff = 10.000 ug/dl
Geo Mean = 3.009
GSD = 1.600
% Above = 0.531
% Below = 99.469

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Site Risk Assessment

Appendix K, Part 3

Groundwater Exposure Support Calculations

NAS JRB Willow Grove, Pennsylvania

APPENDIX K, TABLE K-12

CALCULATION CHECK - ADULT RESIDENT CANCER RISK FROM INHALATION OF SITE 3 GROUNDWATER

REASONABLE MAXIMUM EXPOSURE - INHALATION UNIT RISK METHOD USED IN HHRA

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Inhalation of Vapors During Showering	ICR	Incremental Cancer Risk from cumulative exposure	2.97513E-07	unitless probability	USEPA, 2009	ICR = EC (mg/m3) x (IUR (ug/m3)^{1}) x (1000 ug/mg)
				IUR	Inhalation Unit Risk for cancer toxicity	0.0000029	(ug/m3)$^{-1}$	NCEA, 2002	
				EC	Exposure Concentration	0.000102591	mg/m3	USEPA, 2009	EC (mg/m3) = (EC-event x ET x EF x ED) / (AT)
				EF	Exposure Frequency	350	days/year	USEPA, 2004	(Exposure Concentration equivalent to continuous exposure over averaging period)
				ED	Exposure Duration	24	years	USEPA, 2004	where:
				AT-C	Averaging Time (Cancer)	613200	hours	USEPA, 2009	AT-C = 24 hrs/day x 365 days/yr x 70 years
				AT-N	Averaging Time (Non-Cancer)	210240	hours	USEPA, 2009	AT-N = 24 hrs/day x 365 days/yr x ED yrs
				ET	Exposure Time	1	hours/day	USEPA, 2009	ET (hours/day) = (Dt min/shower / (60 min/hr)) x (1 shower / day)
				EC-event	Exposure Concentration equivalent to steady exposure during 1 shower	0.007489111	mg/m3	USEPA, 2009	EC-event (mg/m3) = (S x Q) / (Ra x CF1 x Dt)
				CF1	Conversion Factor	1000	ug/mg		(Exposure Concentration equivalent to steady exposure during one shower event)
				Q	Function of Air Exchange Rate & Time in Shower & Shower Room	15.68301517	min	Calculated	where: Q = Ds + [(exp(-Ra x Dt))/Ra] - [(exp(Ra x (Ds - Dt)))/Ra]
				Ds	Duration of Shower	30	min	USEPA, 2006	
				Dt	Total Time in Shower Room (considered the Micro-Event Time - ET)	60	min	USEPA, 2006	
				Ra	Rate of Air Exchange	0.01667	1/min	Fos&Chr, 1987	
				S	Indoor VOC Generation Rate	0.477625571	ug/m3/min	Fos&Chr, 1987	where: S = CWD x FR/SV
				FR	Shower Flow Rate	10	l/min	USEPA, 2006	
				SV	Shower Room Air Volume	12	m3	USEPA, 2006	
				CWD	Chemical Concentration Leaving Water Droplet after time ts	0.573150685	ug/l	Fos&Chr, 1987	where: CWD = CW x {1-exp[-KaL x ts x (6/d) x CF2 x CF3]}
				CW	Chemical Concentration in Groundwater	5.26	ug/l	USEPA, 2002a	
				CF2	Conversion Factor	1/3600	hr/sec		
				CF3	Conversion Factor	10	mm/cm		
				ts	Shower Droplet Time	0.5	sec	USEPA, 2006	
				d	Shower Droplet Diameter	1	mm	Fos&Chr, 1987	
				KaL	Adjusted overall mass transfer coefficient	13.84445495	cm/hr	Fos&Chr, 1987	where: KaL = KL/SQRT[(T1 x us)/(Ts x u1)]
				T1	Calibration Water Temperature of KL	293	K	Fos&Chr, 1987	
				Ts	Shower Water Temperature	318	K	Fos&Chr, 1987	
				u1	Water Viscosity at T1	1.002	centipose	Fos&Chr, 1987	
				us	Water Viscosity at Ts	0.596	centipose	Fos&Chr, 1987	

APPENDIX K, TABLE K-12

CALCULATION CHECK - ADULT RESIDENT CANCER RISK FROM INHALATION OF SITE 3 GROUNDWATER

REASONABLE MAXIMUM EXPOSURE - INHALATION UNIT RISK METHOD USED IN HHRA

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Inhalation of Vapors During Showering	KL	Mass Transfer Coefficient	10.24909177	cm/hr	Fos&Chr, 1987	where: KL = 1/[(1/Kl) + ((R x T)/(H x kg))]
				R	Ideal Gas law Constant	8.21E-05	atm m3/mole/K	Fos&Chr, 1987	
				T	Absolute Temperature	293	K	Fos&Chr, 1987	
				H	Henry's law Constant (adjusted to showering temperature)	0.0485	atm m3/mole	USEPA, 2002b	
				kg	Gas-film Mass Transfer Coefficient	988.3845701	cm/hr	Fos&Chr, 1987	where: kg = kH x SQRT[MWH/MW]
				kl	Liquid-film Mass Transfer Coefficient	10.30207681	cm/hr	Fos&Chr, 1987	where: kl = kC x SQRT[MWC/MW]
				kH	Gas-film Mass Transfer Coefficient for Water	3000	cm/hr	Fos&Chr, 1987	
				kC	Liquid-film Mass Transfer Coefficient for Carbon Dioxide	20	cm/hr	Fos&Chr, 1987	
				MWH	Molecular Weight of Water	18	g/mole	Fos&Chr, 1987	
				MWC	Molecular Weight of Carbon Dioxide	44	g/mole	Fos&Chr, 1987	
				MW	Molecular Weight of tetrachloroethene	165.83	g/mole	Fos&Chr, 1987	

Sources

USEPA, 2001. Fact Sheet. Correcting the Henry's Law Constant for Soil Temperature, from website: http://www.USEPA.gov/superfund/programs/risk/airmodel/factsheet.pdf

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2006: Recommended by Region 3 EPA.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002.

NCEA, 2002. Provisional cancer slope factor estimate for tetrachloroethene from National Center for Environmental Assessment, Cinncinatti, Ohio. April.

Foster, S. A. and P.C. Chrostowski. 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. Presented at the 80th Annual Meeting of the Air Pollution Control Association. New York, NY. June.

Default Henry's Law Constants (HLCs) at 25 degrees C obtained from EPA, 1996. See appendix for conversion of HLCs to showering temperature using EPA, 2001.

APPENDIX K, TABLE K-13

CALCULATION CHECK - ADULT RESIDENT CANCER RISK FROM INHALATION OF SITE 3 GROUNDWATER

REASONABLE MAXIMUM EXPOSURE - INHALATION SLOPE FACTOR OLDER METHOD (FOR COMPARISON PURPOSES -- NOT USED IN HHRA)

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Inhalation of Vapors During Showering	ICR	Incremental Cancer Risk from cumulative exposure	2.97513E-07	unitless probability	USEPA, 2009	ICR = Intake (mg/kg-day) x (SF-inh (mg/kg-day^{1}))
				IUR	Inhalation Unit Risk for cancer toxicity	0.0000029	(ug/m3)$^{-1}$	NCEA, 2002	IUR m3/ug = (SF-inh (mg/kg-day)^{1}) x (20 m3/day) / [(1000 ug/mg) x (70 kg)]
				SF-inh	Inhalation slope factor (archaic method for evaluating inhalation toxicity)	0.01015	(mg/kg-day)$^{-1}$	USEPA, 1989	SF-inh (mg/kg-day)$^{-1}$ = (IUR m3/ug) x (1000 ug/mg) x (70 kg) / (20 m3/day)
				Intake	Average daily intake per body weight over a lifetime	2.93E-05	mg/kg-day	USEPA, 1989	Intake (mg/kg-day) = (D x EF x ED)/AT
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	24	years	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	days	USEPA, 1989	
				D	Inhalation Dose for Each Shower	8.92E-05	mg/kg/shower	Fos&Chr, 1987	where: D = [(IR x S) / (BW x Ra x CF1)] x Q
				IR-SH	Inhalation Rate in Shower	13.88888889	l/min	USEPA, 2006	Liters per minute = (20 m3/day) x (1 day / 24 hr) x (1 hr / 60 min) x (1000 L / 1 m3)
				BW	Body Weight	70	kg	USEPA, 2004	
				CF1	Conversion Factor	1.00E+06	(ug x l)/(mg x m3)		
				Q	Function of Air Exchange Rate & Time in Shower & Shower Room	15.68301517	min	Calculated	where: Q = Ds + [(exp(-Ra x Dt))/Ra] - [(exp(Ra x (Ds - Dt)))/Ra]
				Ds	Duration of Shower	30	min	USEPA, 2006	
				Dt	Total Time in Shower Room (considered the Micro-Event Time - ET)	60	min	USEPA, 2006	
				Ra	Rate of Air Exchange	0.01667	1/min	Fos&Chr, 1987	
				S	Indoor VOC Generation Rate	0.477625571	ug/m3/min	Fos&Chr, 1987	where: S = CWD x FR/SV
				FR	Shower Flow Rate	10	l/min	USEPA, 2006	
				SV	Shower Room Air Volume	12	m3	USEPA, 2006	
				CWD	Chemical Concentration Leaving Water Droplet after time ts	0.573150685	ug/l	Fos&Chr, 1987	where: CWD = CW x {1-exp[-KaL x ts x (6/d) x CF2 x CF3]}
				CW	Chemical Concentration in Groundwater	5.26	ug/l	USEPA, 2002a	
				CF2	Conversion Factor	1/3600	hr/sec		
				CF3	Conversion Factor	10	mm/cm		
				ts	Shower Droplet Time	0.5	sec	USEPA, 2006	
				d	Shower Droplet Diameter	1	mm	Fos&Chr, 1987	
				KaL	Adjusted overall mass transfer coefficient	13.84445495	cm/hr	Fos&Chr, 1987	where: KaL = KL/SQRT[(T1 x us)/(Ts x u1)]
				T1	Calibration Water Temperature of KL	293	K	Fos&Chr, 1987	
				Ts	Shower Water Temperature	318	K	Fos&Chr, 1987	
				u1	Water Viscosity at T1	1.002	centipose	Fos&Chr, 1987	
				us	Water Viscosity at Ts	0.596	centipose	Fos&Chr, 1987	

APPENDIX K, TABLE K-13

CALCULATION CHECK - ADULT RESIDENT CANCER RISK FROM INHALATION OF SITE 3 GROUNDWATER

REASONABLE MAXIMUM EXPOSURE - INHALATION SLOPE FACTOR OLDER METHOD (FOR COMPARISON PURPOSES -- NOT USED IN HHRA)

NAS JRB WILLOW GROVE, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Inhalation of Vapors During Showering	KL	Mass Transfer Coefficient	10.24909177	cm/hr	Fos&Chr, 1987	where: KL = 1/[(1/Kl) + ((R x T)/(H x kg))]
				R	Ideal Gas law Constant	8.21E-05	atm m3/mole/K	Fos&Chr, 1987	
				T	Absolute Temperature	293	K	Fos&Chr, 1987	
				H	Henry's law Constant (adjusted to showering temperature)	0.0485	atm m3/mole	USEPA, 2002b	
				kg	Gas-film Mass Transfer Coefficient	988.3845701	cm/hr	Fos&Chr, 1987	where: kg = kH x SQRT[MWH/MW]
				kl	Liquid-film Mass Transfer Coefficient	10.30207681	cm/hr	Fos&Chr, 1987	where: kl = kC x SQRT[MWC/MW]
				kH	Gas-film Mass Transfer Coefficient for Water	3000	cm/hr	Fos&Chr, 1987	
				kC	Liquid-film Mass Transfer Coefficient for Carbon Dioxide	20	cm/hr	Fos&Chr, 1987	
				MWH	Molecular Weight of Water	18	g/mole	Fos&Chr, 1987	
				MWC	Molecular Weight of Carbon Dioxide	44	g/mole	Fos&Chr, 1987	
				MW	Molecular Weight of tetrachloroethene	165.83	g/mole	Fos&Chr, 1987	

Sources

USEPA, 2001. Fact Sheet. Correcting the Henry's Law Constant for Soil Temperature, from website: http://www.USEPA.gov/superfund/programs/risk/airmodel/factsheet.pdf

USEPA, 2002a: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

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USEPA, 2006: Recommended by Region 3 EPA.

USEPA, 2009: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual. (Part F, Supplemental Guidance for Inhalation Risk Assessment). Final. EPA 540-R-070-002.

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Foster, S. A. and P.C. Chrostowski. 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. Presented at the 80th Annual Meeting of the Air Pollution Control Association. New York, NY. June.

Default Henry's Law Constants (HLCs) at 25 degrees C obtained from EPA, 1996. See appendix for conversion of HLCs to showering temperature using EPA, 2001.

APPENDIX K, TABLE K-14
CHEMICAL-SPECIFIC PARAMETERS FOR DERMAL ABSORPTION
NAS JRB WILLOW GROVE, PENNSYLVANIA

COPC	Permeability Coefficient (Kp)	Tau (hr)	T* (hr)	B	FA	Source of Dermal Parameters
ORGANIC COMPOUNDS						
BIS(2-ETHYLHEXYL) PHTHALATE	2.50E-02	1.66E+01	3.99E+01	2.00E-01	8.00E-01	EPA, 2004
1,1-DICHLOROETHANE	6.70E-03	3.80E-01	9.20E-01	0.00E+00	1.00E+00	EPA, 2004
DIBROMOCHLOROMETHANE	3.20E-03	1.57E+00	3.77E+00	0.00E+00	1.00E+00	EPA, 2004
BROMODICHLOROMETHANE	4.60E-03	8.80E-01	2.12E+00	0.00E+00	1.00E+00	EPA, 2004
CARBON TETRACHLORIDE	1.60E-02	7.80E-01	1.86E+00	1.00E-01	1.00E+00	EPA, 2004
CHLOROFORM	6.80E-03	5.00E-01	1.19E+00	0.00E+00	1.00E+00	EPA, 2004
TETRACHLOROETHENE	3.30E-02	9.10E-01	2.18E+00	2.00E-01	1.00E+00	EPA, 2004
TRICHLOROETHENE	1.20E-02	5.80E-01	1.39E+00	1.00E-01	1.00E+00	EPA, 2004
INORGANIC SUBSTANCES						
ARSENIC	1.E-03	N/A	N/A	N/A	N/A	EPA, 2004
COBALT	4.E-04	N/A	N/A	N/A	N/A	EPA, 2004
MANGANESE	1.E-03	N/A	N/A	N/A	N/A	EPA, 2004

Notes:
Permeability constant and other dermal absorption parameters (Tau, T*, B, and FA) from tables and equations in EPA, 2004.

APPENDIX K, TABLE K-15
CHEMICAL-SPECIFIC PARAMETERS FOR SHOWER MODELING
NAS JRB WILLOW GROVE, PENNSYLVANIA

COPC	Molecular Weight (g/mol)	Henry's Law at 25°C (l*atm/mol)	Henry's Law at 45°C (l*atm/mol)	Source of Shower Parameters
1,1-DICHLOROETHANE	98.96	5.61E-03	1.18E-02	EPA, 2001
DIBROMOCHLOROMETHANE	208.29	7.83E-04	2.06E-03	EPA, 2001
BROMODICHLOROMETHANE	163.83	1.60E-03	3.84E-03	EPA, 2001
CARBON TETRACHLORIDE	153.82	3.05E-02	6.72E-02	EPA, 2001
CHLOROFORM	119.38	3.67E-03	7.82E-03	EPA, 2001
TETRACHLOROETHENE	165.83	1.84E-02	4.85E-02	EPA, 2001
TRICHLOROETHENE	131.39	1.03E-02	2.42E-02	EPA, 2001

Notes:
Henry's Law constant at 45 degrees converted using data and formulas presented in the following references:

Sander, Rolf, 1999. Compilation of Henry's Law Constants for Inorganic and Organic Species of Potential Importance in Environmental Chemistry. Internet Website: http://www.mpch-mainz.mpg.de/~sander/res/henry.html. Air Chemistry Department. Max-Planck Institute of Chemistry. PO Box 3060. 55020 Mainz, Germany. Version 3: April 8.

EPA, 2001. Fact Sheet. Correcting the Henry's Law Constant for Soil Temperature. from website: http://www.epa.gov/superfund/programs/risk/airmodel/factsheet.pdf

Appendix K, Part 4

Parameters Used to Calculate Soil Volatilization Factors

NAS JRB Willow Grove, Pennsylvania

APPENDIX K, TABLE K-16
PARAMETER INPUTS FOR CALCULATING SOIL VOLATILIZATION FACTORS
NAS JRB WILLOW GROVE, PENNSYLVANIA

Parameter	Definition	Units	Naphthalene	Ethyl Benzene
HLC soil	Henry's Law at soil temperature		4.83E-04	7.70E-03
H_prime	Unitless Henry's Law	unitless	1.98E-02	3.16E-01
Diff_Air	Diffusivity in air		5.90E-02	7.50E-02
Diff_H2O	Diffusivity in water		7.50E-06	7.80E-06
Foc	fraction organic carbon	g carbon/g soil	0.006	0.006
rho_B	dry soil bulk density	g/cm3	1.5	1.5
rho_S	soil particle density	g/cm3	2.65	2.65
theta_W	water filled soil porosity	L H2O/L soil	0.15	0.15
theta_A	air filled soil porosity	L air/L soil	0.284	0.284
VF_N	total soil porosity	L pore space/L soil	0.434	0.434
VF_T	exposure interval	seconds	9.50E+08	9.50E+08
QoverC	Inverse ratio of the air conc. to emission flux at the center of landfill area	g/m2-s per kg/m3	5.39E+01	5.39E+01
DA	apparent diffusivity	cm2/sec	4.30E-04	6.57E-03
VF	volatilization factor	m3/kg	4.73E+03	1.21E+03

APPENDIX L

SUMMARY OF ACTION ITEMS EVALUATION

DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
10 INDUSTRIAL HIGHWAY
MAIL STOP, #82
LESTER, PA 19113-2090

IN REPLY REFER TO

5090
Code 09TB/JC

09 JAN 2001

Ms. Lisa Bradford
U.S. Environmental Protection Agency, Region III
Federal Facilities Section
1650 Arch Street
Philadelphia, PA 19103-2029

Dear Ms. Bradford:

SUBJ: NAVY'S RESPONSES TO USEPA REGION III COMMENTS ON DRAFT PHASE II REMEDIAL INVESTIGATION (RI) REPORT DATED APRIL 1998; NAVAL AIR STATION JOINT RESERVE BASE (NASJRB) WILLOW GROVE, PA

The Navy had issued a Draft Phase II RI Report in April 1998 for which comments were requested. At a technical meeting held at Northern Division, NAVFAC offices in Lester, PA in April 1999, representatives from the USEPA Region III office and Pennsylvania Department of Environmental Protection (PADEP) offered several comments and recommendations that the Navy took as Action Items.

Since that meeting, the Navy has been addressing each of the Action Items and is now forwarding enclosures (1) and (2) that basically serve as the Navy's responses to regulator comments on the Draft Phase II RI Report. Enclosure (1) contains nine attachments that address specific Action Items. Enclosure (2) is being re-issued and are the Navy's responses to comments submitted by the USEPA Region III's toxicologist that was assigned to this project at that time.

If found to be acceptable, the Navy will incorporate the information contained in enclosures (1) and (2) into Final versions of the Phase II RI Report. As explained at our last meeting held at the USEPA Region III offices on December 5, 2000, the Navy will finalize a separate Phase II RI Report for each individual site rather than a four-site package as was done for the Draft Report.

The Navy would like to request that enclosures (1) and (2) be reviewed and that the regulators be prepared to discuss each of the Action Items at our next technical meeting that has been scheduled for Wednesday, February 7, 2001 at Building 1 located at NASJRB Willow Grove.

If you have any questions regarding the enclosures, please give me a call at (610) 595-0567, extension 163.

Sincerely,

JAMES L. COLTER
Remedial Project Manager
by Direction of the
Commanding Officer

Enclosures: (1) Nine Attachments Addressing Specific Action Items
(2) Navy Responses to EPA Toxicological Comments on Draft Phase II RI Report

Copy to:
PADEP, April Flipse
NASJRB Willow Grove, Jim Edmond
Tetra Tech NUS, Russ Turner

STATUS OF NAVY ACTION ITEMS FROM TECHNICAL MEETING HELD ON 14 APRIL 1999

13 October 1999
4 January 2001 (Revision 1)

SITE 5 REMEDIAL INVESTIGATION:

ITEM 1: The Navy will generate a map that shows IR Sites 2, 3, and 5 and the surrounding area. The map should include building numbers, location of wells and water level readings.

RESPONSE: See Attachment (1) that includes three figures. Figure 1 shows the locations of all monitoring wells installed at Sites 2, 3 and 5 on a USGS Quadrangle. Figure 2 shows the same monitoring well locations on an aerial photo background. Figure 3 shows the potential locations for additional monitoring wells at Site 5.

ITEM 2: What are the effects of the geologic structure on the groundwater flow patterns at SITE 5? How are the dip and bedding planes influencing contaminant movement?

RESPONSE: See Attachment (2). Upon acceptance, this information will be made part of the Final RI for Site 5.

ITEM 3: The Navy will propose a plan to further characterize the groundwater in the area west of well cluster 11 at Site 5.

RESPONSE: Attachment (3) is the Navy's Remedial Investigation Workplan Addendum for Site Investigations at Site 5. This letter workplan was submitted for review on 26 May 2000 and no adverse comments were received.

Implementation of the workplan was completed in the Fall 2000. Attachment (4) is being submitted that is a compilation of the recently collected analytical data. The Navy is currently evaluating this data. The Navy's evaluation consists of using a GIS-based software program (EVS) that analyzes and portrays the data in a three-dimensional view. This effort is not yet completed but should be in the next couple of weeks. The Navy is expecting to be able to present this analysis at the upcoming technical meeting scheduled for February 7, 2001. At this meeting, the Navy will also discuss it's recommendations and conclusions for Site 5. If accepted, these recommendations and conclusions will be made part of the Navy's Final RI for Site 5.

ITEM 4: Navy is to approach Horsham Township Water District about conducting a Pump Test on municipal well #26 in order to assess the impacts, if any, that this well may have on groundwater near Site 5.

RESPONSE: Ralph McQuaid (Horsham Township Water District) was contacted on 7 June 1999. Water demand over the summer was high and other maintenance activities on other wells made running Well #26 more imperative. Fore these reasons, the District was reluctant to shut down the well. Mr. McQuaid suggested that a pump test on Well #26 may be possible in the Fall when demand is typically lower, the other maintenance work would be completed and construction of a new well (Well #40) in the same vicinity as Well #26 would also be completed and could be used to supplement water when #26 is shut down.

Russ Turner will follow up with Mr. McQuaid regarding the status of the above and the possibility of performing the pump test on Well #26 in the near future. This follow up was conducted on 13 October 1999 and it was suggested that the shutdown for Well #26 could take place after the first of the year when the water demand has been historically at its lowest.

The actual shutdown, and subsequent pump test for Horsham Well #26 was conducted during the week beginning 17 January 2000 and was concluded during the week of 22 February 2000. The collected data has been evaluated by the USGS and was presented to the members of Willow Grove's RAB on 7 June 2000. A copy of that presentation is enclosed and discussions regarding Well #26 begins on Page 5 of Attachment (5).

SITE 5 REMEDIAL INVESTIGATION (Continued):

ITEM 5: Navy will review EPIC photos for all of NASJRB Willow Grove received from EPA on 15 April 1999. The Navy will review the photos to see if there are other possible sources in the vicinity of the IR Sites.

RESPONSE: The Navy's review of the EPIC photos was completed for IR Site 5 ONLY in October 2000. The results of this analysis are presented in Attachment (6). Upon approval, the information will be made part of the Final RI for Site 5.

Subsequent conclusions for the other IR Sites will be made part of the Final RI's for each individual site.

ITEM 6: Navy will consider using USGS to investigate weathered bedrock layer as a source of continuing groundwater contamination. This will involve taking cores of the shallow bedrock layer and eluting any VOCs from the core.

RESPONSE: The Navy conducted the coring of the weathered bedrock during the week of 4 September 2000. The analytical results from that effort are presented in Attachment (7). A discussion of the rock core procedures and the results of the lab analysis will be part of the agenda for the next scheduled meeting of Willow Grove's RAB that is to be held on December 6, 2000.

ITEM 7: The Navy will consider whether a soil removal project is warranted either to remove as a source of groundwater contamination or to reduce Eco/human health risk.

RESPONSE: This evaluation will be made part of the Feasibility Study for Site 5 which is currently being developed. The FS will be forwarded concurrently with the submission of the Final RI for Site 5 or shortly thereafter.

LOW-FLOW SAMPLING PROCEDURES:

ITEM 1: EPA expressed concerns that the Low-Flow sampling protocols may not have been followed resulting in a question regarding usability of the analytical data. The following action items resulted:

- Review field logs to determine if protocols were followed
- Examine historical data and compare with the data in question
- Determine if the conceptual site model changes if the concentrations were higher (Assumption: the highest level ever detected or 2 times the latest concentration)
- Determine if multiple fractures present within the screened interval

RESPONSE: Tetra Tech NUS's responses to the first three bullets listed above are shown on Attachment (8). Discussions regarding the last bullet are shown on Attachment (9). If found to be acceptable, the Navy will include this information into the Final RI Report for each IR Site.

ITEM 2: The Navy will look at the effect the suspect data may have on the human health risk assessments.

RESPONSE: Tetra Tech NUS's review of the effects, if any, that the suspect data may have on the human health risk assessments conducted at each of the IR Sites is included in Attachment (8) which discusses data quality issues. If the discussions included in Attachment (8) are found to be acceptable, the Navy will include the information into the Final RI Reports for each IR Site.

From: Kevin C. Kilmartin
To: Russ Turner

Date: July 7, 1999

Re: NASJRB WILLOW GROVE: Analysis of Screened Intervals and Fracture Zones for Monitoring Wells Installed During the Phase II RI

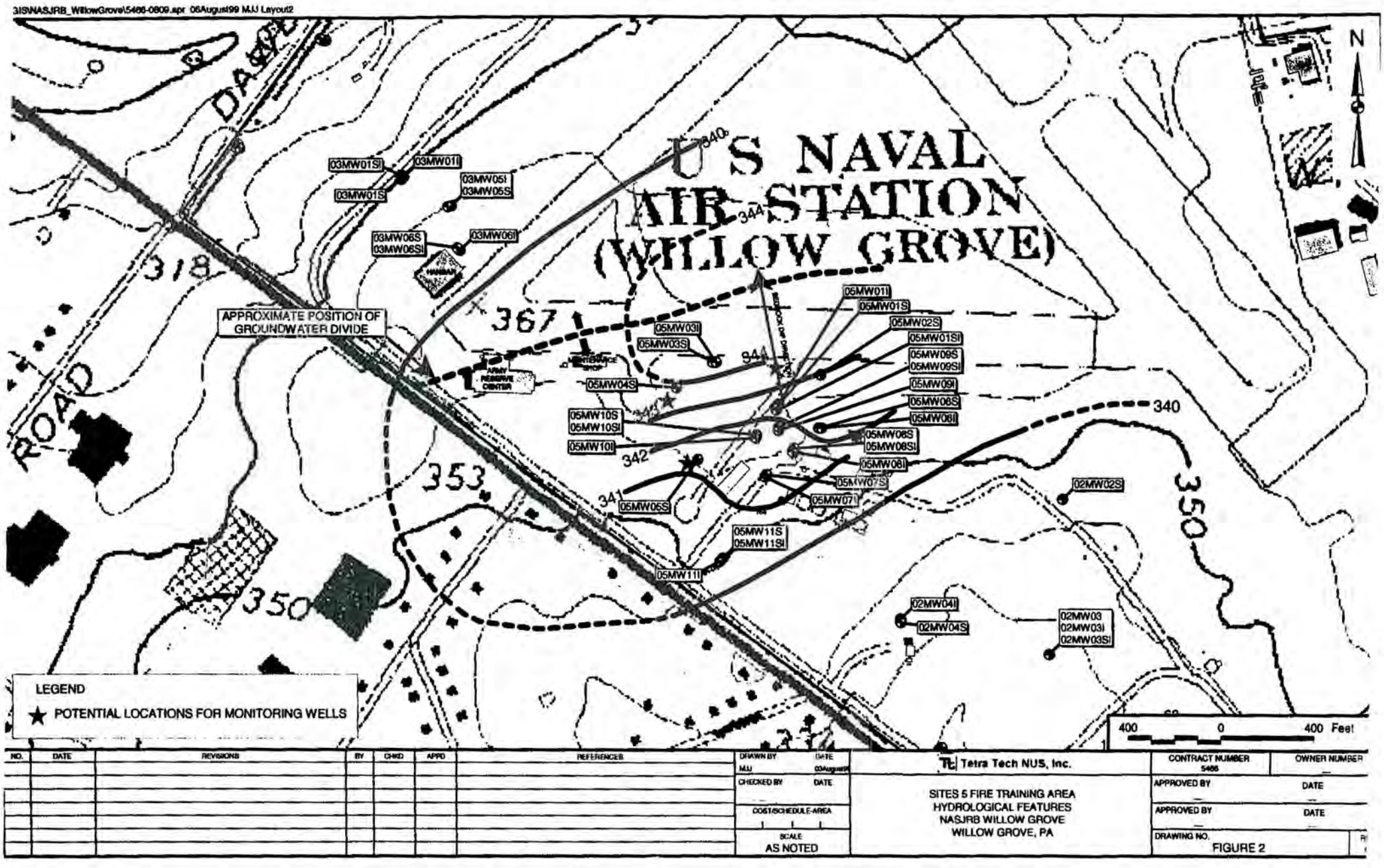
TtNUS was tasked to determine whether any of the screened monitoring wells installed during the Phase II RI were completed in such a manner that the vertical position of the well pump could affect the analytical results when sampling the well under low-flow sampling procedures. In order for the vertical position of the pump to influence the sampling results, the groundwater for that well must be migrating or flowing from multiple, hydraulically isolated fractures that are spaced widely enough that the groundwater from one fracture could be preferentially sampled over the groundwater from the other fracture(s).

A top priority of the borehole retrofitting program was to construct the monitoring wells to obtain groundwater from only one groundwater zone and to not interconnect different groundwater zones. To reach this goal, all boreholes were geophysically logged (including borehole flowmeters), and the potential construction plans were reviewed and discussed with the USGS. The resultant individual well plans were then presented to EPA prior to the construction of the wells. I have reviewed the borehole geophysical logs and the well construction details to reconfirm that the monitoring wells were properly constructed as originally scoped and are obtaining groundwater from only one zone. Therefore, the exact vertical position of the pump within the well screen should not matter, because water can only enter the well through the screen, and all the water entering the screen is from the same zone. Some of my observations that led to this conclusion include:

- The vast majority of wells are screened across only one fracture. Therefore, the groundwater can only be entering the screen through that fracture.

- Some wells are screened across a fracture zone, or a series of smaller fractures rather than one distinct larger fracture. These fractures (typically two or three fractures within a five-foot interval) are very closely spaced vertically (generally on the order of one or two feet), and there was no lithologic indications of confining layers between these fractures. Fractures that are spaced so closely vertically are almost certainly hydraulically interconnected; it would be very unusual for these fractures to be hydraulically isolated from each other. In fact, due to the presence of high-angle vertical fractures (from the television survey), some of these "fracture zones" may be the same fracture intercepted on opposite sides of the borehole walls.

- The flowmeter was carefully considered for each well construction. Screens were extended across multiple fractures only if there was no evidence of intraborehole flow between the respective fractures. In fact, some screens were constructed specifically to monitor one fracture(s) but not the other(s) because of evidence of intraborehole flow.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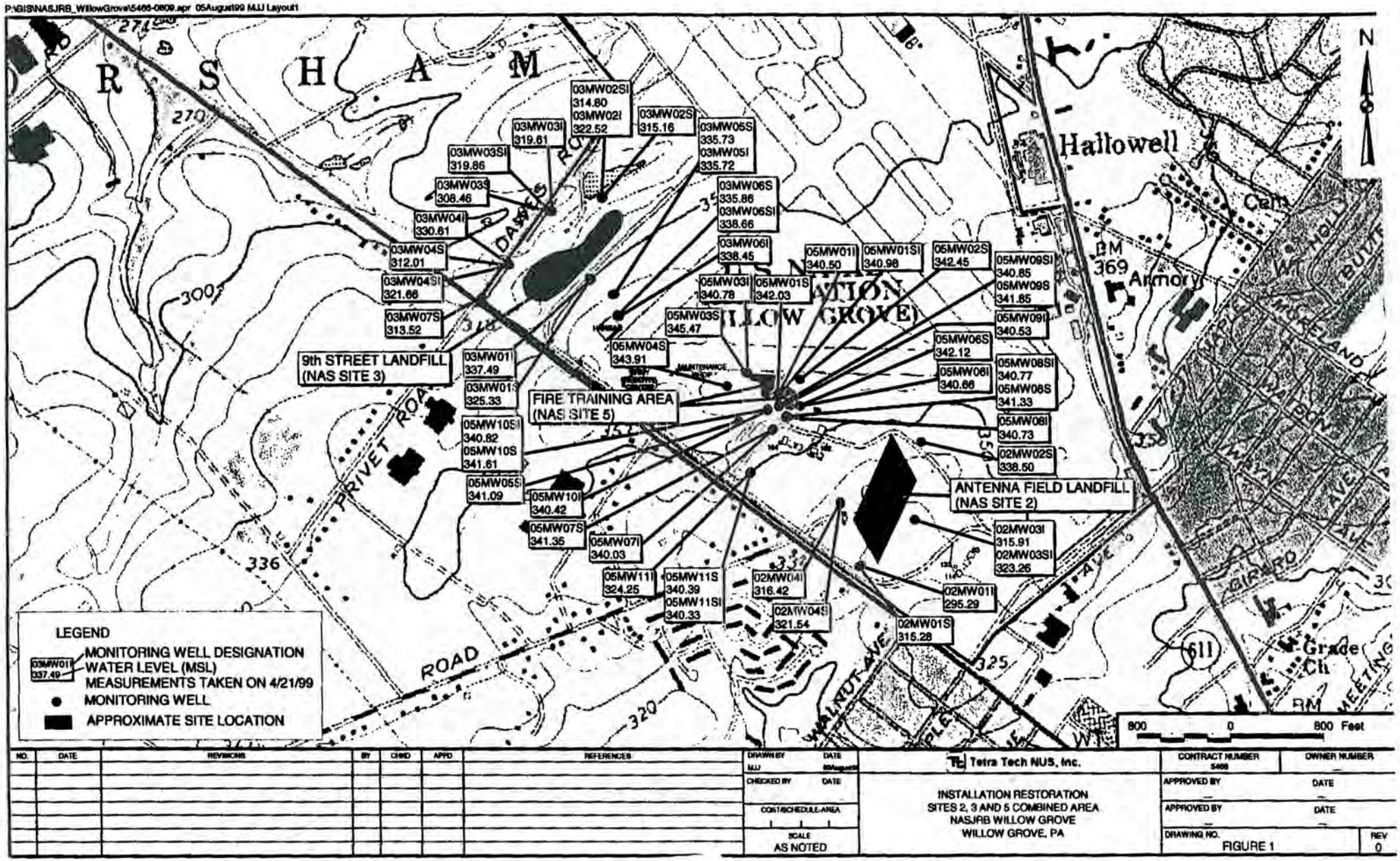
LEGEND
★ POTENTIAL LOCATIONS FOR MONITORING WELLS
NO. DATE REVISIONS BY CHKD APPD REFERENCES
DRAWN BY MJJ DATE 03August99
CHECKED BY DATE
COST/SCHEDULE-AREA
SCALE AS NOTED
Tt Tetra Tech NUS, Inc.
SITES 5 FIRE TRAINING AREA
HYDROLOGICAL FEATURES
NASJRB WILLOW GROVE
WILLOW GROVE, PA
CONTRACT NUMBER 5466
OWNER NUMBER
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2


P:\GIS\NASJRB_WillowGrove\5466-0809.apr 05August99 MLJ Layout1
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03MW02S 315.16
03MW03I 319.61
03MW03SI 319.86
03MW03S 308.46
03MW04I 330.61
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03MW04SI 321.66
03MW07S 313.52
03MW05S 335.73 03MW05I 335.72
03MW06S 335.86 03MW06SI 338.66
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05MW10SI 340.82
05MW10S 341.61
05MW05SI 341.09
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05MW11SI 340.33
02MW04I 316.42
02MW04S 321.54
02MW03I 315.91
02MW03SI 323.26
02MW01I 295.29
02MW01S 315.28
9th STREET LANDFILL (NAS SITE 3)
FIRE TRAINING AREA (NAS SITE 5)
ANTENNA FIELD LANDFILL (NAS SITE 2)
NAVAL AIR STATION WILLOW GROVE
Hallowell
Armory
DAMES ROAD
RIVET ROAD
ROAD
LEGEND
MONITORING WELL DESIGNATION
WATER LEVEL (MSL) MEASUREMENTS TAKEN ON 4/21/99
MONITORING WELL
APPROXIMATE SITE LOCATION
800 0 800 Feet
Tetra Tech NUS, Inc.
INSTALLATION RESTORATION
SITES 2, 3 AND 5 COMBINED AREA
NASJRB WILLOW GROVE
WILLOW GROVE, PA
AS NOTED
FIGURE 1

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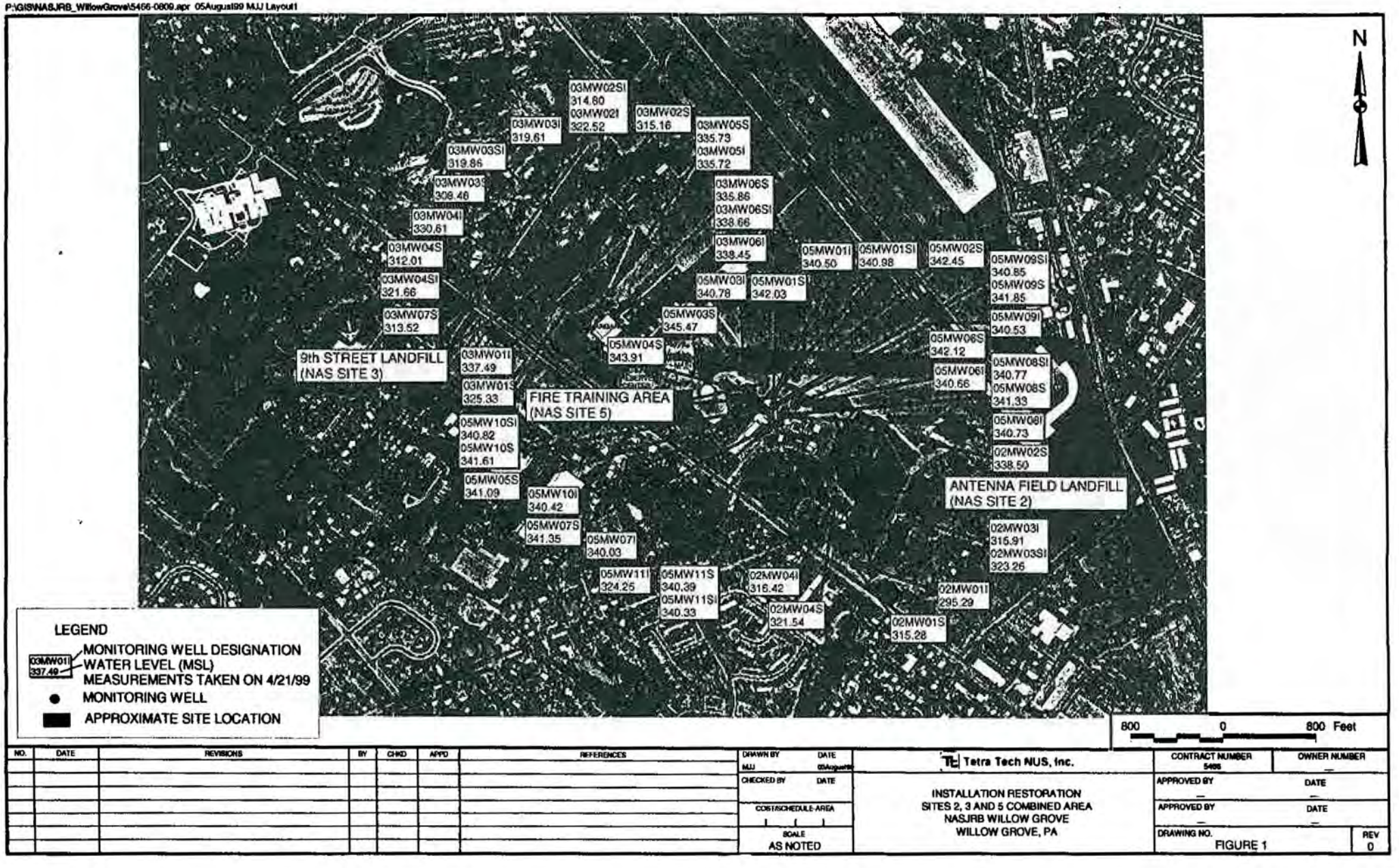

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY: MJJ	DATE: 05August99
CHECKED BY:	DATE:
COST/SCHEDULE-AREA:	
SCALE: AS NOTED	

Tetra Tech NUS, Inc.

INSTALLATION RESTORATION
SITES 2, 3 AND 5 COMBINED AREA
NASJRB WILLOW GROVE
WILLOW GROVE, PA

CONTRACT NUMBER: 5466	OWNER NUMBER: —
APPROVED BY: —	DATE: —
APPROVED BY: —	DATE: —
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(1) An Evaluation of the Effects of Geologic Structure on Groundwater Plume Migration at Site 5

and

(2) A Recommendation for a New Monitoring Well Location To Address the Hydrogeological Data Gap in the Southwestern Portion of the Site

NASJRB Willow Grove

1.0 An Evaluation of the Effects of Geologic Structure on Groundwater Plume Migration at Site 5

1.1 Background

TtNUS was tasked to investigate the effects of the geologic structure on the groundwater flow and plume migration at Site 5, the Fire Training Area. Specifically, EPA asked if the dip of the sedimentary bedrock units (to the northwest) caused either the dissolved-phase groundwater plume or a separate-phase DNAPL to migrate from the source area located near monitoring well cluster location 05MW01 to the northwest toward monitoring well cluster 05MW03, where approximately 50 ug/L of various chlorinated solvents were detected in the intermediate well but none were detected in the shallow (water table) well. The intermediate well (05MW03I) is screened just above a very fine-grained claystone unit. TtNUS had earlier concluded that the solvents detected in 05MW03I were not part of the main plume that has been delineated at Site 5.

1.2 Discussion

The hydrogeologic cross-section (Figure 1) indicates that monitoring well cluster location 05MW03 is hydraulically upgradient from the source area for chlorinated solvents that is located near monitoring well cluster location 05MW01. Figure 1 also indicates that the shallow groundwater at 05MW03 does not contain any chlorinated solvents, which indicates that this well cluster is not located within the source area of the solvents. Therefore, the occurrence of the solvents in monitoring well 05MW03I may be due to either:

- An unknown source located hydraulically upgradient from 05MW03, with the solvents migrating as a dissolved phase with the groundwater along the hydraulic gradient, and to deeper depths due to the downward-oriented vertical gradient; or

- The known source (the VOCs in the soils) located near 05MW01, with the solvents migrating to deeper depths down the geologic dip of the bedrock (but against the hydraulically gradient) to 05MW03.

TtNUS believes the data indicate that the source of the solvents in 05MW03I is an unknown source located hydraulically upgradient from that monitoring well location. The following discussions are presented in support of this hypothesis:

- The siltstones and claystone encountered in the subsurface near the source area (at 05MW01) do not appear to function as effective semi-confining layers to the depths at which they are encountered. Investigations at other base sites (Site 1 and Site 3) where confining conditions were encountered suggest that it is the cumulative effect of multiple fine-grained units that ultimately create the confining conditions at greater depths rather than any particular bed creating the confining conditions at any (including shallow) particular depth. This hypothesis is supported at Site 5 by the observation that upward groundwater flow was noted on the thermal-pulse flow log from the bottom of the 05MW03I borehole (from below the bottom claystone unit) prior the retrofitting of the open borehole with the monitoring well.

The geologic structure (bedrock dip) does not appear to influence the groundwater flow patterns to the total depth of the hydrogeologic investigation at Site 5. As depicted in Figure 1, both the groundwater and the dissolved-phase groundwater plume are migrating in a generally southward direction, while the dip of the bedrock is to the northwest. The hydrogeologic data are indicative of an unconfined groundwater flow system. Specifically:

- There are no major changes in the hydraulic head values across the potential semi-confining layers. The vertical gradients are relatively low and are oriented downward. Higher vertical gradients and more pronounced deflections in the groundwater flow patterns would normally be expected at the bed boundaries if the finer-grained layers were functioning as effective semi-confining units.

- Monitoring wells screened below the potential semi-confining layers contain chlorinated solvents, indicating that the geologic layers are not effectively retarding the migration of these chemicals. The gradational changes in chemical concentrations with depth appear to reflect typical attenuation/dilution processes rather than sharp changes across lithologic and hydrogeologic boundaries.

- The concentrations of the solvents at the source area do not suggest the presence of a DNAPL. An examination of the historical analytical data reveals that no compound approaches even one percent of its solubility in groundwater; the highest recorded concentration is for 1,1,1-TCA (2800 ug/L in 1991). Even if the siltstones and claystone functioned as effective semi-confining layers, the presence of a DNAPL would be required for the solvents to migrate to the northwest (down the bedrock structural dip and against the hydraulic gradient) rather than in a dissolved-phase plume migrating with the groundwater along the hydraulic gradient.

It is noted that monitoring well cluster 05MW03 is not located directly downdip from the source area located near well cluster 05MW01. As can be seen on Figure 2, well 05MW03I was installed about 38° west of true dip. Well 05MW03I was placed directly downdip from the source area based on the regional geology and the limited site-specific subsurface information that was available prior to the drilling of the borehole. The site-specific strike and dip directions were subsequently determined through the correlation of the subsurface geophysical logs at the conclusion of the drilling program. Therefore, it is possible that DNAPL could have migrated directly downdip, with the concentrations at 05MW03I representing the edge of a dissolved plume that is migrating downgradient (and updip) after migrating upgradient (but downdip) as a DNAPL, although as discussed above, the hydrogeological evidence does not indicate the likely presence of DNAPL in this area. To completely confirm this hypothesis, a borehole could be installed downdip from 05MW01 and near the runway (see Figure 2). Based on a rate of dip of 7°, the top of the finer-grained units encountered in 05MW01 at subsurface depths of 0 feet, 82 feet, and 106 feet (which is the unit that 05MW03I is screened above) would be encountered at the new location at subsurface depths of 32 feet, 114 feet, and 138 feet, respectively.

1.3 Other Potential Source Areas

Monitoring well location 05MW03 is located near the runway. The runway basically lies along a topographic high or ridge that bisects the base, and multiple hydrogeologic investigations have indicated that this ridge is both a surface water and a groundwater divide. Therefore, if the source of the solvents detected in 05MW03I is from an upgradient location (since there are no detections in 05MW03S) the potential sources should be limited to the area generally between the runway and the 05MW03 monitoring well cluster location. The nearest structure in this vicinity is part of the Army Reserve complex and is reportedly a maintenance-type facility.

The Army Reserve complex has also been identified as a potential source of the chlorinated solvent detected in the groundwater at the adjacent Site 3 (9th Street Landfill). The buildings at this complex either straddle or are located on either side of the groundwater divide (Figure 2). It is interesting to note, however, that a common source located on the complex could not account for both the Site 3 groundwater plume and the

solvents detected at Site 5 well 05MW03I because of the chemical dissimilarity of the detections (only PCE was detected at Site 3 while many different solvents were detected at Site 5). It is still possible, however, that two different sources could be located on the Army Reserve complex, with the sources located on opposite sides of the groundwater divide.

2.0 A Recommendation for a New Monitoring Well Location to Address the Hydrogeological Data Gap in the Southwestern Portion of the Site

2.1 Background

TtNUS was tasked to recommend a drilling location for an additional monitoring well cluster in the southwestern portion of the site designed to fill a data gap noted by EPA. The available data indicate that there is a component of groundwater flow in that direction and that the groundwater quality has been impacted immediately to the southwest of the source area (at monitoring well cluster 05MW10), but there are limited monitoring wells downgradient of 05MW07 from which to obtain water quality data. The only existing monitoring wells in that quadrant are the shallow wells 05MW05S (40 feet deep) and 05MW04S (30 feet deep).

2.2 Potential Well Locations

An intermediate monitoring well clustered with existing well 05MW05S would close the data gap to the southwest. A well in this location would provide additional hydraulic head and water quality data in a direction potentially downgradient from the source area near 05MW01 and downgradient from the impacted groundwater at 05MW10. Monitoring well 05MW05S has been sampled during both phases of the RI and has never had a positive detection of any VOC, but it is possible that the groundwater plume could be migrated through this area at some depth below the total depth of the shallow well. Due to the rather steep vertical hydraulic gradient at Site 5 (Figure 1), the new monitoring well should be installed at a depth of approximately 250 feet.

A second potential well location would involve the installation of an intermediate monitoring well clustered with existing well 05MW04S. Although this location is actually slightly northwest (rather than southwest) of the source area, the hydraulic head data collected during the Phase II RI did indicate a component of groundwater flow in this direction in the intermediate groundwater zone (because of a lower hydraulic head in monitoring well 05MW03I). Alternatively, the lower hydraulic heads could have resulted from the southward migration of the water level divide to a position just south of the 05MW03 location. Subsequent water level measurement rounds conducted after the RI have not found this same pattern. In these later rounds, the hydraulic head measured in 05MW03I is consistently higher than the head measured in the other intermediate wells, creating the south-to-southwest pattern of groundwater flow. An intermediate well installed to approximately the same depth as 05MW03I (128 feet) would provide useful hydraulic head data and possibly provide information helpful to the evaluation of the potential for an additional source area in this vicinity, as discussed above in Section 1.

DEPARTMENT OF THE NAVY

NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
10 INDUSTRIAL HIGHWAY
MAIL STOP, #82
LESTER, PA 19113-2090

IN REPLY REFER TO

5090
Code 09TB/JC

26 MAY 2000

MEMORANDUM

FOR THE MEMBERS OF THE RESTORATION ADVISORY BOARD (RAB) FOR THE INSTALLATION RESTORATION PROGRAM AT NAVAL AIR STATION JOINT RESERVE BASE (NASJRB) WILLOW GROVE, PENNSYLVANIA

The Navy is enclosing a Workplan to conduct additional environmental investigations at Installation Restoration (IR) Site 5 - Fire Training Area, located at NASJRB Willow Grove, for your review and information.

Development of this workplan was in response to comments and requests made by the U.S. Environmental Protection Agency, Region 3 regarding the Navy's Draft Phase 2 Remedial Investigation Report, dated April 1998.

It is anticipated that upon completion of this supplemental fieldwork effort, the Navy will have enough information to adequately characterize the nature and extent of groundwater contamination at Site 5 and can then proceed with development of a Feasibility Study to evaluate potential groundwater remedies.

Due to funding availability, the Navy will be able to begin implementation of the enclosed workplan during the week of June 19, 2000. Therefore, any comments regarding the workplan should be submitted as soon as possible so that relevant comments can be incorporated.

If you have any questions or would like to discuss the enclosed document further, please give me a call at (610) 595-0567, extension 163.

Sincerely,

JAMES L. COLTER
Remedial Project Manager
By direction of the
Commanding Officer

Enclosure: (1) Remedial Investigation Workplan Addendum for Site 5

ATTACHMENT (3)

Distribution:

U.S. EPA Region III, Lisa Bradford (3 copies)
PADEP, April Flipse/Pam Reigh (2 copies)
NASJRB Willow Grove, Jim Edmond (3 copies)
Community Co-Chair, Liz Gemmill (3 copies)
Restoration Advisory Board, Community Members Mailing List (1 copy each)

ADDENDUM REMEDIAL INVESTIGATION WORK PLAN
FOR SITE INVESTIGATIONS AT SITE 5 - FIRE TRAINING AREA

PHASE II REMEDIAL INVESTIGATION
NASJRB WILLOW GROVE, PENNSYLVANIA

INTRODUCTION

Tetra tech NUS (Tt NUS) has prepared this Work Plan for environmental site investigation on NASJRB Willow Grove property in the vicinity of Site 5 - Fire Training Area. These investigations are planned in response to comments/requests from the Environmental Protection Agency (EPA). EPA comments/requests are based on review of the draft Phase 2 Remedial Investigation (RI) Report for NASJRB Willow Grove Pennsylvania (Brown & Root Environmental, April 1998) and subsequent hydrogeological investigations and reports prepared for the Site 5 vicinity. The Navy has requested Tt NUS to perform additional remedial investigation at Site 5 under Contract Task Order No. 277 under Contract N62472-90-D-1298, Comprehensive Long - Term Environmental Action-Navy (CLEAN).

SUMMARY OF PREVIOUS REMEDIAL INVESTIGATIONS

Findings from the Phase II RI Report (draft) for NASJRB Willow Grove, Pennsylvania continue under review by the regulatory agencies. The findings appear to demonstrate that no off-post groundwater impact from past practices at or near Site 5 - Fire Training area has occurred. The EPA has (informally) questioned this conclusion.

To help determine if there is any potential for contaminated groundwater to migrate off-base, the Navy performed two water level studies in monitoring wells to the southwest of Site 5. Monitoring wells monitored included 05MW11S, 05MW11SI, 05MW11I, 05MW07S, and 05MW07I. See Figure 1 for a map of this area. Monitoring wells 05MW11S, 05MW11SI and 05MW11I were installed as near as possible to the facility boundary in a direct line between the nearest off-station municipal groundwater supply well and the former fire training and drum storage area. Monitoring wells 05MW07S, and 05MW07I are also along the approximate line between the nearest off-station municipal groundwater supply well and the former fire training and drum storage area, but are located closer to Site 5 (Figure 1). The second water level monitoring study involved a

groundwater recovery test resulting from a planned shutdown of the nearest municipal groundwater supply well (Number 26), owned by the Horsham Township Water Authority. Horsham production well No. 26 (H-26) is located approximately 1,500 feet southwest of monitoring wells 05MW11 (Figure 2). Water levels in wells both on and off of the Air Station were monitored for one week before the H-26 pump shutdown, the week of the H-26 pump shutdown, and for one week after the H-26 pump shutdown.

The results of the water level monitoring tests indicate that H-26 does have some influence on movement of groundwater in the vicinity of the known solvent plume at Site 5. Although groundwater originating at or flowing through Site 5 ultimately will reach the vicinity of H-26, the analytical data indicate that the plume may have reached steady-state conditions and does not leave the base property due to dilution and dispersion processes.

BACKGROUND

Tt NUS was assigned to address several perceived data gaps resulting from the regulatory review of the draft Phase II RI. These tasks include the following:

- Tt NUS was assigned to investigate the effects of the geologic structure on the groundwater flow and plume migration at Site 5. EPA questioned if the dip of the sedimentary bedrock units (to the northwest) caused either the dissolved-phase groundwater plume or a separate-phase DNAPL to migrate from the source area located near monitoring well cluster location 05MW01 to the northwest toward monitoring well cluster 05MW03, where approximately 50 ug/L of various chlorinated solvents were detected in the intermediate well but none were detected in the shallow (water table) well. The intermediate well (05MW03I) is screened just above a very fine-grained claystone unit. Tt NUS had earlier concluded that the solvents detected in 05MW03I were not part of the main plume that has been delineated at Site 5. An additional monitoring well is considered necessary to address EPA queries.

- Tt NUS was also assigned to recommend drilling locations for additional monitoring wells in the southwestern portion of the site to fill a gap noted by EPA in the existing solvent plume delineation. The available data indicate that there is a component of groundwater flow to the southwest and that the groundwater quality has been impacted immediately to the southwest of the source area (at monitoring well cluster 05MW10). EPA stated that there are insufficient monitoring wells downgradient of 05MW07 from which to obtain water quality data to accurately map the full extent of the plume. The only existing monitoring wells in that

quadrant are the shallow wells 05MW05S (40 feet deep) and 05MW04S (30 feet deep). Additional monitoring wells are considered necessary to allay concerns voiced by EPA.

- Tt NUS was assigned to investigate the possibility that bedrock in the vicinity of the solvent plume source area (near cluster 05MW01) is impregnated with chlorinated solvents and acting as a continuing solvent source.

SUMMARY OF PLANNED FIELD INVESTIGATIONS

The objective of this study is to conduct an environmental investigation of bedrock and groundwater quality on Navy property near Site 5 in order to fill data gaps identified by regulatory community members. Information will be used to more accurately delineate the current nature and extent of the known contaminant plume near the former fire training area on Navy property. All field activities will be governed by the Work Plan, and Health and Safety Plan (Brown & Root Environmental 1997) and Addenda prepared for phase II remedial activities at NASJRB Willow Grove, Horsham Township, Pennsylvania.

Rock Core Investigation

One rock core will be obtained from the assumed historical solvent plume source area near 05MW01 (see Figure 3 for the approximate location of the planned coring). The actual boring location will be marked in the field. The drilling subcontractor will obtain a 2 inch diameter core sample from the bottom of soil/fill to an approximate depth of 25 feet below ground surface. The soil/rock core will be transferred to clean polyethylene sheeting for immediate photo record, examination, and handling/sampling by USGS. Samples will be obtained at a minimum of 5 foot intervals, and at major fractures. USGS will supply equipment to cut samples from the rock core and crush the samples. At each sample interval, USGS will obtain six slices (approximately 2 inches of length) from the rock core. Two of the slices will be crushed and placed in sealed vials; two will be crushed and placed in vials with methanol; and two will be placed in airtight glass/teflon containers for possible future analysis. Rock core samples will be analyzed at the USGS National Laboratory. The crushed rock core sample placed in vials will be analyzed using a water extraction procedure developed by USGS. The water and methanol extract solutions from the crushed rock core samples will be analyzed for VOC's using EPA approved methods. Appendix A is a copy of a field verification study of TCE in fractured bedrock developed by Beth Parker (see Appendix A).

Monitoring Well Installation

Figure 1 shows the proposed locations for additional monitoring wells. Actual locations will be marked in the field before drilling activities begin. After boreholes are installed, USGS will perform geophysical analyses on the open borehole. The Tetra Tech NUS lead geologist and the USGS geophysicist will confer to make recommendations for monitoring well construction in each borehole based on known features.

To investigate the effects of the geologic structure on the groundwater flow and potential plume migration against groundwater flow gradient at Site 5, a borehole (05MW12) will be installed downdip (north of) 05MW01 near the runway (see Figure 1). Based on a rate of dip of 7°, the top of the finer-grained units encountered in 05MW01 at subsurface depths of 0 feet, 82 feet, and 106 feet (which is the unit that 05MW03I is screened above) would be encountered at the new location at subsurface depths of 32 feet, 114 feet, and 138 feet, respectively.

A new intermediate monitoring well (05MW05I) clustered with existing well 05MW05S will be installed to close the data gap in the measured plume extent to the southwest. A well in this location will provide additional hydraulic head and water quality data in a direction potentially downgradient from the source area near 05MW01 and downgradient from the impacted groundwater at 05MW10. Monitoring well 05MW05S has been sampled during both phases of the RI and has never had a positive detection of any VOC, but it is possible that the groundwater plume could have migrated through this area at some depth below the total depth of the shallow well. Due to the rather steep vertical hydraulic gradient at Site 5 the new monitoring well should be installed at a depth of approximately 250 feet.

A third new monitoring well (05MW04I) will be installed clustered with existing well 05MW04S. Although this location is actually slightly northwest (rather than southwest) of the source area, the hydraulic head data collected during the Phase II RI did indicate a component of groundwater flow in this direction in the intermediate groundwater zone (because of a lower hydraulic head in monitoring well 05MW03I). Alternatively, the lower hydraulic heads could have resulted from the southward migration of the water level divide to a position just south of the 05MW03 location. Subsequent water level measurement rounds conducted after the RI have not found this same pattern. An intermediate well installed to approximately the same depth as 05MW03I (128 feet) would provide useful hydraulic head data and possibly provide information helpful to the evaluation of the potential for an additional source area in this vicinity.

Survey

The horizontal locations and the elevations (at the top of casing for monitoring wells) relative to mean sea level for the three monitoring wells and one rock coring will be measured and recorded by a land surveyor licensed in the Commonwealth of Pennsylvania.

Monitoring Well Water Level Measurements

All Site 5 monitor wells will be gauged to determine piezometric elevations, groundwater flow direction, and gradient.

Groundwater Sampling

Groundwater samples from all Site 5 monitoring wells, field duplicates, and quality control samples will be obtained after well development. All samples will be analyzed for volatile organic compounds (VOCs) and monitored natural attenuation (MNA) parameters. All pertinent field data will be recorded in a field logbook and on the appropriate sample log sheet.

Groundwater sampling will be conducted in accordance with the low-flow sampling procedure based on USEPA Region III amended Groundwater Sampling Procedure Low-Flow Purge and Sampling Guidance. Monitoring wells will be purged and sampled using a low-flow submersible pump and disposable polyethylene tubing. Groundwater will be directed into a flow-through cell with a multi-probe water quality meter. Each well will be purged until the monitored parameters (pH, temperature, conductivity, turbidity, and dissolved oxygen) of three consecutive readings were within 10 percent.

Field Decontamination

All drilling equipment and sampling equipment will be decontaminated before use, between individual samples, and after drilling and sampling activities.

The down-hole drilling equipment and sampling tools will be cleaned using a high pressure steam generator (steam jenny) before beginning work, between boring and well locations, and at the end of the drilling/well installation program. A temporary decontamination pad will be constructed at the study area in to complete this work. NASJRB will provide potable water for decontamination and cleaning.

The sampling equipment used for collecting samples will be decontaminated before field sampling and between samples (a full discussion of sampling requirements are provided in the Phase II RI Work Plan (Brown & Root Environmental, May 1997). The following decontamination steps will be followed:

- Alconox or liquinox detergent solution wash.
- Potable water rinse.
- Deionized water rinse.
- Air dry.

Field analytical equipment such as pH, conductivity, temperature, and turbidity instrument probes will be first rinsed with Deionized water and then with a portion of the sample liquid.

Investigative Derived Waste

Investigative derived wastes including drill cuttings, development water, purge water, and decontamination fluids will be handled and disposed in accordance with procedures described in the Phase 2 RI Work Plan.

Drill Cuttings

Drill cuttings generated during the rock coring and well installation program will be field screened with a PID. If no elevated organic vapor readings are generated at the rock coring location, the drilling cuttings will be backfilled and the coring hole will be filled with grout. If the drill cuttings from the new well boring locations do not indicate any significant PID readings, the cuttings will be spread around the immediate area of the well.

Development Water

Development water from the newly installed monitoring wells will be directed away from the wellhead and discharged to the ground surface and allowed to infiltrate the soil. If PID readings elevated (above background) are noted at any monitoring well, development water from that well will be containerized, sampled and stored on site pending test results for disposal.

Purge Water

Purge water from the newly installed monitoring wells will be directed away from the wellhead and discharged to the ground surface and allowed to infiltrate the soil. The purge water from newly installed wells will be containerized if the development water from those wells was containerized. Purge water from wells with a known history of VOC compounds will be containerized because VOC compounds are not found in Site 5 soils.

APPENDIX A

Field Verification of TCE Matrix Diffusion in a Fractured Sandstone and Implications for Natural Attenuation and Remediation

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200 University Avenue West, Waterloo, ON, Canada, N2L 3G1
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Sedimentary rocks such as sandstones, siltstones, mudstones and shales are referred to as fractured porous media because of their appreciable primary porosity (intergranular porosity) in the matrix between fractures. The primary porosity of lithified sediments generally ranges from a few per cent up to 25%, several orders of magnitude greater than the secondary porosity due to the presence of fractures. Although the matrix has appreciable porosity, the permeability is governed by pore size, and these lithified sediments are referred to as dual permeability media given that the matrix generally has very low permeabilities compared to the fractures, which provide the main avenues for water and DNAPL flow, especially below the water table where the matrix pores are completely filled with water. This large difference between fracture and matrix porosities is an important feature of fractured sedimentary rocks and greatly influences the distribution of chlorinated solvent mass in these deposits in terms of DNAPL persistence as well as solute movement.

Groundwater samples collected from conventional monitoring wells represent a mixture of waters from various fractures, which can be biased in several ways. In some cases, one fracture with exceptionally high concentrations can cause an appearance of relatively high concentrations throughout the open interval in the borehole if this fracture has high hydraulic conductivity; or fractures with high hydraulic conductivity but low concentration levels can mask the presence of high concentration zones. There is no way to determine from monitoring well data alone whether the water samples from the well provide a representative average or a severely biased result. In addition, these groundwater samples are rarely in equilibrium with the pore water concentrations in the matrix and therefore, tell us nothing about the distribution of chemical mass between the relatively immobile pore water of the matrix as compared to the free-flowing water in the fractures. The contaminants such as trichloroethene (TCE) migrate into these low permeability yet porous matrix blocks between fractures by molecular diffusion, which is driven by the chemical's concentration gradient in the aqueous (groundwater) phase. The matrix blocks between the fractures serve as large reservoirs for contaminant mass allowing matrix diffusion alone to cause complete dissolution of immiscible-phase solvents initially present in fractures. Therefore, matrix diffusion diminishes concentrations within plumes, which is a form of natural attenuation.

To investigate this form of natural attenuation, the distribution of TCE in a sandstone matrix was determined by chemical analysis of rock core subsamples taken from two boreholes at an industrial site in southern California. Use of TCE over several decades has resulted in contamination in the underlying Cretaceous Age arkosic sandstone, which contains occasional

beds of siltstone and claystone. Estimated hydraulic conductivities of this formation range from 1.5×10^{-5} to 8.5×10^{-11} cm/s and matrix porosities range from 5 to 16% based on measurements on 11 core samples. The two corehole locations were selected where existing monitoring wells installed within the upper 100-ft of the formation yielded groundwater concentrations of TCE in excess of 10 mg/L. Continuous cores were collected from top of rock (at or near groundsurface) to a depth of 360 ft into rock. Using a field protocol developed specifically for this project, small subsamples (15-180 grams wet-weight) were taken from the core for immediate preservation in 120 ml glass VOA bottles containing a pre-weighted amount of high purity methanol. Three hundred and fifty-nine subsamples were collected and preserved in methanol in the field, of which 271 samples were analyzed. The vertical spacing between discrete-depth subsamples generally ranged between 5 and 10-ft, with 0.5 to 1-ft spacing near many apparent fractures identified during core inspection. The methanol-extract analysis provides total concentrations for TCE per unit-weight of water-saturated rock. These data for the two locations are presented in Figures 1 and 2. Calculations using parameter values for matrix porosity and sorption convert these concentrations to equivalent groundwater concentrations in the matrix pore water.

The rock core concentrations with depth shown in Figures 1 and 2 exhibit large contrasts in TCE distribution. At the location in Figure 1, which is closest to a historical TCE release location, the highest TCE concentrations occur in the vadose zone between 30 and 70-ft depths. At this location, the water typically fluctuates between 70 and 80ft below ground surface (bgs). Almost no TCE was found greater than 130-ft bgs. However, at the second location (Figure 2), no detectable concentrations were obtained in the vadose zone, but high concentrations are observed to a maximum depth of 250-ft bgs. The detection limit for rock core analyses, expressed as equivalent groundwater concentration, varies from sample to sample and ranges from 100-500 ug/L. The highest concentration measured in the matrix pore water was 40 mg/L using a representative retardation factor of 3.75 and matrix porosity of 12%. There is considerable variability in measured concentrations over short distance intervals, indicating the location of contaminant pathways. The profiles of TCE concentration vs. depth show thick zones of TCE at relatively high concentration. Therefore, because the matrix porosity is very large relative to the fracture porosity and because sorption occurs primarily in the matrix, it is apparent that nearly all of the TCE mass at the two locations exists in the rock matrix where groundwater flow has minimal influence. This TCE mass in the matrix serves as a reservoir causing long-term groundwater contamination.

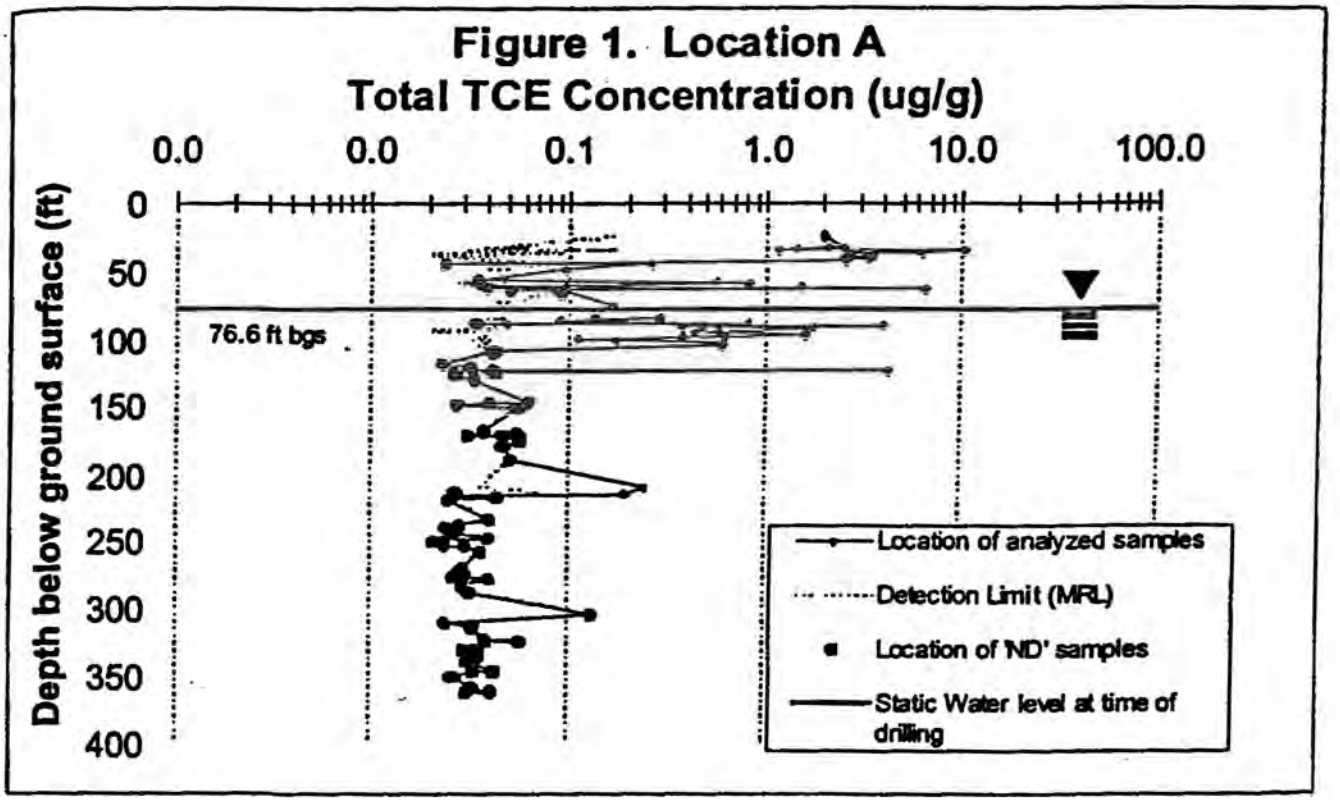
Figure 1. Location A
Total TCE Concentration (ug/g)
0.0
0.0
0.1
1.0
10.0
100.0
Depth below ground surface (ft)
0
50
100
150
200
250
300
350
400
76.6 ft bgs
Location of analyzed samples
Detection Limit (MRL)
Location of 'ND' samples
Static Water level at time of drilling

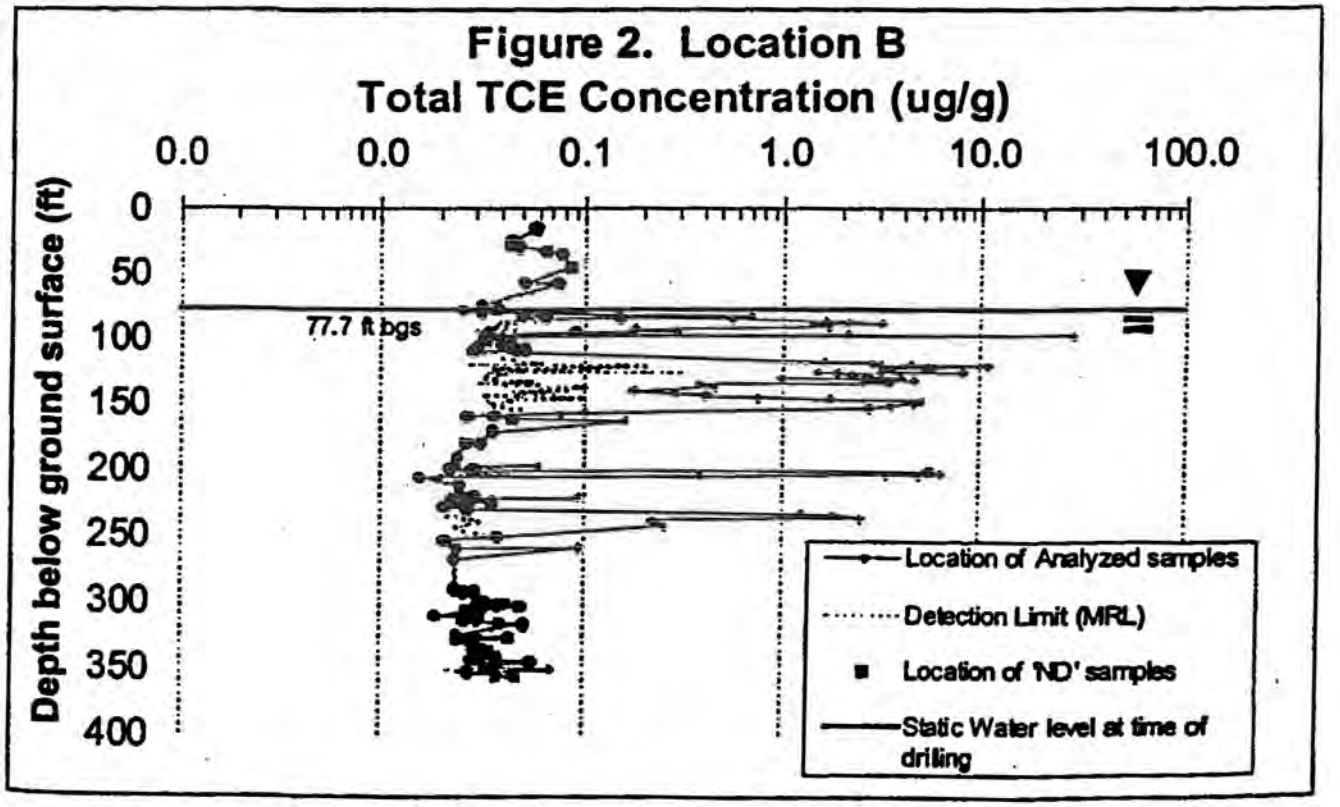
Figure 2. Location B
Total TCE Concentration (ug/g)
0.0
0.0
0.1
1.0
10.0
100.0
Depth below ground surface (ft)
0
50
100
150
200
250
300
350
400
77.7 ft bgs
Location of Analyzed samples
Detection Limit (MRL)
Location of 'ND' samples
Static Water level at time of drilling

LBNL-42718

Proceedings of the International Symposium on
DYNAMICS OF FLUIDS IN FRACTURED ROCKS
Concepts and Recent Advances

In Honor of Paul A. Witherspoon's 80th Birthday

February 10–12, 1999

Edited by

Boris Faybishenko

Earth Sciences Division
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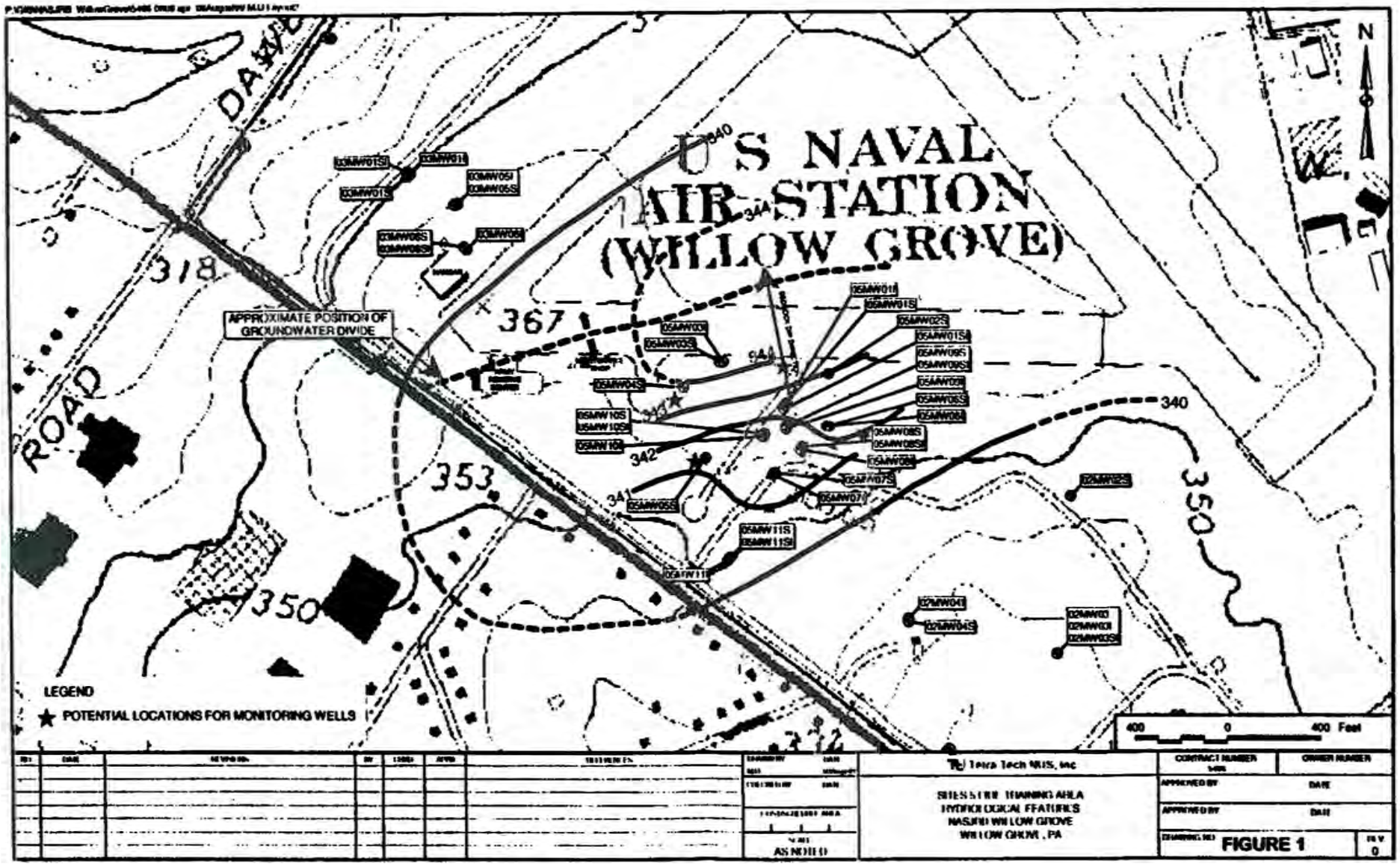
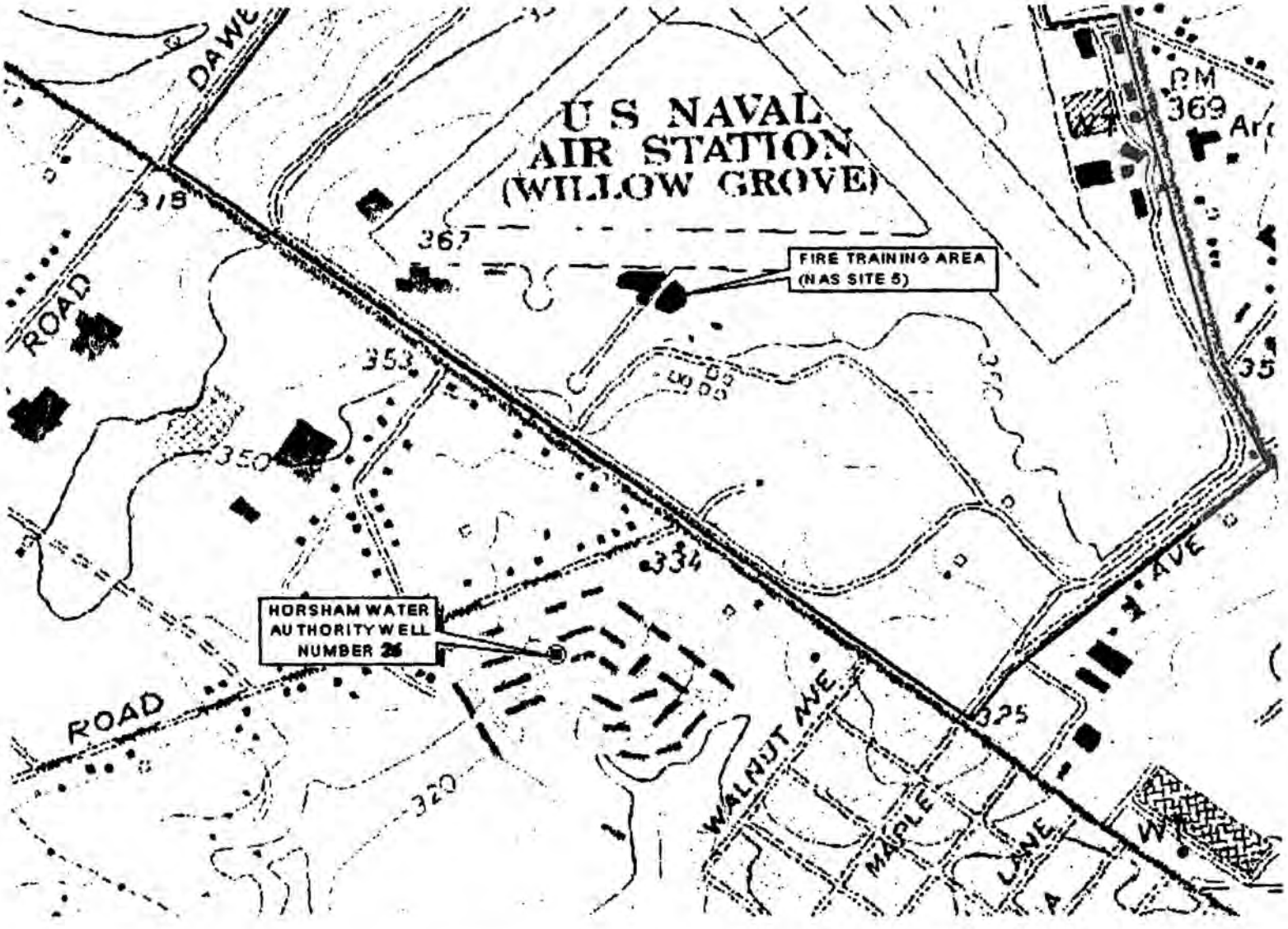
FIGURES


U S NAVAL
AIR STATION
(WILLOW GROVE)
APPROXIMATE POSITION OF
GROUNDWATER DIVIDE
ROAD
DAVIS
340
341
342
350
353
367
318
N
LEGEND
POTENTIAL LOCATIONS FOR MONITORING WELLS
400 0 400 Feet
Tetra Tech NUS, Inc
SITE STUDY TRAINING AREA
HYDROLOGICAL FEATURES
NASJRB WILLOW GROVE
WILLOW GROVE, PA
AS NOTED
FIGURE 1
0



NASJRB WILLOW GROVE SITE 5 - FIRE TRAINING AREA
HORSHAM WELL 26 LOCATION

FIGURE 2

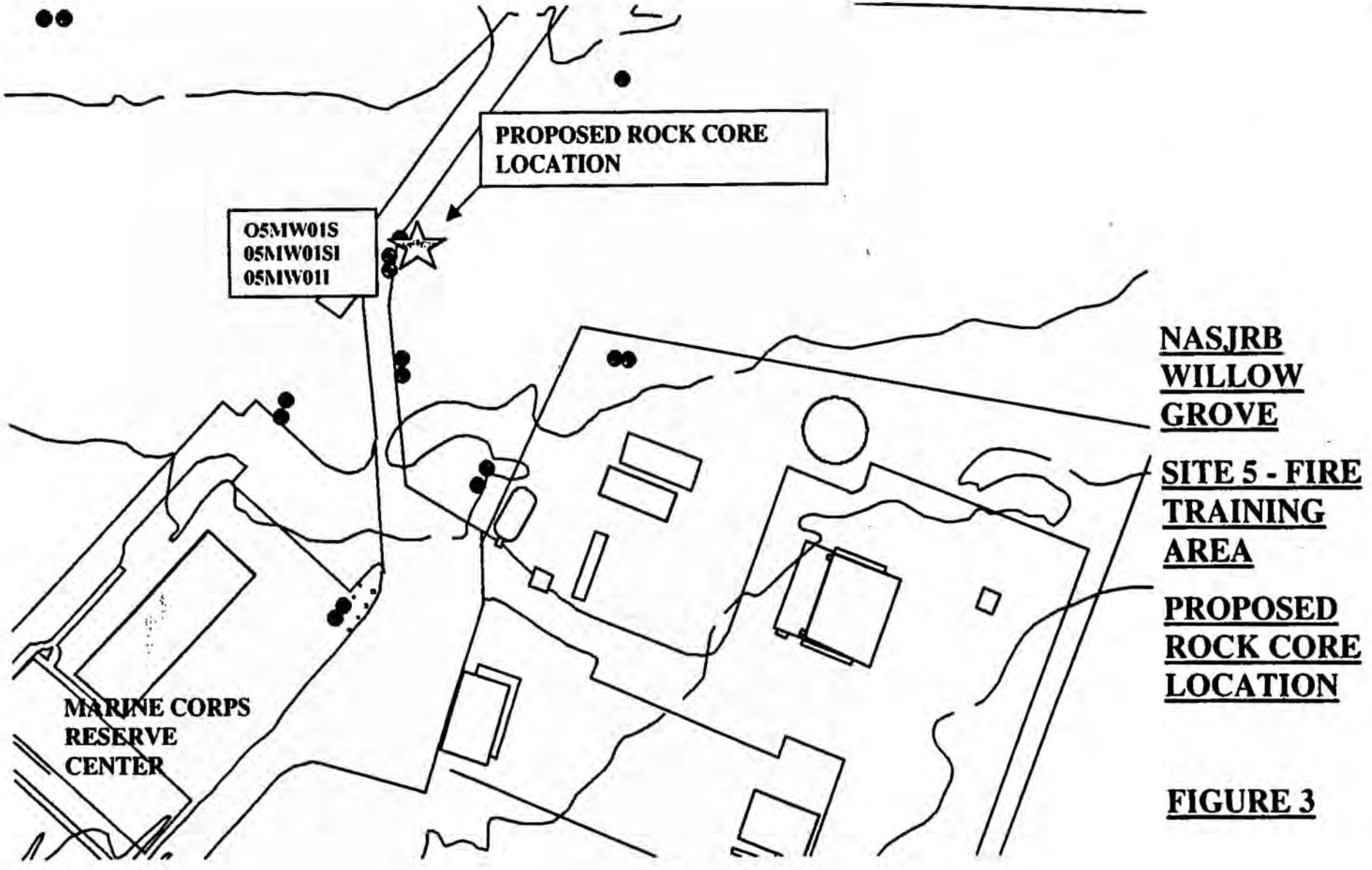

PROPOSED ROCK CORE LOCATION
O5MW01S
05MW01SI
05MW01I
NASJRB WILLOW GROVE
SITE 5 - FIRE TRAINING AREA
PROPOSED ROCK CORE LOCATION
MARINE CORPS RESERVE CENTER

FIGURE 3

Recent USGS Work

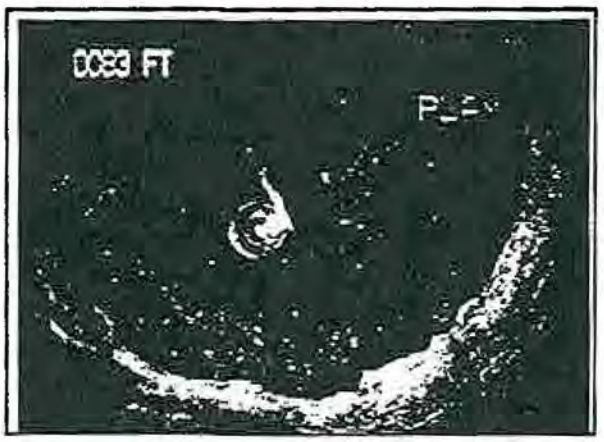
- Production Wells
  - Monitoring during Aquifer Tests
  - Geophysical Logging
  - Packer Testing
- Regional 'Water Table' Mapping
- Horsham Well #26 Shutdown

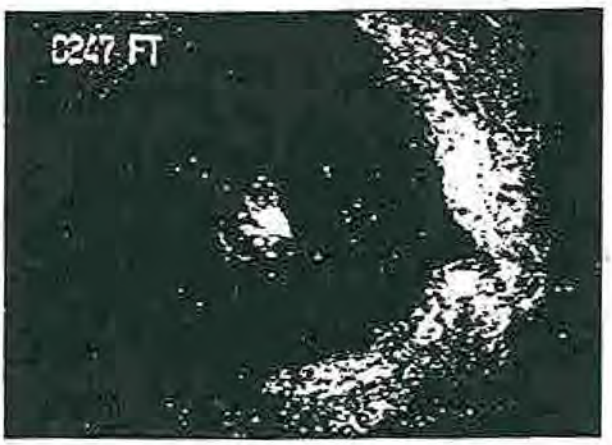
USGS

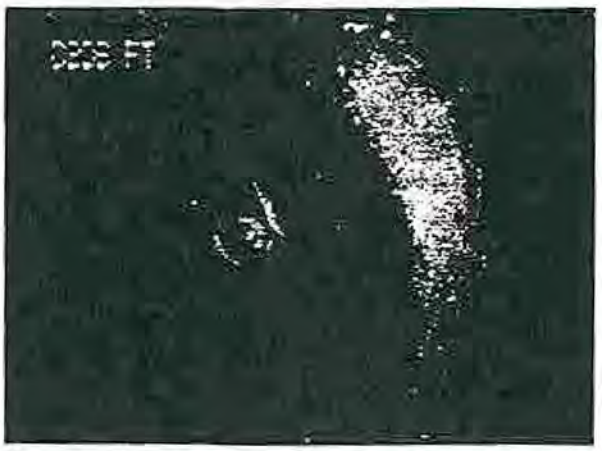
Navy Production Wells

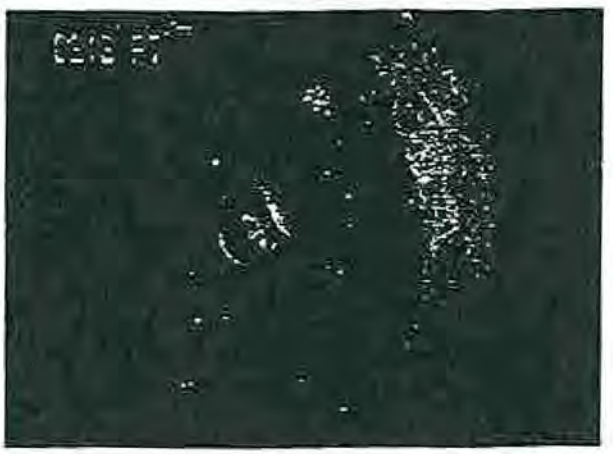
- Geophysical Logging
- Monitoring during Aquifer Tests
  - Testing by TetraTechNUS
  - Continuous water levels
- Packer Testing

USGS







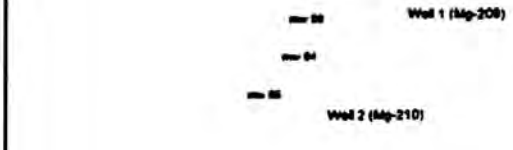


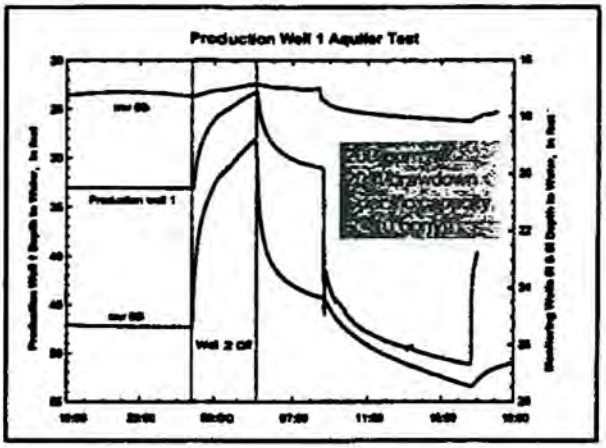
ATTACHMENT (C)

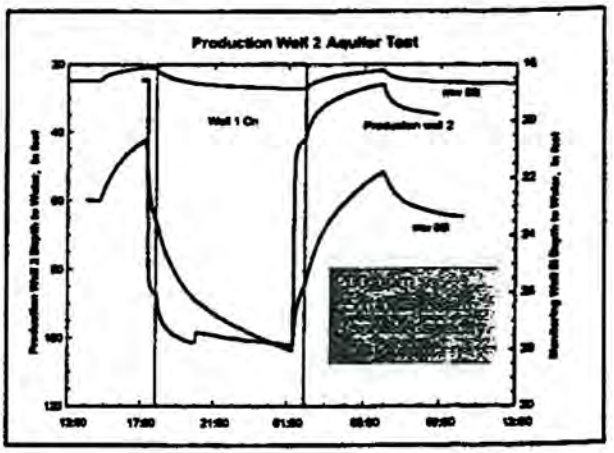
Navy Production Wells

- Geophysical Logging
- Monitoring during Aquifer Tests
  - Testing by TetraTechNUS
  - Continuous water levels
- Packer Testing

USGS



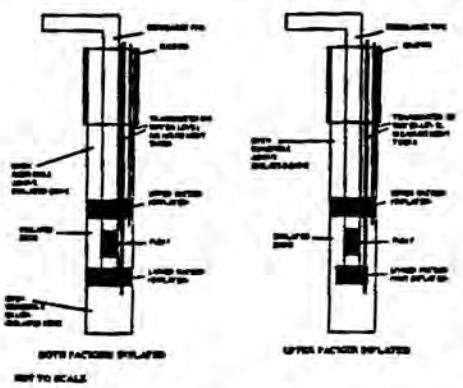


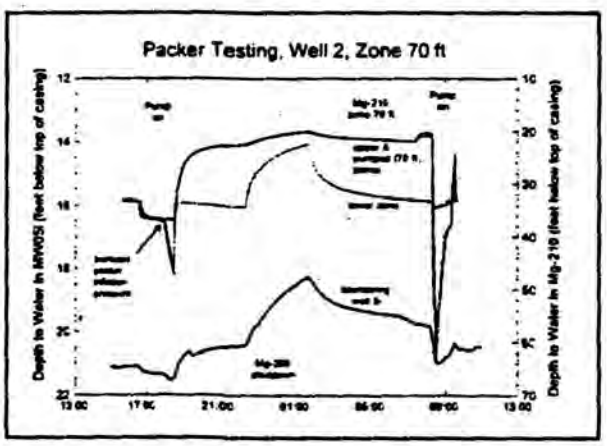


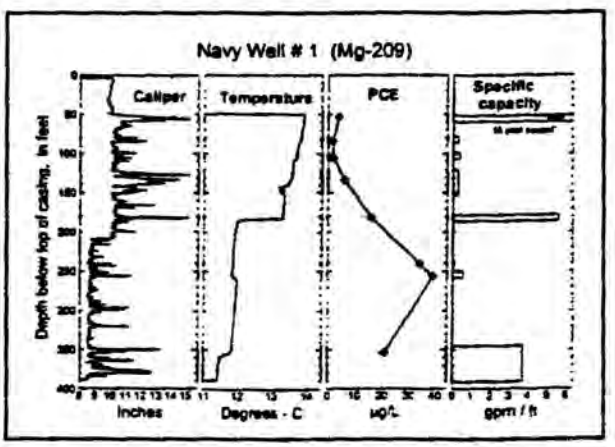
Navy Production Wells

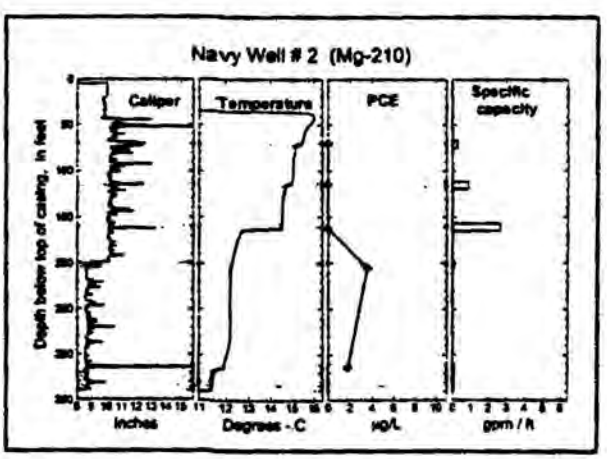
- Geophysical Logging
- Monitoring during Aquifer Tests
  - Testing by TetraTechNUS
  - Continuous water levels
- Packer Testing

USGS





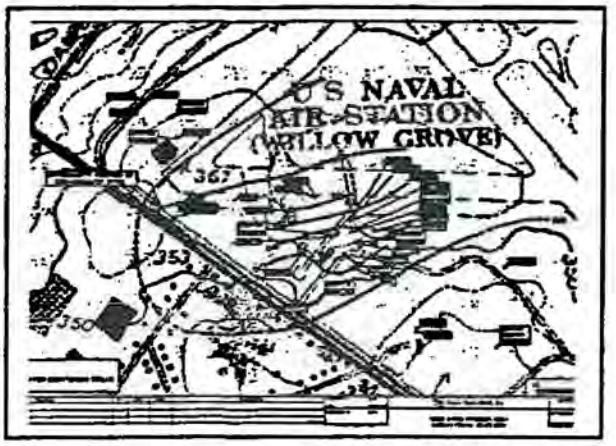


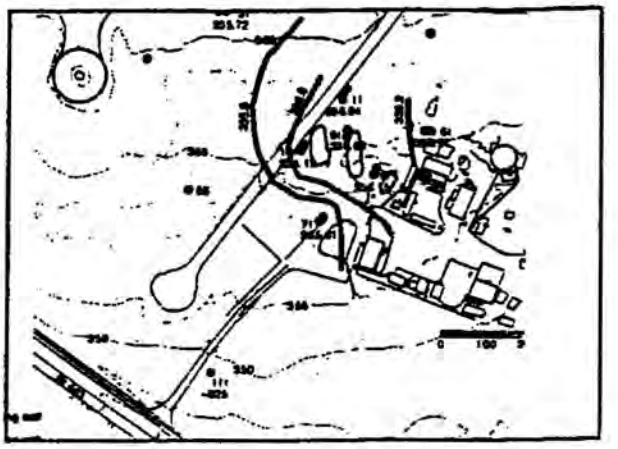


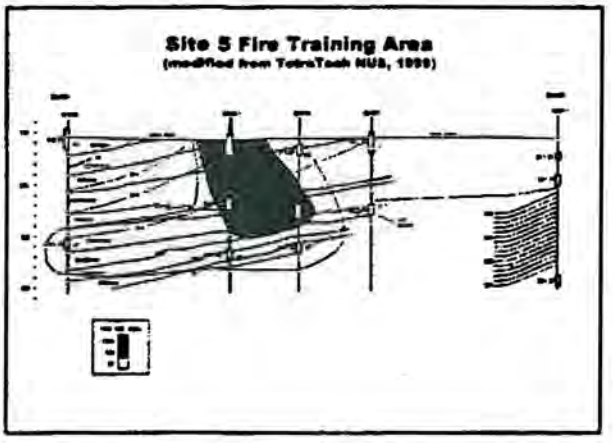
Water Table Mapping

- Monitoring indicator levels
- Regional levels and flow directions

USGS



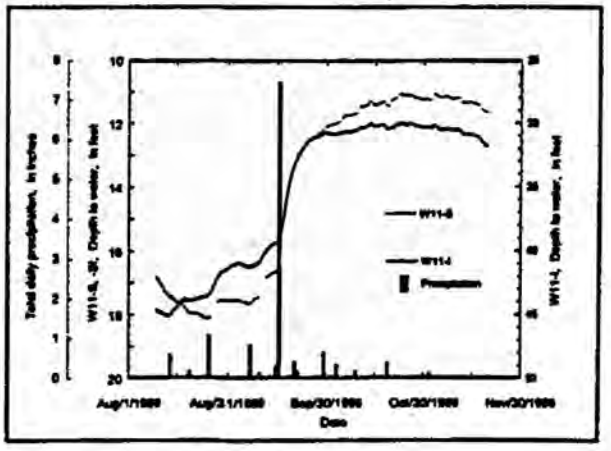


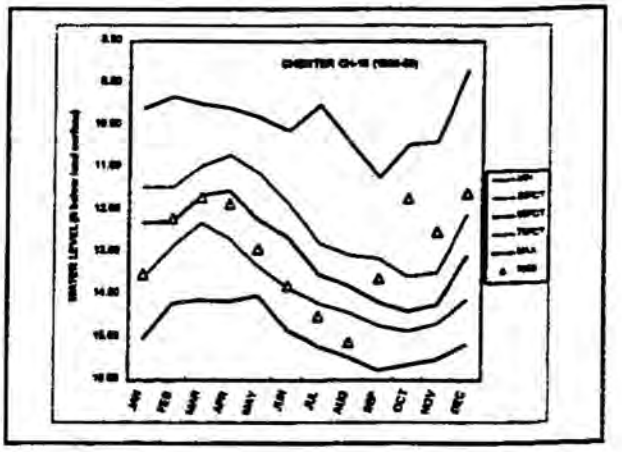


Water Table Mapping

- Monitoring indicator wells
- Regional levels and flow directions

USGS





Water Table Mapping

- Monitoring indicator wells
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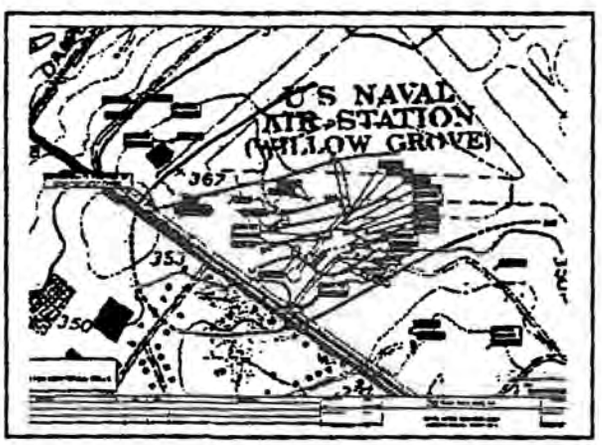
USGS



Shutdown Test of Horsham Well 26

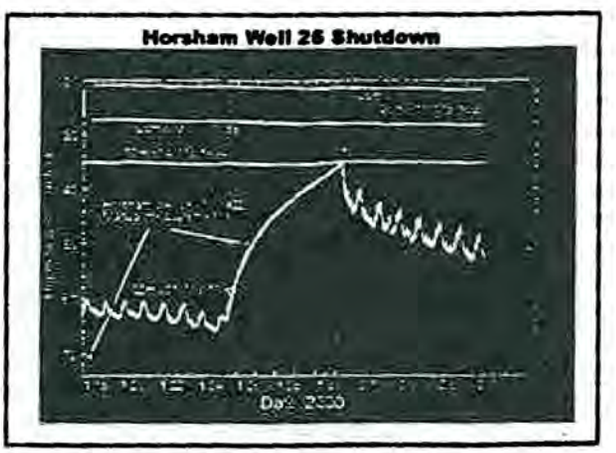
- Public-supply well on tank level switch
- Remove well from service for 6 days
- Monitor water levels
  - TetraTech NUS onsite wells
  - USGS well 26 & homeowner well
- Identify response to shutdown

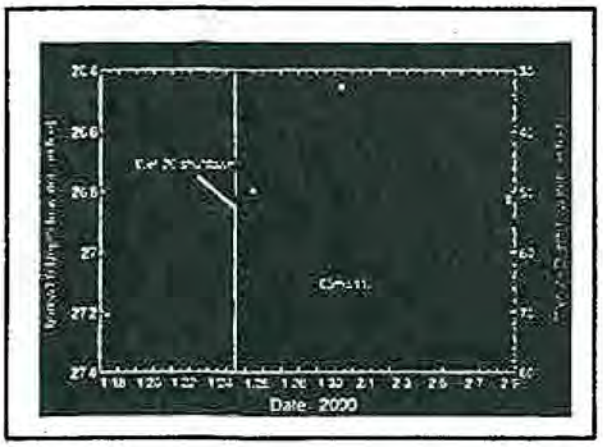
USGS

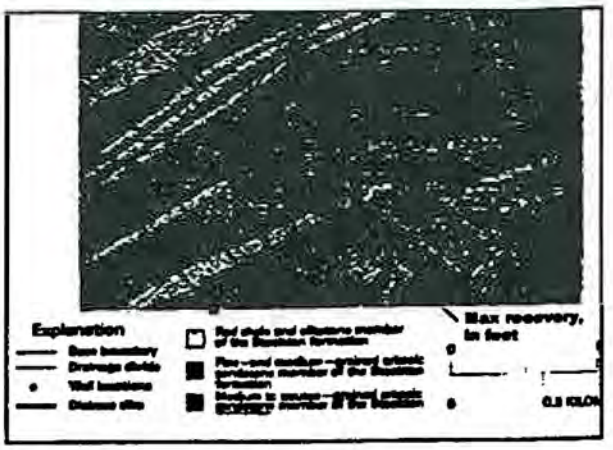
Maximum Recovery after 6 days

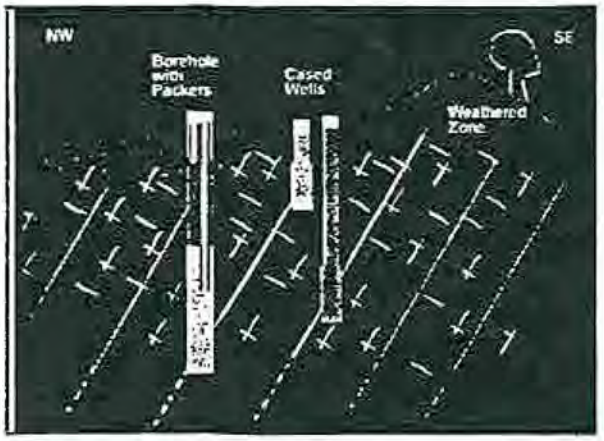
• Horsham # 26	37-40 ft
• 02 mw 01i	28 ft
• 05 mw 11i	0.5 ft
• 02 mw 01s	0.3 ft
• 02 mw 04i	0.3 ft

- All other wells had negative recovery, i.e., the water level dropped





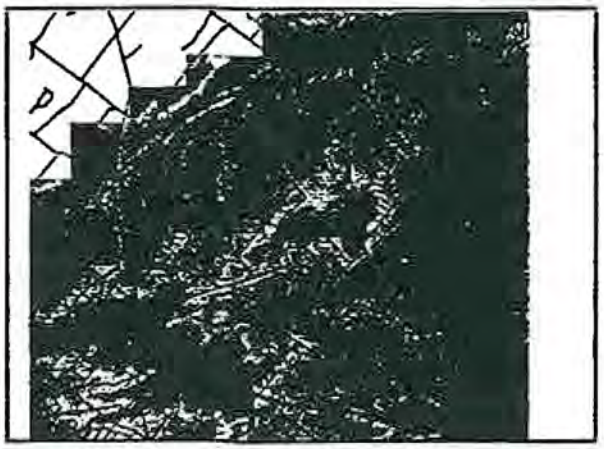


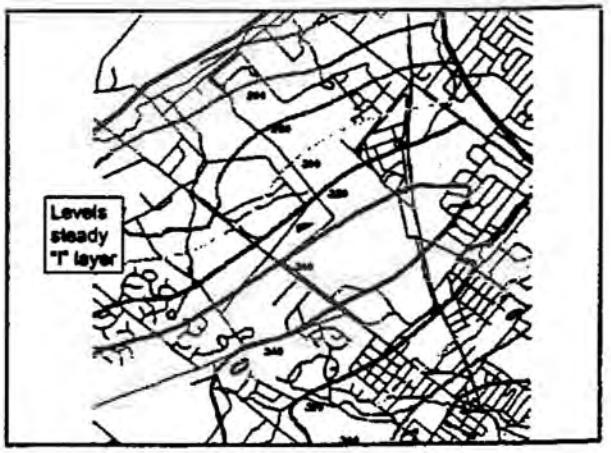


Quantitative Interpretation Ground-Water Flow Model

- Match simulated and measured water levels
- Steady state, pre-shutdown
- Transient response to shutdown
- Simulate contributing areas to streams and wells, average steady-state.

USGS





The End

- Hydrologic Atlas (1 sheet) for w.t. map
- Production well testing report
- Shutdown test report
- Near-term plans
  - Log new monitoring boreholes, Site 5
  - Measure VOC's in shallow core, Site 5

USGS

NAVY REVIEW OF EPIC PHOTOS
FORWARDED BY USEPA REGION III

IR SITE 5 – FIRE TRAINING AREA

INTRODUCTION

In April 1999, the USEPA Region III forwarded a Microsoft Powerpoint file showing a series of anomalies for each of the Navy's Installation Restoration (IR) Sites. These anomalies were identified as a result of the EPA's review of a series of aerial photos known as an EPIC Study. The Navy was requested to review the anomalies at each of the IR Sites and show that soil sampling was conducted in the area of an anomaly or provide rationale for why they are not an environmental concern. Although anomalies were identified for each of the Navy's four main IR sites, the information below will only focus on those anomalies associated with IR Site 5 – Fire Training Area. As each Remedial Investigation (RI) is finalized for each of the IR Sites, a separate rationale, similar to what is provided below, will be provided for each separate IR site and included into the Final RI for that particular site.

ANALYSIS OF EPIC PHOTOS

The first step in the Navy's review of the EPA's EPIC Photos was to independently review each EPIC feature to determine when the feature was first identified. This enabled the Navy to collect background information regarding the potential cause of the feature. A site visit was then conducted and environmental personnel interviewed to try and determine what the anomaly actually might have been. The site visit for IR Site 5 was conducted on October 24, 2000.

The features identified by the USEPA as being of potential concern at IR Site 5 were divided into three categories; (1) those features that are actually within the site boundaries of IR Site 5, (2) those features that are to the south of IR Site 5 and fall within the boundaries of IR Site 6, and (3) those features that are within the boundary of the former Marine Corps Reserve Training Compound.

FEATURES WITHIN IR SITE 5

These features are limited to those on the northern half of the powerpoint slide for Site 5. By overlaying the locations of soil sampling that was conducted as part of the Navy's Phase I and II RI's, it has been determined that each of these anomalies has been subjected to soil sampling and for those areas where the sample result is above a soil cleanup standard, it will be dealt with accordingly. Please note that soil cleanup standards have not yet been established for this site.

26GS appears present in August 17, 1971 as areas of high reflectivity. They appear similar in nature to the sand traps at the golf course, and may represent sand piles. One alternate explanation is the three light colored objects could be aircraft fuselages that were staged in this area and used as part of the fire fighting training effort.

TR6A may exist in the May 5, 1964 photo, but appears to be a part of a longer linear feature, most likely a road. No other evidence of this feature was found during the site visit.

TR6 (there are two, this is the eastern one) is most visible in May 5, 1964. It appears to be a linear trench or drainage ditch filled with water. There are other similar features (water filled ditches) evident on the photo. The photo was likely taken during a wetter period. The feature is visible in the June 1978 photo but appears as an area of different color. The most likely explanation for this could be a lack of vegetation. It is not discernable in the August 1971 photo. According to Jim Edmond, NASJRB Willow Grove Environmental department, this feature was a drainage ditch that was necessary to divert surface runoff during the time that re-grading was underway to raise the runway. This ditch bends south and directed flow towards the fence at the Marine Training Area. A lighter colored feature can be seen in the 1977 photo that looks like an drainage outlet from this surface water runoff system.

The other TR6 feature (the west one) and 19DG are co-located. The area is evident as early as August 17, 1971 and may represent storage piles for sand or airplanes. The area appeared to be sparsely covered with trees in May 5, 1964. By 1977, the area is more cleared of vegetation. The ground areas of TR6 and 19DG, and 26GS and 38DG are evident. Part of 19DG is dark in color and parallel to the roadway in the false color July 13, 1984 photo. By 1992, the roadway seems out of service and is now accessed from the south.

GS40 appears to be the burn area located at IR Site 5. This area was sampled during the Navy's Phase I RI effort.

DB6 is visible in many of the photos. It is the primary staging area for the FFTA, and has been extensively investigated during the Navy's Phase I and II RI efforts.

ST2 could not positively be identified, however it's location is very close to the approximate location of a trailer that is shown in figure 4.5.1 of the SI. This anomaly was found in the May 5, 1964 photo and again in July 13, 1984 photo. This anomaly was not located during the October 2000 site visit.

FEATURES WITHIN IR SITE 6

The southern half of the area are less evident features, usually of shorter duration. This second area includes IRP Site 6 – Former Rifle Range #1. This entire area has been re-worked between 1992 and is the present location of a newly constructed Marine Corps Reserve Training Building with an associated paved parking area surrounding the building.

10OS may be a feature visible on the August 17, 1971 photo Frame 5. It seems to be casting a shadow to the Northeast. This could be a parked vehicle, whatever the feature is, it is on a paved area.

7DG is difficult to discern on the photos. It could be part of the larger 38DG in the June 1, 1978 photos, frame 2 in particular. That may be the only set of photos of scale large enough to identify a feature of this size.

1DG is not evident in the photos, but may represent regrading for the parking area described in TR6. This would have occurred between 1984 and 1992.

DG 29 is visible in the August 17, 1971 photos, frame 5 but does not appear to be of a significant environmental concern.

38DG is most evident in the 1942 photos and appears to be the location of the raised rifle range berm for the Former Rifle Range #1 (IR Site 6). In the 1958 photos, the area is being regraded. In the 1978 photos, these two areas just appear to be bare ground. By 1984, the eastern feature is paved or gravel. It was reported that this area was cleared of bullet fragments prior to re-grading in 1965. This location, along with those to the south such as 7DG, 1DG, and DG 29 were re-graded to construct a parking area for recreational vehicles, and later in the 1990's to construct Buildings 176, 177, and 178. Lead sampling was conducted during construction of these new buildings and the results indicated that concentration of lead were detected but were below established background levels for the installation (memo from Jim Colter dated 05 May 1994).

DB6 appears in the June 1, 1978 photos. It also appears to be a feature in August 17, 1971 photo.
It is observed that the 1978 photo set is of the largest scale, enabling identification of numerous small ground scars in the vicinity of site 5. This photo set also clearly identifies a large construction project that appears to be the expansion of the TARMAC. The pond at the NW edge of the Air force's aircraft parking area also appears to be undergoing maintenance of some sort. Due to this construction, a number of larger ground scars and evidence of dirt staging can be found throughout the facility. The June 1978 photos appear to be from a drier period, as many dry areas appear as scars also.

FEATURES WITHING FORMER MARINE CORPS RESERVE TRAINING CENTER

The third area is the former Marine Corps Reserve Training Compound, a fenced area where no disposal activities were reported to have taken place. In general, the features are discussed in a north to south direction.

ST6 appears in June 1, 1978 as three large objects stored south of the fire fighter area. This area was describes as containing a number of small storage buildings of different sizes and construction methods built over a period of time and nicknamed the Marine Shanty-town. The construction of Buildings 638 and 639 eliminated the need for the shanty-town and the structures were removed. No disposal is reported to have taken place within the Marine compound.

OS3/OS5, 10OS appear to be within the Marine reserve area within the fence, where no disposal has been reported.

CONCLUSION

It has been concluded that all of the anomalies identified at IR Site 5 during the EPA's EPIC Study have had some level of soil sampling associated with it. It is further concluded that the other anomalies that are not directly associated with IR Site 5 are features that are not associated with disposal activities and are, therefore, not of any environmental concern.

EVALUATION OF GROUNDWATER SAMPLE DATA QUALITY
NASJRB WILLOW GROVE
PHASE II REMEDIAL INVESTIGATION

Problem Definition

Based on spot review of some of the groundwater sampling data from the phase II remedial investigation (RI), EPA expressed concerns that the proper low-flow protocol may not have been followed for groundwater sample collection. EPA requested that the Navy investigate the method used for each groundwater sample taken. EPA requested that a comparison to historical analytical result values from the same monitoring well, and an evaluation of data usability evaluation be performed for any sample obtained outside of conformance with the low-flow protocol. The objective was to identify potential impacts on the site conceptual model (and the associated human health risk evaluation) at any study site.

Summary of Investigation

Evaluation of data quality for groundwater samples obtained and analyzed in the RI has been completed. Several samples were not obtained in strict conformance with the "low-flow" procedure in the approved work plan. Analytical results from each sample obtained outside of strict procedural conformance were evaluated using a procedure discussed and agreed to between the Navy and EPA. The data quality evaluation procedure was designed to identify the highest reasonable conservative analyte concentration that could be expected for that sample point. There were cases where the imputed ("new") concentration at a particular groundwater sampling point (either the highest historical value or two times the phase II RI result) exceeded the concentration used to evaluate human health or ecological risk. However, there was no substantial change to the site conceptual model in any case. No changes are being recommended for the RI risk evaluations or overall conclusions as a result of the data quality evaluation. However, recommendations for additional investigative/confirmatory activities at individual sites are presented below. A summary of the sample result review procedures and conclusions follow.

ATTACHMENT (8)

Results

Site 1 – Privet Road Compound Area

VOCs – The highest historical value for PCE in monitoring well 01MW02S (110 ug/l in 1989) exceeds the 1997 RI result (ND) and the risk-based concentration (RBC [1.6 ug/l]). However, the 1991 RI result (non detect [ND]) and the 1998 Air Force result (ND) agree well with the 1997 RI result.

Although in this case the site conceptual model would be changed by imputing the highest historical value, the 1997 RI result agrees well with other samples obtained in this decade, so no changes to the RI conclusions or human health risk assessment are recommended.

Metals – No metals analyses were performed on groundwater samples in the 1997 RI.

Site 2 – Antenna Field Landfill

VOCs - The highest historical value for TCE in monitoring well 02MW02S (3J ug/l in 1989) exceeds the 1997 RI result (ND) and the RBC (1.6 ug/l). However, four consecutive samples (including the 1997 RI result), obtained after the 3J value, are all ND.

Although in this case the site conceptual model would be changed by imputing the highest historical value, the 1997 RI result agrees well with three other samples obtained after the 1989 3J value, so no changes to the RI conclusions or human health risk assessment are recommended.

Metals – No metals results from the 1997 RI were significantly lower than available historical results. Metals were generally in the range of available historical results for each location.

Site 3 – Ninth Street Landfill

VOCs – The 1997 RI tetrachloroethene (PCE) analytical results obtained from 03MW03S (5J ug/l), 03MW03SI (18 ug/l), 03MW04S (21 ug/l), 03MW06S (29 ug/l), and 03MW06I (39 ug/l) all exceed the RBC (1.1 ug/l) and four of five exceed the MCL (5 ug/l). The corresponding historical high concentration found in existing monitoring wells 03MW03S (13 ug/l), 03MW03SI (37 ug/l), and 03MW04S (84 ug/l) is higher than the corresponding 1997 RI concentration and also exceeds reference criteria. Two times the concentration found in new monitoring wells would be

03MW06S (58 ug/l), and 03MW06I (74 ug/l), which also exceed the corresponding RBC and MCL.

If these imputed higher concentrations were used, the representative concentration used for calculating estimated human health risk would be higher. However, the site conceptual model (approximate extent of the plume) would not change, and the RI conclusions, to perform a feasibility study to investigate ways to mitigate potential health effects and to perform additional groundwater investigations in the vicinity of the Army Reserve Complex, would not change.

RECOMMENDATION: Some or all of these monitoring wells should be sampled again as ongoing surveillance of plume movement or as part of pre-remedial action activities during or after the feasibility study phase.

Metals – The highest historical value for arsenic in monitoring wells 03MW03S and 03MW04S (3J ug/l in 1989) exceeds the 1997 RI result (ND) and the RBC (0.45 ug/l) but is lower than the MCL (50 ug/l). The highest historical value for nickel in monitoring well 03MW03S (1140J ug/l in 1989) exceeds the 1997 RI result (ND) the tap water RBC (73 ug/l) and the MCL (100 ug/l).

Two times the concentration of chromium found in new monitoring well 03MW06I (90.9 ug/l [RBC 18 ug/l; MCL 100 ug/l]), iron (8170 ug/l [RBC 1100 ug/l]), manganese (457 ug/l [RBC 84 ug/l]) and nickel (84 ug/l [RBC 73 ug/l; MCL 100 ug/l]) would exceed the reference criteria noted.

If these imputed higher metals concentrations were used, the representative concentration used for calculating estimated human health risk from groundwater would become higher and the site conceptual model (extent of the plume) would change. However, the two additional "hits" of arsenic from the historical investigations would have limited impact on the calculation of the estimated human health risk because they are near the value of the representative concentration for arsenic used in the risk assessment (1.98 ug/l). Also, using the imputed 2 times the concentrations of chromium, iron, and manganese found in 03MW06I may be considered overly conservative because these metals were not encountered at levels of concern in historical sampling events, and the sample endpoint turbidity value (~400 NTU) encountered in this newly-installed monitoring well indicates the type of sampling difficulty that could result in metals results biased high (due to non-dissolved metals). The RI conclusions to perform a feasibility study to investigate ways to mitigate potential health effects and to perform additional groundwater investigations in the vicinity of the Army Reserve Complex would not change.

RECOMMENDATION: Monitoring well 03MW06I should be sampled using low-flow techniques and analyzed for metals during the next sampling activity in the vicinity of the Army Reserve Complex.

Site 5 – Fire Training Area

VOCs – The 1989 1,1,1-trichloroethane (1,1,1-TCA) analytical result obtained from 05MW01I (260 ug/l), exceeds the 1997 RI result (54 ug/l) as well as the lowest drinking water advisory reference criterion (200 ug/l) and the MCL (200 ug/l). However, three other historical samples from 05MW01I were all ND. In this case the highest historical concentration does not exceed the RBC (790 ug/l).

In the (new) monitoring well samples where no historical results are available, application of the imputed 2 times the 1997 RI concentrations would result in some "hits" being higher for the human health risk assessment estimation, but no new "hits" would result.

In this case, the site conceptual model would change by imputing the highest historical value for 1,1,1-TCA. However, the 1997 RI result agrees well with three other historical samples obtained from 05MW01I. The conceptual model change would only be the addition of another exceedence in 05MW01I, where a more significant exceedence of PCE has already been noted. Therefore, no changes to the RI conclusions, which recommend an FS to evaluate options for Site 5 groundwater, or to the human health risk assessment are recommended.

Metals – No change to the site conceptual model would result from applying the highest historical concentration or two times the 1997 RI value (in the case where no historical value is available).

From: Kevin C. Kilmartin
To: Russ Turner

Date: July 7, 1999

Re: NASJRB WILLOW GROVE: Analysis of Screened Intervals and Fracture Zones for Monitoring Wells Installed During the Phase II RI

TtNUS was tasked to determine whether any of the screened monitoring wells installed during the Phase II RI were completed in such a manner that the vertical position of the well pump could affect the analytical results when sampling the well under low-flow sampling procedures. In order for the vertical position of the pump to influence the sampling results, the groundwater for that well must be migrating or flowing from multiple, hydraulically isolated fractures that are spaced widely enough that the groundwater from one fracture could be preferentially sampled over the groundwater from the other fracture(s).

A top priority of the borehole retrofitting program was to construct the monitoring wells to obtain groundwater from only one groundwater zone and to not interconnect different groundwater zones. To reach this goal, all boreholes were geophysically logged (including borehole flowmeters), and the potential construction plans were reviewed and discussed with the USGS. The resultant individual well plans were then presented to EPA prior to the construction of the wells. I have reviewed the borehole geophysical logs and the well construction details to reconfirm that the monitoring wells were properly constructed as originally scoped and are obtaining groundwater from only one zone. Therefore, the exact vertical position of the pump within the well screen should not matter, because water can only enter the well through the screen, and all the water entering the screen is from the same zone. Some of my observations that led to this conclusion include:

- The vast majority of wells are screened across only one fracture. Therefore, the groundwater can only be entering the screen through that fracture.

- Some wells are screened across a fracture zone, or a series of smaller fractures rather than one distinct larger fracture. These fractures (typically two or three fractures within a five-foot interval) are very closely spaced vertically (generally on the order of one or two feet), and there was no lithologic indications of confining layers between these fractures. Fractures that are spaced so closely vertically are almost certainly hydraulically interconnected; it would be very unusual for these fractures to be hydraulically isolated from each other. In fact, due to the presence of high-angle vertical fractures (from the television survey), some of these "fracture zones" may be the same fracture intercepted on opposite sides of the borehole walls.

- The flowmeter was carefully considered for each well construction. Screens were extended across multiple fractures only if there was no evidence of intraborehole flow between the respective fractures. In fact, some screens were constructed specifically to monitor one fracture(s) but not the other(s) because of evidence of intraborehole flow.

ATTACHMENT (4)(9)

July 2, 1999

NASJRB WILLOW GROVE
REPLY TO EPA TOXICOLOGICAL COMMENTS
DRAFT PHASE II REMEDIAL INVESTIGATION REPORT

GENERAL COMMENTS

1. The decision criteria employed for determination whether a compound is above background and PCOC and CPOC selection should be further explained. As written, the most useful information concerning the selection of a compound as a CPOC, PCOC or significance above background is shown on individual tables which summarize the results of statistical testing. The footnotes should be expanded upon in Section 2.3 of the report and a logic flowchart presented to identify the yes/no result of each test.

Reply: Concur. Selection criteria for chemicals of potential concern will be presented in more detail in Section 2.3. A logic flowchart and/or table will accompany the updated text to further clarify the selection process.

2. Section 3.1.1.4 indicates that representative concentrations were calculated based on both 1997 and 1991 RI data. Data from these two sampling events were pooled, but there is no indication whether sampling populations from each event were comparable. The text should be revised and an analysis presented to ensure that pooling of data for each contaminant was appropriate.

Reply: Concur. The text in Section 3.1 1.4 will be revised to better reflect what was done. Generally (for all media except groundwater) the data sets from 1991 and 1997 were combined because the Work Plan was formulated to obtain samples to further define extent of contamination (i.e., fill data gaps). At each site, the contamination of concern resulted from past practices ending 20 or more years ago, no new contamination has been deposited in the period of the investigation, and the sampling plan was predicated on filling data gaps in contiguous media within the area of concern.

In the case of groundwater, all existing monitoring wells were sampled and risk assessment was calculated based on the most recent (1997) data only. However, at Site 1, there was no metals data from the 1997 sampling round. Therefore, for Site 1, the two data sets were combined (inorganics and organics) to permit human health risk calculations to proceed. In the case of Site 1, the two groundwater data sets will be compared as suggested.

3. Tables are included in the document that present the results of a comparison of surface water analytical data to applicable or relevant and appropriate requirements (ARARs) and to be considered (TBC) values. There are no freshwater chronic ambient water quality criteria (AWQC) provided for aluminum, beryllium or iron (see, for example, Table 4-12). This is incorrect. The aluminum criterion is pH dependent and may be calculated based on site-

specific or proxy pH values. The iron criterion is 1,000 micrograms per liter (µg/L). The beryllium value is 5.3 µg/L (lowest observed effect level). All tables should be updated using applicable freshwater chronic AWQC.

Reply: Concur. All appropriate tables will be updated using chemical-specific freshwater chronic AWQC values.

4. References for citations in the human health risk assessment portions of the RI report are not provided. References for all citations located throughout the RI report should be provided.

Reply: Concur. References will be added or updated in the human health risk assessment portions of the report.

5. Section 3 presents a discussion of five potential receptors for the NASJRB Willow Grove sites. In addition, extensive risk calculations were prepared for each receptor for each site. However, the human health risk assessment conclusions for each site do not present the results for all five receptors and typically only discuss the results for one or two receptors (i.e., occupational workers and recreational child). It is unclear why the results for each receptor at each site are not discussed in the conclusions, especially when several receptors at each site usually meet EPA's acceptable risk criteria. The results of risk calculations performed for all receptors and all media at each site should be discussed in the conclusion sections for each site so that human health risks for all scenarios are clearly defined. If the results for all five receptor scenarios are not discussed because the scenarios are not applicable for each site (e.g., building residential homes on Site 2, Antenna Road Landfill, or Site 3, Ninth Street Landfill), then these receptors and scenarios should have been screened out in the exposure assessment (Section 3.1.3).

Reply: Concur. The conclusions for each of the site-specific human health risk assessments will be updated to include text concerning all of the carcinogenic and noncarcinogenic risks for all potential receptors that are exposed to media at that site.

6. The evaluation of the sites includes data collected from various media in 1991 during the Phase I Remedial Investigation in addition to the Phase II data. The use of different temporal data sets should be discussed and the figures should be revised to clearly distinguish between samples collected during the two events.

Reply: Data appearing on maps could pertain to the 1991 or 1997 remedial investigations. In the case of groundwater sample results reported on figures, the year the groundwater sample was obtained is noted with the result. For other media, such as sediments and soils, the text and tables provide the requested information.

July 2, 1999

7. In order to avoid potentially unnecessary institutional controls to limit excavation, subsurface soil risk evaluations to potential receptors, including future residents should be performed. Similarly, residential rather than industrial RBCs should be used to screen for COPCs. Otherwise, an institutional control may be necessary to ensure that the property remains industrial/commercial and is not used for residential development at any time in the future.

Reply: Future land use at the base is known. The land use will remain as industrial/light industrial and NASJRB Willow will remain as an active military base. Residential and recreational land uses presented in each site-specific human health risk assessment are hypothetical in nature. No change is required to the risk assessment RBCs. Appropriate caveats will be inserted in the text to indicate that if the land use designation were to change in the future, the human health risk assessment selection criteria may need to be revised. — Residential RBCs must be used unless restrictions are already in place (EPA, 2/7/01)

SPECIFIC COMMENTS

1. **Executive Summary, Site 1 - The Privet Road Compound, Page ES-1, Paragraph 2.** This paragraph states that "Consistent with United States Environmental Protection Agency (EPA) guidelines, the 'reasonable anticipated future land use' exposure scenario is Occupational Worker." It is unclear what these guidelines are and how this land use was determined. The human health risk assessment analyses for Site 1, as detailed in Tables 4-24, 4-25, 4-26, and 4-27, indicate that the following scenarios have acceptable carcinogenic and noncarcinogenic risks associated with them: adult/child trespasser, recreational child, and excavation worker. Risks to the occupational worker just slightly exceed EPA's acceptable carcinogenic risk criteria. Cancer and noncancer risks to residents exceed EPA's risk criteria. The paragraph should be revised to accurately reflect the results of all human health and ecological risk assessment analyses. This comment also applies to Section 4.9.

Reply: The subject EPA guidelines referred to, OSWER Directive No. 93555.7-4 (Land Use in the CERCLA Remedy Selection Process), and OSWER 9355.0-69 (Rules of Thumb for Superfund Remedy Selection) will be referenced in the text.

The current and future land use of this property is controlled by the United States Navy. The anticipated land use is described in the Master Plan for NASJRB Willow Grove. The anticipated future land use could change from the current military-type use if there were an Air Station property transfer. There are generally only two methods of transferring this type of Navy property, through BRAC (which would take an act of Congress) or through the GSA, (in the event that parcels were to be declared excess). Under BRAC, action would be taken in accordance with the legislation. Excess property transfers handled by GSA could be conveyed with deed restrictions as determined at the time of property transfer. In

any event, CERCLA 120(h) requirements would apply.

The objective of the Executive Summary and the Evaluation Summary sections is to summarize the pertinent information for a reviewer who may not be interested in studying the entire voluminous RI document. Therefore some information, available elsewhere in the RI/FS record, is not repeated in the summary sections.

This paragraph states that "human health risk assessment ... found that the site does not pose a threat to current or reasonably anticipated future human ... receptors." However, the human health risk assessment analyses indicated that the EPA's acceptable carcinogenic and noncarcinogenic risk criteria are exceeded for adult/child residents. In addition, the occupational worker just slightly exceeds EPA's acceptable carcinogenic risk value. This paragraph should be revised to clearly state the conclusions from the human health risk assessment. This comment also applies to Section 4.9.

Reply: The text will be corrected to reflect that the occupational worker scenario just slightly exceeds EPA's acceptable carcinogenic risk value.

2. **Executive Summary, Site 2 - The Antenna Field Landfill, Page ES-2, Paragraph 6.** This paragraph states that "Consistent with EPA guidelines, the 'reasonable anticipated future land use' exposure scenario is Occupational Worker." It is unclear what these guidelines are and how this land use was determined. The human health risk assessment analyses for Site 2, as presented in Tables 5-25, 5-26, 5-27, and 5-28, indicate that the following scenarios have acceptable carcinogenic and noncarcinogenic risks associated with them: occupational worker, adult/child trespasser, recreational child, and excavation worker. Cancer and noncancer risks to residents exceed EPA's risk criteria. The paragraph should be revised to accurately reflect the results of all human health and ecological risk assessment analyses. This comment also applies to Section 5.9.

Reply: The subject EPA guidelines referred to, OSWER Directive No. 93555.7-4 (Land Use in the CERCLA Remedy Selection Process), and OSWER 9355.0-69 (Rules of Thumb for Superfund Remedy Selection) will be referenced in the text.

The current and future land use of this property is controlled by the United States Navy. The anticipated land use is described in the Master Plan for NASJRB Willow Grove. The anticipated future land use could change from the current military-type use if there were an Air Station property transfer. There are generally only two methods of transferring this type of Navy property, through BRAC (which would take an act of Congress) or through the GSA, (in the event that parcels were to be declared excess). Under BRAC, action would be taken in accordance with the legislation. Excess property transfers handled by GSA could be conveyed with deed restrictions as determined at the time of property transfer. In any event, CERCLA 120(h) requirements would apply.

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The objective of the Executive Summary and the Evaluation Summary sections is to summarize the pertinent information for a reviewer who may not be interested in studying the entire voluminous RI document. Therefore some information, available elsewhere in the RI/FS record, is not repeated in the summary sections.

3. **Executive Summary, Site 2 - The Antenna Field Landfill, Page ES-3, Paragraph 1.** This paragraph states that "human health risk assessment found that the site does not pose a threat to current or reasonably anticipated future human receptors." However, the human health risk assessment analyses indicate that EPA's acceptable carcinogenic and noncarcinogenic risk criteria are exceeded for adult/child residents. This paragraph should be revised to clearly state the conclusions from the human health risk assessment. This comment also applies to Section 5.9.

Reply: This paragraph appears correct as it is written.

4. **Executive Summary, Site 3 - Ninth Street Landfill, Page ES-3, Paragraph 2.** This paragraph states that "Consistent with EPA guidelines, the 'reasonable anticipated future land use' exposure scenario is Occupational Worker and Recreational Child." It is unclear what these guidelines are and how these land uses were determined. The human health risk assessment analyses for Site 3, as detailed in Tables 6-23, 6-24, 6-25, and 6-26, indicate that the following scenarios have acceptable carcinogenic and noncarcinogenic risks associated with them: occupational worker, adult/child trespasser, recreational child, and excavation worker. However, the human health risk assessment analysis indicates that EPA's acceptable noncancer criteria is exceeded for adult/child residents. The paragraph should be revised to accurately reflect the results of all human health and ecological risk assessment analyses. This comment also applies to Section 6.9.

Reply: The subject EPA guidelines referred to, OSWER Directive No. 93555.7-4 (Land Use in the CERCLA Remedy Selection Process), and OSWER 9355.0-69 (Rules of Thumb for Superfund Remedy Selection) will be referenced in the text.

The current and future land use of this property is controlled by the United States Navy. The anticipated land use is described in the Master Plan for NASJRB Willow Grove. The anticipated future land use could change from the current military-type use if there were an Air Station property transfer. There are generally only two methods of transferring this type of Navy property, through BRAC (which would take an act of Congress) or through the GSA, (in the event that parcels were to be declared excess). Under BRAC, action would be taken in accordance with the legislation. Excess property transfers handled by GSA could be conveyed with deed restrictions as determined at the time of property transfer. In any event, CERCLA 120(h) requirements would apply.

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The objective of the Executive Summary and the Evaluation Summary sections is to summarize the pertinent information for a reviewer who may not be interested in studying the entire voluminous RI document. Therefore some information, available elsewhere in the RI/FS record, is not repeated in the summary sections.

5. **Executive Summary, Site 3 - Ninth Street Landfill, Page ES-3, Paragraph 2.** This paragraph states that the "human health risk assessment found that the site does not pose a threat to current or reasonably anticipated future human receptors." However, the human health risk assessment analyses indicated that EPA's acceptable noncarcinogenic risk criteria is exceeded for adult/child residents. This paragraph should be revised to clearly state the conclusions from the human health risk assessment. This comment also applies to Section 6.9.

Reply: This Paragraph appears correct as written. In an attempt to keep this summary concise, only pertinent information is presented. Other information is readily available elsewhere in the RI/FS documents.

6. **Executive Summary, Site 5 - The Fire Training Area, Page ES-4, Paragraph 7.** This paragraph states that "Consistent with United States Environmental Protection Agency (EPA) guidelines, the 'reasonable anticipated future land use' exposure scenario is Occupational Worker". It is unclear what these guidelines are and how this land use was determined. The human health risk assessment analyses for Site 3, as detailed in Tables 7-23, 7-24, 7-25, and 7-26, indicate that the following scenarios have acceptable carcinogenic and noncarcinogenic risks associated with them: occupational worker, adult/child trespasser, and recreational child. However, the human health risk assessment analysis indicates that EPA's acceptable cancer and noncancer risk criteria are exceeded for adult/child residents. In addition, the EPA's noncancer criteria are exceeded for a future excavation worker. The paragraph should be revised to accurately reflect the results of all human health and ecological risk assessment analyses. This comment also applies to Section 7.9.

Reply: The subject EPA guidelines referred to, OSWER Directive No. 93555.7-4 (Land Use in the CERCLA Remedy Selection Process), and OSWER 9355.0-69 (Rules of Thumb for Superfund Remedy Selection) will be referenced in the text.

The current and future land use of this property is controlled by the United States Navy. The anticipated land use plan is described in the Master Plan for NASJRB Willow Grove. The anticipated future land use could change from the current military-type use if there were an Air Station property transfer. There are generally only two methods of transferring this type of Navy property, through BRAC (which would take an act of Congress) or through the GSA, (in the event that parcels were to be declared excess). Under BRAC, action would be taken in accordance with the legislation. Excess property transfers handled by GSA could be conveyed with deed restrictions as determined at the

time of property transfer. In any event, CERCLA 120(h) requirements would apply.

The objective of the Executive Summary and the Evaluation Summary sections is to summarize the pertinent information for a reviewer who may not be interested in studying the entire voluminous RI document. Therefore some information, available elsewhere in the RI/FS record, is not repeated in the summary sections.

7. **Executive Summary, Site 5 - The Fire Training Area, Page ES-5, Paragraph 1.**
This paragraph states that "human health risk assessment found that the site does not pose a threat to current or reasonably anticipated future human. receptors." However, the human health risk assessment analyses indicated that EPA's acceptable carcinogenic and noncarcinogenic risk criteria are exceeded for adult/child residents. This paragraph should be revised to clearly state the conclusions from the human health risk assessment. This comment also applies to Section 7.9.

Reply: This paragraph appears to be correct as written.

8. **Executive Summary, Human Health Risk Assessment, Site 1 - The Privet Road Compound, Page ES-19, Paragraph 5.**
This paragraph states that "the total cumulative carcinogenic risk for the current occupational worker is equal to EPA's target carcinogenic risk range at Site 1 for the RME scenario." However, Table 4-24 indicates that the calculated total risk is 1.20E-4 which marginally exceeds the EPA target carcinogenic risk range of 1.0E-4 to 1.0E-6. Consideration of site-specific conditions, as well as risk management factors, should dictate the need for action (or not) in this instance. In addition, the results for human health risk assessment analyses for all receptors should be included in this paragraph.

Reply: The text will be corrected to reflect that the occupational worker scenario just slightly exceeds EPA's acceptable carcinogenic risk value.

9. **Executive Summary, Human Health Risk Assessment, Site 2 - The Antenna Field Landfill, Page ES-21, Paragraph 5.**
This paragraph states that "noncarcinogenic HIs for the potential receptors at Site 2 are less than 1.0". However, Tables 5-27 and 5-28 indicate that the total cumulative RME and CTE noncarcinogenic risk for adult/child residents exceed the EPA's noncarcinogenic HI value. The text should be revised so that it is consistent with the summary data tables. In addition, the results for human health risk assessment analyses for all receptors should be included in this paragraph.

Reply: This section appears to be correct as written. The objective of the Executive Summary and the Evaluation Summary sections is to summarize the pertinent information for a reviewer who may not be interested in studying the entire voluminous RI document. Therefore some information, available elsewhere in the RI/FS record, is not repeated in the

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summary sections.

10. Executive Summary, Human Health Risk Assessment, Site 3 - Ninth Street Landfill, Page ES-24, Paragraph 5.

This paragraph states that "the total cumulative carcinogenic risk for the future residential receptor is 9E-05 under the RME" risk scenario. However, Table 6-23 indicates that the total cumulative carcinogenic risk for the future residential receptor is 4.54E-05 under the RME risk scenario. This paragraph also states that "the RME risk for groundwater consumption ... for a future residential receptor is 7E-05". However, Table 6-23 indicates that the carcinogenic risk for groundwater consumption for a future residential receptor is 1.51E-05. The text should be revised to correct these inconsistencies. In addition, the results for human health risk assessment analyses for all receptors should be included in this paragraph.

Reply: Concur. The text will be revised for numeric inconsistencies.

The objective of the Executive Summary and the Evaluation Summary sections is to summarize the pertinent information for a reviewer who may not be interested in studying the entire voluminous RI document. Therefore some information, available elsewhere in the RI/FS record, is not repeated in the summary sections.

This paragraph states that iron and barium in groundwater are main contributors to the RME and CTE noncarcinogenic risk at Site 3 for a future residential child and adult receptor. However, the results shown in Appendix J, Tables J-35 and J-36, appear to indicate that chromium and manganese are stronger contributors to risk in groundwater. In addition, this section also states that iron and dieldrin in surface soil are the main contributors to noncarcinogenic risk at Site 3. However, the individual contaminant results shown in Appendix J, Table J-5 and J-6 indicate that for a future residential child, the main contributor is iron followed by aluminum, manganese, and dieldrin. For a future residential adult, the main contributor is iron, followed by aluminum, dieldrin, and manganese. The text should be revised so that it is consistent with the data tables or an explanation as to how dieldrin was chosen as a main contributor should be included.

Reply: Concur. The text will be revised for risk driver inconsistencies.

11. Section 2.0, Field Investigation, Page 2-1.

Field activities and collection of samples which were conducted during the Phase I Remedial Investigation, 1991, should be discussed in this section.

Reply: The Phase I RI Report contains a complete discussion of these activities. Where appropriate, Phase I RI samples are discussed in the site-specific Nature and Extent of Contamination sections for each of the four IR sites in the Phase II RI.

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12. **Section 2.3, Establishment of Background Concentrations, Page 2-31.**
The limitations of using surface soil as a surrogate for subsurface background conditions should be discussed.

Reply: Concur. The limitations of using background surface soil as a surrogate data set for background subsurface soil will be discussed in the human health risk assessment uncertainty section.

13. **Section 2.3, Establishment of Background Concentrations, Page 2-31, Paragraph 2.**
This paragraph states that background sample analytical statistics for groundwater were not attempted. However, background sample analytical statistics for groundwater are presented for each site. The text and tables should be revised to correct this inconsistency. Also, note that in the specific comments for each site, as discussed below, that the groundwater background sample analytical statistic tables appear to be incorrect.

Reply: Concur. Text and tables concerning background analytical statistics related to groundwater data sets will be removed from each site-specific human health risk assessment.

14. **Table 2-13**
Many of the calculated means are the same as 95th percent UTLs. Please explain. Also, when the 95th percent UTL for background exceeds the maximum detection for a given compound, was the maximum detect used as the default comparison value?

Reply: Disagree. In Table 2-13, 95% UTLs were not calculated. Only the background means were listed. The text "95 % Upper Tolerance Limit (UTL)" is present as a divider section with only the very last column of the table actually showing the UTL value.

15. **Section 3.1.1.3, Page 3-4**
Contrary to the text on this page, it seems that background concentrations were considered for the screening of organics.

Reply: Disagree. Background concentrations were not considered for the screening of organic compounds. Information regarding background concentrations and organics were presented in the report for informational purposes only. Text and tables will be revised as appropriate to clarify that background comparison analysis was not used to eliminate organic chemicals as COPCs.

16. **Section 3.1.1.3, Identification of Chemicals of Potential Concern (COPC), Page 3-6, Paragraph 5.**
This paragraph explains the exceptions to the COPC selection for each medium described on Pages 3-4 to 3-6. However, due to the formatting of the text, it appears that these exceptions are only relevant to groundwater COPC selection. These exceptions should be

moved to the beginning of Section 3.1.1.3, so that it is clear that they are relevant to COPC selection for all media.

Reply: Concur. The text will be revised as appropriate to clearly explain COPC selection.

In addition, the tables in Section 4, 5, 6, and 7 which illustrate the COPC selection for each site appear to indicate that chemicals that do not have an RBC will not be selected as a COPC. However, this approach is not discussed in the text. All criteria that were used to include or exclude a chemical as a COPC should be discussed in the text. Chemicals lacking RBCs should be retained as COPCs or evaluated using structurally similar surrogates.

Reply: Chemicals without a quantitative RBC will be retained as COPCs and will only be discussed qualitatively in the uncertainty section of the human health risk assessment [surrogates will not be assigned to COPCs without quantitative toxicity values because of the high uncertainty associated with this procedure]. Text and tables will be revised as appropriate.

Also, on pages 3-5 and 3-6, screening benchmarks for sediment and surface water are based on professional judgement. This should be clearly stated in the text.

Reply: Concur. Selection of sediment and surface water exposure scenarios will be clarified in text.

17. **Table 3-1, Page 3-12.**
A number of discrepancies were found in a comparison between values presented in Table 3-1 and IRIS (on-line), HEAST (1997), Region III RBCs (April 1998), and Region III Oral ABS Values for Oral-to-Dermal Extrapolation (December 1996). Since no dates were provided in this Table 3-1 and no references were provided with the human health risk assessment, it was not possible to identify the source of the discrepancies. The following values obtained from the references listed above are different from those in Table 3-1.

A. Fraction of COPC Absorbed in the Gastrointestinal Tract N/A for carcinogenic PAHs.
0.89 for RfD; CSF see IRIS for PCBs.
0.02 for Vanadium.
0.025 for Zinc.

B. Oral RfD
2.0E-02 for 1,1,1-trichloroethane.
3E-02 for 1,2-dichloroethane.
3E-03 for benzene.

2E-03 for beryllium.

C. Dermal RfD and SFs
See following comment on Section 3.1.2.4., Page 3-14

D. Inhalation RfD
1.4E-03 for 1,2-dichloroethane
1.4E-01 for tetrachloroethene
5.7E-06 for beryllium

E. Inhalation SFs
1.4E-02 for Bis(2-ethylhexyl)phthalate
2.0E+00 for PCBs

Reply: The values for Oral RfD (Comment B), Inhalation RfD (Comment D), and Inhalation SF (Comment E) were all taken from Region 3 RBC Tables dated 3-14-97, which was the latest update at the time the risks were estimated. For Fraction of COPC Absorbed in GI Tract (Comment A), Table 3-1 lists the values as provided from ATSDR, which at the time the risks were estimated were considered to be representative of fraction of COPC absorbed in the GI Tract.

18. Section 3.1.2 Toxicity Assessment, Adjustment of Dose-Response Parameters, Paragraph 5, Page 3-14 and Table 3-1, Page 3-12.
The equations for deriving dermal RfDs and SFs from oral RfDs and SFs are correct in the text. However, the dermal RfDs and SFs are calculated incorrectly as shown in Table 3-1. It appears that in the table, the oral RfDs were incorrectly divided by the $ABSEFF_{oral}$ to derive the dermal RfDs, and the oral SFs were incorrectly multiplied by the $ABSEFF_{oral}$ to derive the dermal SFs. However, a spot check of the calculations in Appendix J indicates that the correct dermal RfDs and SFs were used.

Reply: Concur. Table 3-1 will be revised as appropriate for numeric inconsistencies.

19. Table 3-3, Page 3-17.
The absorption factors presented in Table 3-3 represent chemical-specific values to adjust site doses, not toxicity values. These factors apply only to soil and sediment and represent the "ABS" parameter for dermal pathway (e.g., in Table 3-12).

Reply: Concur. Table 3-3 will be revised as appropriate for numeric inconsistencies.

20. Section 3.1.3.2, Potential Receptors, Page 3-20, Paragraph 4.
This paragraph indicates that cancer and noncancer risks will be estimated separately for adolescent and adult trespassers. However, the summary tables for each individual site present the cancer risk results for adult/child trespassers combined. The text and tables

should be revised to correct this inconsistency. Adult and adolescent trespassers should be evaluated separately.

Reply: Concur. Adolescent and adult trespassers will be evaluated separately for non-carcinogenic effects and carcinogenic effects. Text and tables will be revised as appropriate

21. **Section 3.1.3.5.1, Exposure Estimates, Page 3-23, Paragraph 2.**
The text states that the "CTE is only to be run at a particular site when the total cancer risk exceeds 1E-04 (considered the upper bound of EPA's acceptable risk range) or when the noncarcinogenic HI is greater than 1.0." This approach evaluates the results of the RME scenario first, then determines which site, medium, and receptors require CTE calculations. However in the RI report, the CTE was run for all sites, receptors, and media, although in many cases the RME risks and HI were below EPA acceptable risk criteria. The text should be revised to correspond to the procedures followed in the BRA.

Reply: Concur. The text will be revised to state that "all RME and CTE risks were presented in this risk assessment, however, CTE should only be considered when RME cancer risks exceed 1E-04 or when RME noncarcinogenic HI's exceed 1.0.

22. **Section 3.1.3.5.1, Surface and Subsurface Soil Exposure, Page 3-23, Paragraph 4.**
This section cites EPA, 1989a as the source of the soil ingestion, dermal contact, and inhalation of fugitive dust equations. Since references are not provided, it has been assumed, based on other information presented in the RI report with the same citation, that the source is Risk Assessment Guidance on Superfund (RAGS). However, RAGS does not present the same equations as shown here. For example, the dermal contact equations in the RI report include a factor for EV (event frequency), which is not included in the equations found in RAGS. The correct references for each equation should be provided and if modifications to the referenced, standard equations are made, the modifications should be described. This comment also applies to the surface water, sediment, and groundwater exposure equations.

Reply: Concur. The correct references will be cited as appropriate for the equations and any modifications to the standardized equations will be noted and described.

23. **Table 3-10, Page 3-32**
According to this table, the RME exposure frequency for a recreational child is seven days per year. This is not very conservative. Please justify.

Reply: The 7 day/year exposure frequency value is taken from RAGs Part A, as the national average for swimming days per year. Swimming is not evaluated in this BRA, however, 7 days/year was thought to be representative of a typical recreational activities event and as such was applied to the recreational child.

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24. **Table 3-14, Page 3-36**
According to this table, the RME exposure frequency for an excavation worker is 30 days per year. The default value for this receptor is generally 250 days per year. Either the exposure frequency for this receptor should be replaced by a more realistic estimate, or strong justification should be provided.

Reply: Excavation workers are generally not going to be subjected to the same exposure frequency as the standard industrial worker (i.e. 250 day/year exposure). Excavation activities were assumed to last for approximately 1 month per year. Major excavation activities at Willow Grove (i.e., those lasting more than 1 month) are not anticipated.

25. **Section 3.1.3.6, Page 3-61, Paragraph 2**
According to this paragraph, an exposure frequency of 219 days per year was assumed in the adult lead model. Why wasn't the default of 250 days per year used?

Reply: Average exposure values should be input into the adult lead model. An exposure frequency of 219 days per year represents and average value for an industrial worker.

26. **Section 4-5, Nature and Extent of Contamination, Page 4-10.**
Revise the text to correctly refer to Figures 4-21A through C.

Reply: Concur. Text will be corrected.

27. **Table 4-5, Page T-4-4.**
A footnote should be included for the qualifier B. This comment pertains to similar tables in the report.

Reply: Concur. The qualifier B and its meaning (compound also found in blank sample) will be added to each table as appropriate.

28. **Section 4.6.1, Transport and Transformation of Detected Contaminants, Page 4-20.**
Revise text from "reference center" to "reference criteria".

Reply: Concur. Text will be corrected.

29. **Section 4.6.2, Conclusions, Page 4-22.** A discussion should be presented on the compound arsenic in this section. Arsenic was identified as COPC in soils, subsurface soils, sediments, and groundwater. It's presence in these media and elevated concentrations indicate that it is site related and future migration could occur.

Reply: Conclusions based on the discussion of arsenic in Section 4.6.1 will be added.

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30. Section 4.7.6, Conclusions, Page 4-31, Paragraph 4

The section states that other than a future residential child receptor, the noncarcinogenic HIs for the other potential receptors at Site 1 are less than 1.0. However, Tables 4-26 and 4-27 indicate that the RME and CTE noncarcinogenic HIs for a future adult receptor are 1.95 and 1.38 respectively, which exceed the EPA's target HI. The text should be revised to reflect the results presented in Tables 4-26 and 4-27.

Reply: Concur. The risks presented in the text and risks presented in tables will be checked for accuracy and consistency. Appropriate text and/or table changes will be made.

31. Table 4-17, Page T-4-87.

This table presents background comparison test results for groundwater data for Site 1. The footnotes indicate that the overall decision for each groundwater pollutant is NA, if all individual background tests are NA. While the table indicates that all individual background tests are NA for each groundwater pollutant, the overall conclusion for each pollutant is not NA but evaluated as yes or no. This table should be revised so that either the correct overall conclusion for each pollutant is shown or the correct result for each individual background test is shown.

Reply: Concur. Table 4-17 will be changed as appropriate.

32. Tables 4-19 to 4-23, page T-4-105 to T-4-114.

These tables present the COPC selection for each contaminant in each medium at Site 1. However, the footnotes which explain the criteria for COPC selection are not complete. Since the criteria for COPC selection are already described in Section 3, the footnotes should be deleted and a reference to Section 3 should be added. In addition, a final column should be added to the table which describes the reason the contaminant was included as a COPC (i.e., exceeded RBC and background, exceeded RBC, chemical is break-down product of a COPC, etc.) so that it is clear why the chemical was selected as a COPC.

Reply: Concur. The footnotes regarding selection criteria will be taken off Tables 4-19 through 4-23 and a reference to Section 3 selection criteria text will be added. A column will be added to each table stating the reason for inclusion or exclusion of each chemical.

Tables 4-19 to 4-22 include the background results. However, Table 4-23 does not include background results. The format of Tables 4-19 to 4-23 should be consistent and background results should be added to Table 4-23.

Reply: Concur. Tables 4-19 through 4-22 will be checked for consistency and changes will be made as appropriate.

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33. Table 4-23, page T-4-112.

This table presents the selection of sediment COPCs for Site 1. However, Table 4-21 on page T-4-109 presents the same information. In addition, there is a second Table 4-23 on page T-4-113 that presents groundwater COPCs for Site 1. Table 4-23 on page T-4-112 should be removed from the report.

Reply: Tables 4-23 and 4-21 will be checked for content and accuracy and changes to the tables and or text that presents them will be made as appropriate.

34. Table 4-23, page T-4-113.

This table presents the selection of COPCs in groundwater at Site 1. However, some the data listed for the organic contaminants appear to be incorrect. The representative concentration listed for 1,2-dichloroethene (total) is 5. However, Table 4-16 lists the representative concentration as 4.35. The representative concentration listed for tetrachloroethene is 7.49. However, Table 4-16 lists the representative concentration as 9.2. The representative concentration listed for trichloroethene is 11. However, Table 4-16 lists the representative concentration as 12. In addition, Table 4-16 includes 1,1,1-trichloroethane, 1,1-dichloroethane, carbon tetrachloroethene, and toluene. However, these pollutants are not included in Table 4-23. The tables should be revised so that they are consistent.

Reply: Concur. The numbers will be checked concerning risks shown in Tables 4-16 and 4-23 and the numbers referred to in the text. Changes will be made as appropriate.

35. Section 5.6.2 Conclusions, Page 5-12.

A discussion should be presented on the potential for arsenic and dieldrin to migrate from the site. Arsenic and dieldrin were selected as a COPC in soils, subsurface soils, surface water, sediment, and groundwater and detected in seep samples. Erosion of soils was identified as a significant process at the site.

Reply: These issues will be further discussed, as requested.

36. Section 5.7.6, Conclusions, Page 5-22, Paragraph 1.

The section states that other than a future residential child receptor, the noncarcinogenic HIs for the other potential receptors at Site 2 are less than 1.0 However, Tables 5-27 and 5-28 indicate that the RME and CTE noncarcinogenic HIs for a future residential adult receptor are 1.56 and 1.27, which exceed the EPA's target HI. The text should be revised to reflect the results presented in Table 5-27 and 5-28. In addition an HI of 1.56 would round to a value of 2. This discrepancy should be corrected.

Reply: Text will be modified to discuss values found in the tables.

Risks will be presented in the text that are consistent in terms of significant digits.

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37. Table 5-18, Page T-5-66.

This table presents background comparison test results for groundwater data for Site 2. The footnotes indicate that the overall decision for each groundwater pollutant is NA if all individual background tests are NA. While the table indicates that all individual background tests are NA for each groundwater pollutant, the overall conclusion for each pollutant is not NA but evaluated as yes or no. This table should be revised so that either the correct overall conclusion for each pollutant is shown or the correct result for each individual background test is shown.

Reply: Concur. Table 5-18 will be changed as appropriate.

38. Tables 5-20 to 5-24, page T-5-72 to T-5-83.

These tables present the COPC selection for each contaminant in each medium at Site 2. A final column should be added to the table which describes the reason the contaminant was included as a COPC (i.e., exceeded RBC and background, exceeded RBC, chemical is break-down product of a COPC, etc.), so that it is clear why the chemical was selected as a COPC.

Reply: Concur. A column will be added to each table stating the reason for inclusion or exclusion of each chemical.

Tables 5-20 to 5-23 include the background results. However, Table 5-24 does not include background results. The format of Tables 5-20 to 5-24 should be consistent and Table 5-24 should include background results.

Reply: Tables 5-20 through 5-23 will be checked for consistency and changes will be made as appropriate.

39. Table 5-25, page T-5-84.

The sum of the inhalation RME cancer risks for each medium for a future resident is incorrectly stated at 3.10E-07. The correct value is 4.85E-07. The table should be revised so that the correct sum is shown.

Reply: Concur. Table 5-25 will be changed as appropriate.

40. Section 5.5.1.2, Page 5-5.

The document states that TCDD-TEQs exceeded reference criteria in the two surface soil samples that were analyzed for dioxins. However, Table 5-5, which presents a comparison of detected compounds to ARARs and TBCs, does not present the results of the dioxin analyses. Further, it appears that the nature and extent of dioxin contamination may remain undefined. It is not clear that dioxin in surface water, seeps or sediments would have been identified in this evaluation. Therefore, the uncertainty associated with

potential dioxin contamination should, at a minimum, be evaluated as part of the site-specific uncertainty analysis.

Reply: Concur. The dioxin analysis and explanation will be updated in the human health risk assessment.

41. Section 6.5, Nature and Extent of Contamination.
Revise the text to correctly reference Figure 6-11 A through E.

Reply: Concur. These figures should be called Figures 6-12 A through E.

42. Section 6.5, Nature and Extent of Contamination.
According to the text, detections in surface and sediment at this site were determined to be statistically unrelated to the site. The methodology and tests employed to reach this conclusion should be discussed.

Reply: Concur. This issue will be further clarified.

43. Table 6-16, Page T-6-68.
This table presents background comparison test results for groundwater data for Site 3. The footnotes indicate that the overall decision for each groundwater pollutant is NA, if all individual background tests are NA. While the table indicates that individual background tests are NA for each groundwater pollutant, the overall conclusion for each pollutant is not NA. This table should be revised so that either the correct overall conclusion for each pollutant is shown or the correct result for each individual background test is shown.

Reply: Concur. Table 6-16 will be changed as appropriate.

44. Tables 6-18 to 6-22, page T-6-81 to T-6-92.
These tables present the COPC selection for each contaminant in each medium at Site 3. A final column should be added to the table which describes the reason the contaminant was included as a COPC (i.e., exceeded RBC and background, exceeded RBC, chemical is break-down product of a COPC, etc.), so that it is clear why the chemical was selected as a COPC.

Reply: Concur. A column will be added to each table stating the reason for inclusion or exclusion of each chemical.

Tables 6-18 to 6-21 include the background results. However, Table 6-22 does not include background results. The format of Tables 6-18 to 6-22 should be consistent and background results should be added to Table 6-22.

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Reply: Tables 6-18 through 6-21 will be checked for consistency and changes will be made as appropriate.

45. Section 6.7.6, Conclusions, Page 6-24, Paragraph 4.

This section indicates that the total cumulative RME carcinogenic risk for a future residential receptor is 9E-05 and the RME carcinogenic risk for groundwater consumption for a future residential receptor is 7E-05. However, Table 6-23 indicates the results are 4.54E-05 and 2.35E-05, respectively. The text and table should be revised so that they are consistent.

Concur. The text and tables will be checked for accuracy and consistency and revised as appropriate.

This section states that iron and barium in groundwater are main contributors to the RME and CTE noncarcinogenic risk at Site 3 for a future residential child and adult receptor. However, the results shown in Appendix J, Tables J-35 and J-36, appear to indicate that chromium and manganese are stronger contributors in groundwater. In addition, this section also states that iron and dieldrin in surface soil are the main contributors to noncarcinogenic risk at Site 3. However, the individual contaminant results shown in Appendix J, Tables J-5 and J-6 indicate that for a future residential child, the main contributor is iron followed by aluminum, manganese, and dieldrin and for a future residential adult, the main contributor is iron, followed by aluminum, dieldrin, and manganese. The text should be revised so that it is consistent with the data tables or an explanation as to how dieldrin was chosen as a main contributor should be included.

Reply: The text will be revised to be consistent with the data tables.

46. Section 7.5, Nature and Extent of Contamination, Page 7-4.

Revise the text to correctly reference Figure 7-9 A through D.

Reply: Concur. Text will be corrected

47. Section 7.6.2, Conclusions

Examination of figures 7-9A and 7-9B shows soils contaminated with SVOCs and groundwater contaminated primarily with VOCs. The conclusion that "residual soil contamination is a continuing source of VOCs to groundwater" appears unfounded. The text should be revised.

Reply: Concur. This conclusion will be restated to reflect the dearth of VOCs found in soils.

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48. **Section 7.7.1, Data Evaluation, Surface Soils, Page 7-11, Paragraph 3.**
This section lists the organic and inorganic COPCs as presented in Table 7-18. However, dibenzofuran is listed as a COPC in Table 7-18, but is not included on the list. The text should be revised so that it is consistent with the results in Table 7-18.

Reply: Concur. The text will be revised to be consistent with the data tables.

49. **Section 7.7.6, Conclusions, Page 7-21, Paragraph 1.**
The section states that other than a future residential child receptor, the noncarcinogenic HIs for the other potential receptors at Site 5 are less than 1.0. However, Table 7-25 indicates that the RME noncarcinogenic HI for a future adult receptor is 2.24 and Table 7-26 indicates that the CTE noncarcinogenic HI for a future adult receptor is 1.76 and for a future excavation worker is 62.1. The text should be revised to reflect the results presented in Tables 7-25 and 7-26.

Reply: Text will be modified to discuss values found in the tables.

50. **Table 7-16, Page T-7-62.**
This table presents background comparison test results for groundwater data for Site 5. The footnotes indicate that the overall decision for each groundwater pollutant is NA if all individual background tests are NA but evaluated as yes or no. While the table indicates that individual background tests are NA for each groundwater pollutant, the overall conclusion for each pollutant is not NA. This table should be revised so that either the correct overall conclusion for each pollutant is shown or the correct results for each individual background test is shown.

Reply: Concur. Table 7-16 will be changed as appropriate.

51. **Tables 7-18 to 7-22, page T-7-73 to T-7-83.**
These tables present the COPC selection for each contaminant in each medium at Site 5. A final column should be added to the table which describes the reason the contaminant was included as a COPC (i.e., exceeded RBC and background, exceeded RBC, chemical is break-down product of a COPC, etc.) so that it is clear why the chemical was selected as a COPC.

Reply: Concur. A column will be added to each table stating the reason for inclusion or exclusion of each chemical.

Tables 7-18 to 7-21 include the background results. However, Table 7-22 does not include background results. The format of Tables 7-18 to 7-22 should be consistent and background results should be added to Table 7-22.

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Reply: Tables 7-18 through 7-21 will be checked for consistency and changes will be made as appropriate.

52. Table 7-24, page T-7-85.

This table lists values for the estimated CTE total cancer risk for ingestion, dermal contact, and inhalation of subsurface soil for a future excavation worker at Site 5. However, Table J-16, which contains the backup calculations of estimated CTE cancer risks and noncarcinogenic hazard indices for a future excavation worker from subsurface soil exposure at Site 5, lists all the values as NA. The tables should be revised so that they are consistent.

Reply: Table 7-24 and the text presenting it will be checked for accuracy and revised as appropriate.

53. Appendix J, Human Health Risk Assessment Documentation.

Appendix J does not contain page numbers. Page numbers should be included throughout the report, including in Appendix J.

Reply: Concur. Page numbers will be added.

The equation for Surface Soil Exposure, Dermal Contact defines "ABS" as fraction from contaminated source for arsenic. "ABS" should be defined as the chemical-specific absorption factor for dermal contact.

Reply: Concur. The "ABS" term will be defined as appropriate.

The inhalation equation in Appendix J states R_{10} is equal to E_{10}/A. However, Section 3.1.3.5.1 presents R_{10} as equal to $E_{10} * A$. The inhalation equations should be revised to show the correct relationship between the variables and should be consistent throughout the RI report.

Reply: The inhalation equations will be revised as appropriate.

The equations presented in Section 3.1.3.5 and in Appendix J are not consistent. For example, the ingestion equation on Page 3-25 uses different units and includes a 365 days/yr conversion factor. The surface/subsurface soil lung inhalation equation on page 3-25 uses the variable X and IF_R; however these variables are not included in the inhalation equation in Appendix J. Instead, the inhalation equation in Appendix J uses the variables CA and FR-I. CA was previously defined as carcinogenic risk; however in this equation, it represents contaminant concentration. The sediment dermal intake equation on page 3-40 uses the variables BW, SA, ED, and EV; however, these variables are not used in the sediment dermal intake equations in Appendix J. Instead, the sediment dermal intake equation in Appendix J uses the variable AGE. Equations with

consistent nomenclature should be used throughout the RI report and should be consistent with those equations found in EPA reference documents.

Reply: Concur. Consistency regarding terminology will be provided throughout the revised HHRA.

3.2 ECOLOGICAL RISK ASSESSMENT APPROACH

Ecological receptors at NASJRB Willow Grove may be at risk from contaminants associated with Sites 1, 2, 3, and 5. Therefore, an ecological risk assessment (ERA) was performed to characterize the potential risks from site-related contaminants to ecological receptors that inhabit the installation. The ERA was based on laboratory analyses of surface soil, surface water, and sediment samples collected from each site. This section provides an outline of the approach that was taken to assess the impacts of site contamination on ecological receptors and the habitats that support these organisms. This assessment followed a two-step process:

Step 1: Preliminary Problem Formulation and Ecological Effects Evaluation (Section 3.2.1)

- Preliminary Problem Formulation - This is the first phase of an ERA, which discusses the goals, breadth, and focus of the assessment. It includes general descriptions of NASJRB Willow Grove sites with emphasis on the habitats and ecological receptors present. This phase also involves characterization of contaminant sources and migration pathways, evaluation of routes of contaminant exposure, and selection of analytes to be assessed. Assessment and measurement endpoints are also selected in this phase. In addition, a conceptual model is developed that describes how contaminants associated with the RI sites may come into contact with ecological receptors.

- Preliminary Ecological Effects Evaluation - In this phase, medium-specific ecological screening levels for each analyte (i.e., concentrations of each contaminant above which adverse effects to ecological receptors may occur) are identified. This step is undertaken concurrently with the exposure assessment described below.

Step 2: Preliminary Exposure Assessment and Risk Calculation (Section 3.2.2)

- Preliminary Exposure Estimate - This portion of the ERA includes the identification of contaminant concentration data used to represent ecological exposure in various media and the selection of exposure point contaminant concentrations from those data.

- Preliminary Risk Calculation - In this step, exposure point concentrations are compared to screening levels in order to characterize potential risks to ecological receptors of concern. Analytes found to pose potential risk after these comparisons are selected as ecological chemicals of potential concern (COPCs).

When these two steps are completed, the results are interpreted and the uncertainties associated with the ERA are addressed. The above process, described in further detail below, represents the general approach recommended in the most recent U.S. EPA guidance for performing ecological risk assessments (U.S. EPA, 1997), which served as the basis for the ERA methodology. Additional guidance consulted for this ERA includes Department of the Navy ERA policy (DON, 1999), EPA Region III BTAG ERA guidelines (USEPA, 1994), and other ERA guidance documents and publications (Calabrese and Baldwin, 1993; Suter, 1993; Wentsel et al., 1996).

Due to the potential complexity of ERAs, they are usually conducted using a tiered approach and punctuated with Scientific/Management Decision Points (SMDPs). SMDPs are meetings involving the risk managers and risk assessment team and are conducted to evaluate the work up to that point and to ensure that the ecological risk assessment is proceeding in an efficient manner. Information analyzed in one tier is evaluated to determine whether the objectives of the study have been met. The results are then used to identify the data required for the next tier, if necessary. The Tier 1 ERA is also known as a Screening Risk Assessment. The Screening Risk Assessment uses conservative (i.e. stringent) assumptions to evaluate site data and determine whether additional ecological risk assessment or accelerated site cleanup may be warranted, or that the site poses negligible ecological risks.

The second tier is a baseline ERA (BERA), which is conducted if the results of the screening-level ERA indicate that additional study is warranted. The BERA comprises Steps 3 through 7 of the 8-step ERA process, and is a more focused study of the initial COPCs. The beginning of the BERA also presents a more balanced evaluation of the conservativeness inherent in the first two steps of the ERA process (DON, 1999).

3.2.1 Preliminary Problem Formulation and Ecological Effects Evaluation

Section 3.2.1.1 discusses the components of problem formulation and Section 3.2.2.2 discusses the components of ecological effects evaluation.

3.2.1.1 Preliminary Problem Formulation

Ecological Setting

The preliminary problem formulation contains a description of the background of the site and a general description of the ecological setting at NASJRB Willow Grove. These topics are presented in Section 1.4. The main areas of interest at NASJRB Willow Grove for this ERA are Sites 1, 2, 3, and 5. These sites are described in detail in site-specific sections.

Habitat Types and Ecological Receptors

Descriptions of habitat types and ecological receptors were composed for Sites 1, 2, 3, and 5, and are presented in site-specific sections of this report. Data regarding habitats and ecological receptors were obtained from previous reports and from biological characterizations conducted at the installation during this investigation. Information on the occurrence of threatened and endangered species on and near the four sites was obtained from the U.S. Fish and Wildlife Service, the Pennsylvania Game Commission, the Pennsylvania Fish and Boat Commission, the Pennsylvania Department of Environmental Protection, and the Natural Resources Manager at NASJRB Willow Grove.

Contaminant Sources, Release Mechanisms, and Migration Pathways

Site-specific contaminant sources, release mechanisms, and migration pathways are discussed in site-specific sections of this report. The general transport mechanisms that were investigated include combustion, volatilization, wind erosion, overland runoff, and infiltration of contaminants. Constituents in soil could volatilize from surficial material or become airborne through wind erosion. Contaminated fugitive dust could be generated during ground-disturbing activities such as construction or excavation. Contaminants could then be dispersed in the surrounding environment and transported to downwind locations, where they could become deposited in surface soil, surface water, or sediment. Combustion was probably a major transport mechanism during the period when the landfills and fire training area were in use. However, combustion is assumed to currently represent a negligible transport mechanism at NASJRB Willow Grove since open burning activities have ceased.

Precipitation runoff could carry constituents to nearby surface water and sediment. Infiltrating precipitation could cause the contamination of subsurface soil and groundwater. Upon infiltrating the soil column and reaching the water table, a contaminant may be carried with the flow of groundwater to downgradient locations. Groundwater from the site may eventually discharge to surface water; contaminants could be subsequently deposited in sediment or accumulate in the tissues of aquatic organisms.

Exposure Routes

Terrestrial animals could be exposed to soil contaminants through the ingestion of contaminated food items. Animals can also incidentally ingest soil while grooming fur, preening feathers, digging, grazing close to the soil, or feeding on items to which soil has adhered (such as roots and tubers). Terrestrial vegetation could be exposed to contaminants via direct aerial deposition and root translocation. However, aerial deposition was not investigated, primarily because the contaminant sources at the sites under investigation are largely covered by vegetation. Terrestrial animal receptors may also come into contact with contaminants in surface water through drinking, although this exposure route represents a negligible portion of total exposure for most receptors. Exposure to contaminants in the soil via dermal contact may occur but is unlikely to represent a major exposure pathway because fur, feathers, and chitinous exoskeletons minimize transfer of contaminants across dermal tissue.

Inhalation does not represent a significant exposure pathway because air contaminant concentrations are assumed to be quite low, even for burrowing wildlife. In addition, inhalation ecotoxicity data for chronic exposure are lacking. Therefore, the air pathway was not considered for ecological receptors.

Aquatic and semi-aquatic organisms at NASJRB Willow Grove could be exposed to contaminants via direct contact with surface water and sediments, incidental ingestion of surface water and sediments, and consumption of contaminated food items. Aquatic and semi-aquatic organisms could also be exposed to constituents from contaminated groundwater that potentially discharges into nearby surface water.

Selection of Analytes to be Investigated

All analytes detected in surface water, sediment, and surface soil samples collected during 1991 Phase I and 1997 Phase II sampling activities were assessed in this investigation. However, calcium, magnesium, potassium, and sodium were excluded in the screening process since they are essential nutrients that are toxic only in extremely high concentrations. Due to the scarcity of data for these essential nutrients, it was not possible to develop ranges of toxicity even at high concentrations. The limited toxicity data available indicate that high dietary intake of these nutrients is well tolerated.

Assessment and Measurement Endpoints

One of the major tasks in problem formulation is the selection of assessment and measurement endpoints. An assessment endpoint is "an explicit expression of actual environmental values that are to be protected" and measurement endpoints are "measurable ecological characteristics that are related to the valued characteristic chosen as the assessment endpoint" (USEPA, 1997). For this ERA, the assessment endpoint was the maintenance of aquatic and terrestrial receptor populations. Therefore, the specific objectives of this assessment were to determine if exposure to contaminants present in the surface water, sediment, and soil on and near the sites are likely to result in declines in ecological receptor populations. Declines in populations could result in a shift in community structure and possible elimination of resident species from aquatic, semi-aquatic, and terrestrial environments.

Measurement endpoints serve as surrogates for assessment endpoints, since they are more easily quantified or observed than assessment endpoints. Measurement endpoints consisted of contaminant concentrations associated with adverse effects on growth, survival, and reproduction of aquatic organisms (surface water screening levels), benthic organisms (sediment screening levels), and terrestrial vegetation and soil invertebrates (surface soil screening levels).

Conceptual Site Model

The conceptual model is designed to diagrammatically identify potentially exposed receptor populations and applicable exposure pathways, based on the physical nature of the site and the potential contaminant source areas. Actual or potential exposures of ecological receptors associated with the sites were determined by identifying the most likely pathways of contaminant release and transport. A complete exposure pathway has

three components: a source of contaminants that can be released to the environment; a route of contaminant transport through an environmental medium; and an exposure or contact point for an ecological receptor. The conceptual model for each site is presented in site-specific sections of this report.

3.2.1.2 Preliminary Ecological Effects Evaluation

For this ERA, exposure-point concentrations of detected analytes in surface water, sediment, and surface soil were compared to ecologically based guidelines to determine if the analytes should be selected as COPCs. Although groundwater-to-surface-water migration of groundwater contaminants is possible at NASJRB Willow Grove, ecological receptors are not directly exposed to groundwater. Additionally, no groundwater thresholds have been developed based on ecological concerns. Potential ecological risks associated with groundwater contaminants are reflected in the evaluation of the potential risks associated with surface water and sediment, since the sources of contamination at the sites under investigation have been in place long enough for groundwater plumes to discharge into nearby surface water and sediment. Thus, groundwater contaminants were not screened against surface water contaminants in the ecological risk assessment. It is noted that an artesian flowing well formerly existed downstream from the pond near Site 3. However, this well has been capped so that flow from this monitoring well is nonexistent. There are no other flowing artesian wells near any other site investigated in this report. The Navy corrected the problem of flowing artesian monitoring wells during RI field investigations in the spring of 1997 by repairing the leaking sample assemblies. Long-term annual inspection and maintenance of these artesian monitoring wells will ensure no flow of groundwater to surface water.

Methods used for the selection of medium-specific benchmarks used in this ERA are provided below.

Surface Water Screening Levels

Actual exposures of aquatic receptors to surface water contaminants at NASJRB Willow Grove were assumed to be primarily chronic (long-term) exposures, usually at sublethal concentrations. Initial screening levels for this ERA were chronic screening values obtained from USEPA Region III BTAG (EPA, 1995), EPA chronic ambient water quality criteria (AWQC), EPA final chronic values (FCVs), and Tier II values (EPA, 1996b).

Sediment Screening Levels

Initial contaminant screening levels for benthic organisms were preferentially EPA Region III BTAG screening levels (EPA, 1995). These values are primarily Effects Range-Low (ER-L) values from Long and Morgan (1990) and Long et al. (1995), and Apparent Effects Thresholds (AETs).

Surface Soil Screening Levels

Initial screening levels for soil organisms consisted primarily of USEPA Region III BTAG screening levels (EPA, 1995), Oak Ridge National Laboratory (ORNL) surface soil screening levels, and Dutch "B" levels that represent ecological toxicity endpoints (Netherlands, 1994).

3.2.2 Preliminary Exposure Estimate and Risk Calculation

Section 3.2.2.1 describes the components of preliminary exposure estimate and Section 3.2.2.2 describes the components of preliminary risk calculation.

3.2.2.1 Preliminary Exposure Estimate

The maximum detected concentrations of analytes in surface water, sediment, and surface soil were used as exposure point contaminant concentrations for comparison to ecological screening levels in the risk calculation step. Detailed descriptions of sampling locations, data validation, data treatment, and data selection were presented in previous sections.

3.2.2.2 Preliminary Risk Calculation

The preliminary risk calculation step in the ERA process compares exposure-point contaminant concentrations with screening levels protective of ecological receptors (EPA, 1997). The ratio of the exposure-point contaminant concentration to the screening level is called the hazard quotient (HQ) and is defined as follows:

$$HQ_i = EPC/ESL_i$$

where: HQ_i = Hazard Quotient for analyte "i" (unitless)

EPC_i = Exposure Point Concentration for analyte "i" (µg/L or mg/kg)

ESL_i = Ecological Screening Level for analyte "i" (µg/L or mg/kg)

When the ratio of the exposure point concentration to its respective screening level equaled or exceeded 1.0, adverse impacts were considered possible, and the contaminant was retained as a COPC. The HQ value should not be construed as being probabilistic; rather, it is a numerical indicator of the extent to which an exposure point concentration exceeds or is less than a screening level. HQ values equal or greater than 1.0 indicate that ecological receptors are potentially at risk; additional evaluation or data may be necessary to confirm with greater certainty whether ecological receptors are actually at risk.

The use of HQs is probably the most common method used for risk characterization in ERAs. Advantages of this method, according to Barnthouse et al. (1986), include the following:

- The HQ method is relatively easy to use, is generally accepted, and can be applied to any data.
- The method is useful when a large number of contaminants must be screened.

This method of risk characterization has some inherent limitations. One primary limitation is that it is a "no/maybe" method for relating toxicity to exposure. That is, it uses single values for exposure concentrations and screening levels. The HQ method does not account for the variability in both these parameters or for incremental or cumulative toxicity.

The comparisons of maximum contaminant concentrations in each medium to screening levels are presented in screening tables. The screening tables include the frequency of detection for each analyte, the range of detected values, and contaminant-specific screening levels.

3.2.3 Step 3a: Refinement of Contaminants of Potential Concern

The ERA methods described above constitute the first two steps of the 8-step ERA process. Thus, the ERA, up to this point, can be considered to be a "screening-level" assessment, or "Tier 1" assessment, since it is based primarily on a conservative initial screening of contaminant concentrations against contaminant-specific screening levels. As will be seen in site-specific ERAs, maximum concentrations of several analytes exceed ecological screening levels. Because of this, and since the locations and number of samples appears to be adequate to determine the nature and extent of site related contamination, a more thorough assessment is warranted. Therefore, in accordance with EPA (1997) and Navy policy (DON, 1999), and as

per discussions with Region III BTAG, a portion of Step 3 of the 8-step ERA process was included in this assessment.

Step 3 of the 8-step ERA process is BERA problem formulation (EPA, 1997). This step consists of several sub-steps designed to develop the goals, breadth, and focus of the BERA. The initial sub-step within Step 3 is refinement of contaminants of potential concern, and is referred to as "Step 3a - Refinement of Conservative Exposure Assumptions" in the Navy's ERA guidance (DON, 1999).

The use of conservative guidelines and maximum detected concentrations in the screening-level assessment is necessary to ensure that potential risks are not underestimated. However, if the hazard quotients derived from comparisons of maximum concentrations to conservative screening levels are used as the single factor for including a COPC in a baseline ERA without consideration of other relevant information, additional ecological studies such as toxicity testing or tissue analyses could be undertaken for COPCs that do not actually pose significant risks. For this reason, refinement of COPCs, the first sub-step within Step 3, was incorporated into the ERA. Step 3a involves the consideration of factors such as background data (mainly for inorganics), toxicological evaluation of COPCs, frequency of detection, and comparisons of COPCs to alternate guidelines (EPA, 1997; DON, 1999).

3.2.3.1 Alternate Guidelines

Less conservative guidelines are presented in Step 3a of this ERA to provide balance to the conservative screening-level assessment. For example, some sediment screening values in Steps 1 and 2 consisted of ER-L values obtained from Long et al. (1995) However, an ER-L is defined as the concentration below which adverse ecological effects "would rarely be observed", and the effects range-medium (ER-M) is the concentration below which adverse effects "would occasionally occur" (Long et al., 1995). Therefore, ascribing risk to a sediment contaminant detected in a concentration that exceeds the ER-L but is below the ER-M can be misleading. Recent studies have indicated that ER-Ms are much better indicators of potential adverse effects than ER-Ls (Long et al., 1998), and thus, ER-Ms are included in Step 3a.

Less conservative sediment guidelines also include Probable Effects Levels (PELs) developed by the Florida Department of Environmental Protection (FDEP, 1994). The PELs are loosely analogous to ER-Ms. The data set used by Long et al. (1995) to develop ER-Ls and ER-Ms was used also by FDEP. However, unlike the ER-Ls and ER-Ms, PELs also incorporate chemical concentrations observed or predicted to be associated with no adverse biological effects (no effects data). The PEL is the geometric mean of the 50th percentile in the effects data set and 85th percentile in the no effects data set. The PEL represents the lower limit of the range of contaminant concentrations that are usually, or always, associated with adverse biological effects (FDEP, 1994).

Other less conservative sediment guidelines such as Severe Effects Levels (SELs) developed by the Ontario Ministry of the Environment (MOE) are also presented in Step 3a. MOE guidelines are based exclusively on observed effects in the field (absence of certain species). The SEL represents the contaminant level that could potentially eliminate most of the benthic organisms. Unlike National Oceanic and Atmospheric Administration (NOAA) and FDEP guidelines, MOE guidelines are based on freshwater sediments. Probable Effects Concentrations (PECs) developed as part of EPA's Assessment and Remediation of Contaminated Sediments Program (EPA, 1996c), and other guidelines are also presented in Step 3a.

Alternate guidelines for surface water are not as plentiful as for sediments. Therefore, a broad range of alternate guidelines for surface water could not be developed. However, alternate guidelines are presented, when available, for surface water COPCs in Step 3a for each site investigated herein.

Alternate surface soil guidelines for some COPCs were available from ORNL (Efroymson et al., 1997a; 1997b) and are presented in Step 3a. These data were derived to be used as screening values for investigating the potential effects of contaminants on soil litter invertebrates (i.e. earthworms), soil microbes,

and plants. Other alternate ecological soil guidelines include Dutch "B" soil valves indicative of "moderate soil contamination that requires further study" (Beyer, 1990), and Canadian Council of Ministers of the Environment Soil Quality Guidelines (CCME, 1997).

3.2.3.2 Toxicological Evaluation of COPCs

Toxicity data and information from various sources in the literature are discussed as they relate to the interpretation of potential risks from each COPC. These sources include the USFWS Chemical Hazard Reviews, commonly referred to as the "Eisler" publications, ATSDR Toxicity Profiles on CD-ROM, and ecotoxicological journals.

3.2.3.3 Other Considerations

The establishment of background concentrations was discussed in Section 2.3. Background data were obtained from the sampling and analysis of surface water, sediment, and surface soil during Phase II activities. As a result, background data are available for use in assessing the extent to which chemical concentrations at Sites 1, 2, 3, and 5 are due to site-related activities, since concentrations of inorganic contaminants can be naturally elevated and exceed screening values.

The frequency of detection and spatial analysis of elevated contaminant concentrations were evaluated to determine whether potential risks are widespread or limited to a small area. The magnitude of the HQs was also considered. As described earlier, the relationship between the magnitude of an HQ and toxicity is not necessarily linear. However, the magnitude of an HQ can be used as a rough approximation of the extent of potential risks, especially if there is sufficient confidence in the guideline used.

3.2.4 Ecological Risk Assessment Approach Summary

Due to past contaminant releases at Sites 1, 2, 3, and 5, a screening-level ERA was conducted for each of these sites. Maximum contaminant concentrations in surface water, sediment, and surface soil were compared to screening level toxicity values that are protective of ecological receptors. Potential risks to ecological receptors were investigated in the form of HQ values, which is the ratio of the representative contaminant concentration to the screening level toxicity value. Risks were considered possible when an HQ value was equal to or greater than 1.0. Subsequently, other quantitative and qualitative factors were investigated in Step 3a to more fully assess potential risks. A "weight-of-evidence" approach (EPA, 1997) was used as part of Step 3a to determine the extent of potential risks when HQ values exceeded 1.0. Information in Step 3a was used to determine final ecological contaminants of concern (COCs).

3.2.5 Screening Level and Step 3a Uncertainty Analysis

Uncertainty is associated with all aspects of the ERA process. This section provides a summary of the general uncertainties involved in this ERA, and discusses how the uncertainties may affect the final risk values and conclusions. Discussions of site-specific uncertainties are contained in site-specific sections of this report.

Once an ERA is complete, the results must be reviewed and evaluated to identify the types and magnitudes of uncertainties involved. Relying on results from a risk assessment without consideration of uncertainties, limitations, and assumptions inherent in the process can be misleading. If numerous conservative assumptions are combined in the ERA process, the resulting calculations will propagate the uncertainties associated with each of those assumptions. The resulting bias is toward over-predicting risks. Thus, both the results of the risk assessment and the uncertainties associated with those results must be considered when making risk management decisions.

Generally, risk assessments carry two types of uncertainty: measurement and informational. Measurement uncertainty refers to the variability inherent in measured data. Informational uncertainty stems from the limited availability of necessary information. There is often a significant gap between what is needed and what is available. Information regarding the effects of certain contaminants on ecological receptors, the biological mechanism of a contaminant, the impact of physiological differences on exposure pathways, or the behavior of a contaminant in various environmental media is often absent.

Uncertainty is associated with each of the steps of the risk assessment process:

- Uncertainty in problem formulation can result from limited information regarding contaminant sources, release mechanisms, and exposure routes.
- Uncertainty in the ecological effects evaluation arises from the quality of the existing screening values and toxicity data to support a determination of potential adverse impacts to ecological receptors.
- Uncertainty associated with the exposure estimate includes the methods used and the assumptions made to determine exposure point concentrations.
- Uncertainty in risk calculation includes that associated with the potential effects of exposure to multiple contaminants and the cumulative uncertainty from combining conservative assumptions made in earlier activities.

3.2.5.1 Uncertainty in the Preliminary Problem Formulation

The sites investigated in this ERA receive contaminant inputs from more than one source, although initially, contaminants are conservatively assumed to stem directly from site-related activities. Since contaminant concentrations may reflect inputs from many sources, uncertainties exist regarding whether risk characterized at a discrete site stems from site-related contaminants.

3.2.5.2 Uncertainty in the Ecological Effects Evaluation

Uncertainty in this risk assessment results from the nature and quality of the available toxicity data used to derive toxicity screening values. This uncertainty is reduced when similar effects are observed across species, strain, sex, and exposure route; when the magnitude of the response is clearly dose related; and when postulated mechanisms of toxicity are similar for laboratory and wildlife species. Most screening values are based on the most conservative assumptions possible. Thus, although an inherent level of conservatism is needed in an ecological risk assessment to ensure that the most sensitive receptors are protected, conservative screening values may heavily overestimate potential risks and the resulting HQ values may be misleading. AWQC and some sediment screening values used in this assessment are based on laboratory studies that do not take into account mitigating or ameliorating physical and chemical conditions in the environment. For example, the most bioavailable (i.e., toxic) form of the contaminant is usually applied to the exposure medium. In reality, bioavailability is rarely, if ever, 100 percent. Several of these uncertainties were addressed as part of Step 3A, but uncertainties still remain.

In addition, ERAs, unlike human health risk assessments, must consider risks to many different species. However, calculation of risk values for each potential receptor species is not possible. For this ERA, conservative screening values protective of a wide range of ecological receptors were sought. The underlying assumption associated with the use of these screening values is that contaminant concentrations in excess of these values are indicative of potential impacts to actual receptors inhabiting the area. However, species-specific physiological differences that may influence an organism's response to a contaminant or subtle behavioral differences that may increase/decrease a receptor's contact with a contaminant are seldom known. Also, contaminants were present in some media for which no suitable benchmarks were available,

and as a result, they could not be quantitatively assessed. Risks may be biased low in these instances. For these reasons, the use of toxicity screening values will introduce error into the results of an assessment.

Potential risks may be under- or over-estimated due to the interactive effects of contaminants. Contaminants with similar modes of action may have additive effects (e.g., organochlorine pesticides) or synergistic effects. In this case, potential risks could be underestimated. Contaminants can also have ameliorating effects on certain receptors. In this case, potential risks could be overestimated.

3.2.5.3 Uncertainty in the Exposure Estimate

Uncertainty in the exposure estimate arises mainly in the methods used to obtain exposure point concentrations. The maximum detected contaminant concentrations were used to represent the highest contaminant concentrations to which ecological receptors might be exposed. If the samples evaluated in this ERA are representative of contaminant concentrations associated with each site, then this approach is conservative and should overestimate potential risks to ecological receptors. The maximum concentration of a contaminant in a given medium may have been collected in a "hot spot" of contamination, and may be much higher than the remaining values in the data set. In such a case, the use of maximum values may overestimate potential risks. Additionally, contaminants that appear to pose significant potential risk may be mitigated by several factors, including a low frequency of detection or elevated concentrations in areas with no significant habitat. These factors would reduce actual exposure.

Dermal and inhalation exposures were not evaluated in this ERA. Dermal exposure is usually limited by the outer coverings of most receptors. Nevertheless, certain portions of some receptors, such as footpads, eyes, and nose do not contain fur or feathers, and may have a higher chance of exposure. However, these areas generally constitute a small portion of the total surface area of most receptors. Inhalation of contaminants is assumed to be miniscule. Airborne aerosols, particulates, and vapors are assumed to be inapplicable for aquatic media, and there is little bare soil at the sites under investigation. As a result, airborne particles would be expected to be minimal. Burrowing wildlife such as woodchucks could be exposed to some contaminants via inhalation. However, data regarding inhalation exposure and toxicity for wildlife were not available. In summary, the dermal and inhalation exposure routes are considered to be minor, but since they cannot be quantitatively assessed, the associated potential risks are inherently underestimated.

3.2.5.4 Uncertainty in the Risk Calculation

Uncertainty in the risk calculation is affected by all aspects of the ERA process described in the above sections. Uncertainty in risk calculation also results from the combination of different components of the ERA in this step. Each of those components already contains different types of uncertainty, as discussed above. Thus, uncertainties may be propagated when these components are combined. To try to reduce the overall uncertainty in the risk assessment, the weight-of-evidence approach is used to make risk decisions. This approach considers all aspects of the assessment, including the uncertainties, to make determinations of potential risks.

7.8 ECOLOGICAL RISK ASSESSMENT

This section presents the results of the ecological risk assessment performed at Site 5, the Fire Training Area.

7.8.1 Preliminary Problem Formulation

This section includes a discussion of available habitats, ecological receptors, contaminant sources, release mechanisms, migration pathways, exposure routes, selection of analytes to be investigated, assessment and measurement endpoints, and the conceptual site model.

7.8.1.1 Habitat Types and Ecological Receptors

Site 5 consists of disturbed areas of grass, weeds, and shrubs (Figure 7-10). The northern portion of the site is a regularly mowed grassy area adjacent to aircraft taxiway Juliet. A shrub thicket is located west of the paved access road into the site. An area of weeds and shrubs exists east of the access road in the vicinity of the former burn area. Sumac (*Rhus* spp.) and box-elder (*Acer negundo*) are abundant in that area. A shallow drainage ditch east of the access road separates the weedy area from the grassy area near the taxiway. The area surrounding the ditch is thickly vegetated with common reed (*Phragmites australis*) and cattail (*Typha* spp.). Two small, shallow excavated ponds (approximately 80 ft by 20 ft) are located approximately 100 feet south of the site. These ponds are not shown on the National Wetlands Inventory Map of the area (U.S. Department of the Interior, undated), but marsh vegetation has become established in the area surrounding the two ponds. The western pond was completely covered with a dense layer of cattail during a site visit in March 1999.

The site is adjacent to an open taxiway to the north, the Marine Corps Compound to the south and southeast, and a paved access road to the west. Thus, to a large extent, wildlife species at the site consist of those that have become accustomed to human disturbance. These include rabbits, raccoons, smaller mammals such as mice, reptiles and amphibians, and various birds. A woodchuck burrow was observed near the former burn area during the March 1999 site visit. During periods of relative human inactivity, deer and red foxes are known to occasionally utilize the site. Avian raptors are expected to forage in the grassy area adjacent to the taxiway. The two small ponds are inhabited by minnows, aquatic invertebrates, reptiles and amphibians, and are occasionally utilized by various receptors that forage on aquatic organisms (e.g., wading birds, waterfowl, raccoons, etc.). There are no known animals or plants state- or federally-listed as threatened, endangered, or candidates for listing, at the site.

7.8.1.2 Contaminant Sources, Release Mechanisms, and Migration Pathways

The contaminant source at Site 5 consists of the former Fire Training Area. Petroleum and related wastes were burned at the site for fire training exercises. Potential contaminant release pathways at the site include volatilization, wind erosion, overland runoff, and infiltration of contaminants. Combustion was probably a major transport mechanism during the period when the fire training area was in use. However, combustion is not a current transport mechanism at Site 5 since open burning activities have ceased.

Constituents in soil could volatilize from surficial material or become airborne via wind erosion. Contaminated fugitive dust can be generated during ground-disturbing activities, such as construction or excavation. The contaminants could then be dispersed in the surrounding environment and transported to downwind locations where they could repartition to surface soil, surface water, or sediment through gravitational settling, precipitation, and deposition. However, most of the site is heavily vegetated,

minimizing the airborne contaminant transport pathway. The absence of vegetation in the immediate area of the burn ring could contribute to fugitive emissions of fine-grained soil particles, but since this area is small, fugitive emissions are probably insignificant.

The flat topography in the vicinity of the site decreases the degree of precipitation runoff. However, two small ponds are approximately 100 feet from the site in a slight downslope direction. In addition, some runoff could eventually drain into ditches that exit the base approximately 2,000 ft south of the site. This drainage eventually flows into Pennypack Creek approximately 3,000 south of the air station.

Infiltrating precipitation can cause the contamination of subsurface soil and groundwater. After reaching the water table, contaminants can be carried with the flow of groundwater to downgradient locations. Contaminants transported in groundwater to surface water can be deposited subsequently in sediment or surface water, and can potentially accumulate in the tissues of aquatic organisms downstream. Groundwater beneath Site 5 flows southeast or southwest, depending on location and depth. The nearest surface water (other than the two nearby ponds) into which site groundwater could discharge is Pennypack Creek, approximately 4,500 feet south of the site. There is no evidence from the RI indicating that groundwater discharges into Pennypack Creek.

7.8.1.3 Exposure Routes

Terrestrial animals at Site 5 can be exposed to soil contaminants through the ingestion of contaminated food items. In addition, animals can incidentally ingest soil while grooming fur, preening feathers, digging, grazing close to the soil, or feeding on items that are covered with soil (such as roots and tubers). Terrestrial vegetation can be exposed to contaminants through direct aerial deposition and root translocation. Aerial deposition could have been a significant exposure route during historical landfill activities. However, aerial deposition is presently minimal since most of the site is vegetated. Terrestrial receptors can also come into contact with contaminants in surface water by using it for drinking, although this exposure route generally represents a negligible portion of total exposure for most receptors.

Aquatic and semi-aquatic organisms in the ponds near Site 5 can be exposed to contaminants through direct contact with surface water and sediments, incidental ingestion of surface water and sediments, and consumption of contaminated food items. Exposure to contaminants in the soil via dermal contact can occur but is unlikely to represent a major exposure pathway because fur, feathers, and chitinous exoskeletons minimize the transfer of contaminants across dermal tissue.

Volatile constituents could be present in some site soils and soil-bound contaminant airborne suspension could occur at Site 5. However, inhalation does not represent a significant exposure pathway because this investigation assumes that air contaminant concentrations are quite low, even for burrowing wildlife. Since inhalation ecotoxicity data for chronic exposure are lacking, the air pathway was not considered for ecological receptors.

7.8.1.4 Selection of Analytes to be Investigated

As discussed in Section 3.2.1.1, calcium, magnesium, potassium, and sodium were excluded as COPCs in all media because they are essential nutrients that are toxic only in extremely high concentrations. Otherwise, analytes selected for evaluation consisted of all analytes detected during current and previous sampling of surface water, sediment, and surface soil at Site 5.

7.8.1.5 Assessment and Measurement Endpoints

A description of assessment and measurement endpoints for this investigation is presented in Section 3.2.1.1.

7.8.1.6 Conceptual Site Model

Figure 7-11 shows the conceptual model for Site 5. The figure shows a complete exposure route for the wind erosion pathway. However, since most of the site is heavily vegetated, the wind erosion pathway is assumed to be minimal. In addition, the dermal (direct contact) exposure route is included in the conceptual model since it is theoretically possible, but as mentioned earlier, it represents a minor exposure route and was not investigated.

7.8.2 Preliminary Ecological Effects Evaluation

Ecologically-based screening values (ESVs), concentrations of contaminants in various media considered protective of ecological receptors, were compared to exposure point concentrations of detected analytes in surface water, sediment, and surface soil to determine if the analytes qualify as ecological COPCs at Site 5. The selection of ESVs was discussed in section 3.2.1.2.

7.8.3 Preliminary Exposure Estimate

The maximum detected contaminant concentrations in surface water, sediment, and surface soil were used as exposure point concentrations for comparison to ecological screening levels. Mean contaminant concentrations and 95% UCL of the mean contaminant concentrations (when available) were also compared to alternate guidelines in Step 3a of the assessment.

7.8.4 Preliminary Risk Calculation

The maximum detected concentrations of aluminum, barium, iron, lead, and dieldrin in surface water exceeded screening levels and thus, they were retained as COPCs (Table 7-27).

No inorganic sediment analytes exceeded screening levels (Table 7-28). Aluminum, barium, beryllium, cobalt, iron, manganese, and vanadium were retained as sediment COPCs since no screening levels were available. Several organics in sediments were retained as COPCs since their maximum concentrations exceeded screening levels; these consisted of anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, phenanthrene, and pyrene. Aldrin, dieldrin, benzo(k)fluoranthene, 2-butanone, and toluene were retained as sediment COPCs since no screening levels were available.

Aluminum, antimony, arsenic, cadmium, chromium, iron, lead, manganese, thallium, vanadium, and zinc were retained as inorganic COPCs in surface soil since their maximum concentrations exceeded screening levels (Table 7-29). Several SVOCs (primarily PAHs) were retained as organic COPCs in surface soils because their maximum concentrations exceeded screening levels. Acetone and a few SVOCs were retained as COPCs because no screening levels were available.

7.8.5 Step 3a: Discussion

Step 3a considerations are discussed below on a COPC-specific basis.

7.8.5.1 Metals

Aluminum

Aluminum was a COPC in sediment because no initial screening level was available, and was a COPC in surface water and soil because its HQ exceeded 1.0. Its concentration in surface water was twice the ORNL lowest chronic value (Table 7-30). Aluminum concentrations in sediment were well below the only available alternate guideline (Table 7-31), which was a probable effects concentration (PEC) from the USEPA Assessment and Remediation of Contaminated Sediments Program (ARCS). The maximum concentration of aluminum in sediments was less than twice the average background concentration. Concentrations of aluminum in all surface soil samples were within the range of background concentrations.

Aluminum is not readily absorbed through the skin and gastrointestinal absorption of ingested aluminum is poor due to the transformation of aluminum salts into insoluble aluminum phosphate (Venugopal and Luckey, 1978). Another factor in the lack of accumulation of aluminum in animals with age or the absence of any increase in tissue levels of aluminum following fairly high dietary intake may be that certain organisms possess a homeostatic mechanism for this element. Aluminum compounds are generally not harmful to most terrestrial organisms and are considered to be toxicologically inert, except in cases of high experimental doses or prolonged inhalation (Venugopal and Luckey, 1978). Data on the toxicity of aluminum to aquatic organisms is somewhat limited. Freshwater organisms usually are not adversely affected when pH is between 6.5 and 9.0 (EPA, 1988). The pH in the surface water sample collected from the western small pond south of the site was within this range (pH=6.77, Appendix C). The pH in the surface water sample collected from the eastern small pond south of the site was slightly lower, at pH=6.35. Overall, however, the aluminum concentrations in Site 5 media are similar to background values. For these reasons, aluminum should be dropped from further consideration at Site 5.

Antimony

Antimony was a COPC in surface soil, but was not detected in surface water and was not a COPC in sediment. Antimony was not detected in background surface soil samples but its HQ was relatively low (HQ=1.8). Few alternate ESVs are available for antimony in surface soil (Table 7-32). Because of its absence in surface water and low concentrations in sediment, and its and relatively low concentrations in surface soil, antimony should be dropped from further consideration at Site 5.

Arsenic

Arsenic was not a COPC in surface water or sediment. Arsenic concentrations in surface soil exceeded the initial screening level in only one sample, and its HQ was low (HQ=1.1). The concentration in this sample was less than the BTAG screening level, less than all alternate ESVs, and was within the range of background values (Table 7-32). For these reasons, arsenic should be dropped from further consideration at Site 5.

Barium

Barium was a COPC in surface water and sediment, but an initial sediment ESV was not available. The maximum surface water concentration was much less than the BTAG ESV (Table 7-30). Barium was detected in both surface water and sediment samples from each of the two ponds, but all values were less than the average background concentrations (Tables 7-30 and 7-31). Barium is a common element in sediments and it is not generally associated with significant toxicity (ATSDR, 1997). For these reasons, barium should be dropped from further consideration at Site 5.

Beryllium

Beryllium was a COPC in sediment since an ESV was not available. Beryllium was not detected in surface water and was not a COPC in surface soil. Although no sediment ESVs were available for beryllium, its concentrations in sediment samples from both ponds were less than the average background concentration (Table 7-31). Therefore, beryllium should be dropped from further consideration at Site 5.

Cadmium

Cadmium was a COPC in surface soil, but was not detected in surface water or sediment. It was detected in 3 of 15 surface soil samples, and it exceeded the initial ESV in only one sample (Appendix A, Table A-18), with an HQ of 1.6. Its concentration in this single sample (4.7 mg/kg) was less than, or only slightly greater than the alternate ESVs shown in Table 7-32. Because of its absence in surface water and sediment, and its relatively low concentrations in surface soil, cadmium should be dropped from further consideration at Site 5.

Chromium

Chromium was a COPC in surface soil, but was not detected in surface water and was not a COPC in sediment. Chromium concentrations in surface soil exceeded the maximum background concentration in three samples (Appendix A, Table A-18), but were greater than twice the average background concentration in only one sample (05SS27), with a value of 56.5 mg/kg.

There is a wide range among available surface soil ESVs for chromium (Table 7-32). The ORNL values in table 7-32 are for hexavalent chromium, the most toxic form of this metal (Efroymson et al, 1997a; 1997b). All chromium concentrations at Site 5 are total chromium. The CCME value of 64 mg/kg is for total chromium (CCME, 1997). The Dutch B value of 250 mg/kg is also for total chromium (Beyer, 1990). Although not shown in Table 7-32, the Dutch "A" value representative of background values (Beyer, 1990), as well as the Dutch "Target Value" that represents the "soil quality required for the full restoration of the soil's functionality for human, animal and plant life" is 100 mg/kg (NMHSP&E, 1994). Since chromium concentrations exceeded twice the average background concentration in only one of 15 samples, and the concentration in this sample was less than most ESVs for total chromium, potential ecological risks (if any) appear to be limited to a small area. Therefore, chromium should be dropped from further consideration at Site 5.

Cobalt

Cobalt was a COPC in sediment because no initial ESV was available. It was not detected in surface water and was not a COPC in surface soil. Cobalt was detected at the same concentration (7.1 mg/kg) in both sediment samples. This value was less than the average concentration in background sediments, and was considerably less than the only available ESV of 50 mg/kg (Table 7-31). Cobalt is present in all natural media, and is a component of certain B vitamins, which are essential for birds and mammals. (ATSDR, 1997). For these reasons, cobalt should be dropped from further consideration at Site 5.

Iron

Iron was a COPC in surface water and surface soil because it exceeded the initial ESVs for these media, and was a COPC in sediment since an initial ESV was not available. The maximum concentration of iron in surface water only slightly exceeded the ESV (HQ = 1.2). The maximum sediment concentration was less than the average background sediment concentration, and was considerably less than the lowest available ESV, which is a "lowest effect level" established by the Ontario Ministry of the Environment (Table 7-31). Surface soil concentrations of iron exceeded the maximum background concentration in only three samples (Appendix A, Table A18), but concentrations in all samples were considerably less than twice the average background concentration (Table 7-32). Because its concentration in surface

water only slightly exceeded the ESV, and since its presence in surface soil and sediment was similar to background concentrations, iron should be dropped from further consideration at Site 5.

Lead

Lead was a COPC in surface water and surface soil but not in sediment. The surface water HQ was low (HQ=1.2), and the maximum concentration in surface water (3.0 µg/L) was less than the BTAG ESV and the ORNL lowest chronic value (Table 7-30). In addition, the concentrations in each of the two surface water samples were flagged with a "K" qualifier (Appendix A, Table A-20), indicating that the values are "biased high due to exceedance of technical quality control criteria". Lead concentrations in five of 15 surface soil samples exceeded twice the average background concentration and the maximum background value of 64.7 mg/kg (Figure 7-9C). Lead concentrations in all five of these samples exceeded the CCME guideline, and the Dutch "B" value was exceeded in two samples (Table 7-32). All soil lead concentrations were less than the ORNL ESV of 500 mg/kg. The maximum concentration of 412 mg/kg was in sample 05SS22 at the southern portion of the former burn area. Lead in this sample might pose potential risks to ecological receptors.

Manganese

Manganese was a COPC in sediment because an initial ESV was not available, and was a COPC in surface soil with an HQ of 2.65. Its maximum concentration in sediment was less than one half of the average background sediment concentration, and was considerably less than all available screening levels (Table 7-31). Most surface soil concentrations exceeded the few available ESVs (Table 7-32), but the HQ was relatively low. All surface soil concentrations were less than the maximum background soil concentration, and most were less than the average background value. Manganese is a common element in the earth's crust and an essential nutrient. Because of its relatively low HQ and its presence at concentrations within the range of background concentrations, manganese should be dropped from further consideration at Site 5.

Thallium

Thallium was a COPC in surface soil but was not detected in surface water or sediment. Thallium was detected in 7 of 15 surface soil samples and its concentration slightly exceeded the maximum background value in only two samples (Appendix A, Table A-18). All surface soil concentrations were less than twice the average background value (Table 7-32). Only two ESVs were available for thallium in surface soil, and these differed by a factor of 1,000 (Table 7-32), so its potential toxicity is difficult to assess. However, all soil concentrations were less than the ORNL screening level of 1.0 mg/kg, a value established for soil phytotoxicity (Efroymson et al , 1997b). Because of this, and since thallium in surface soil was similar to background soil concentrations, thallium should be dropped from further consideration at Site 5.

Vanadium

Vanadium was a COPC in sediment because an initial ESV was not available, and was a COPC in surface soil with an HQ of 1.8. Vanadium was not detected in surface water. No sediment ESVs were available for vanadium, but all sediment concentrations at Site 5 were less than the average background sediment concentration (Table 7-31). Surface soil concentrations were generally within the range of background soil values, and all surface soil concentrations were less than twice the average background soil concentration (Table 7-32). Available ESVs cover a wide range of values (Table 7-32), so the potential toxicity is difficult to assess, but vanadium is not generally considered to be toxic in the environment (Mailman, 1980). Because of this, and since concentrations at Site 5 were similar to background concentrations, vanadium should be dropped from further consideration at Site 5.

Zinc

Zinc was a COPC in surface soil with an HQ of 2.7, and was not a COPC in surface water or sediment. Surface soil concentrations were generally less than the average background soil concentration, and the maximum soil concentration was less than one-fourth of the maximum background soil concentration (Table 7-32). Soil concentrations were greater than the lowest available ESV of 10 mg/kg, but less than the Dutch "B" value. Because zinc was not a COPC in surface water or sediment, and its concentrations in Site 5 soil samples were well within the range of background soil concentrations, zinc should be dropped from further consideration at Site 5.

7.8.5.2 Pesticides

Aldrin

Aldrin was a sediment COPC since an initial ESV was not available. It was not detected in surface water or surface soil. The single detected value of aldrin in sediment was considerably less than the Ontario severe effects level (SEL) for aldrin (Table 7-31). The SEL values are based on actual observed field effects. Although aldrin was not detected in background sediments, it was probably used base-wide in the past for pest control and is unrelated to Site 5. For these reasons, aldrin should be dropped from further consideration at Site 5.

Dieldrin

Dieldrin was a sediment COPC since an initial ESV was not available, and was a COPC in surface water (HQ=31.6). It was not detected in surface soil. The single detected value of dieldrin in surface water was less than the alternate guideline for dieldrin. Sediment concentrations were considerably less than the SEL value (Table 7-31). As with aldrin, it is probable that dieldrin was used base-wide in the past for pest control and is unrelated to Site 5. For these reasons, dieldrin should be dropped from further consideration at Site 5.

7.8.5.3 Semivolatile Organic Compounds

Several SVOCs were retained as COPCs in sediment and surface soil; none were detected in surface water. Carbazole and dibenzofuran were detected in most surface soil samples but in no sediment samples. There were no soil ESVs for carbazole or dibenzofuran, but their concentrations were elevated only in a single sample (05SS30, Appendix A, Table A-18). Because ESVs were not available for these two compounds, and since they were elevated in only one sample, carbazole and dibenzofuran should be dropped from further consideration at Site 5.

PAH Compounds

All other SVOCs at Site 5 consisted of PAH compounds. Eight PAHs, as well as total PAHs, were retained as sediment COPCs sediment since their maximum concentrations exceeded ESVs. The HQ values for these compounds were relatively low, and none of the maximum concentrations of those compounds exceeded ER-M values or SEL values (Table 7-31). In addition, although not naturally-occurring, the concentrations of most of those compounds in Site 5 sediments were not markedly greater than the concentrations in background sediments. PAHs are common in media from industrialized areas, especially areas that experience vehicular traffic. One PAH compound (benzo(k)fluoranthene) was retained as a sediment COPC since no ESV was available, but its maximum concentration was comparable to the maximum concentrations of similar PAHs which did not exceed their alternate guidelines. Concentrations of total PAHs in all sediment samples were less than the ER-M, PEL, PEC,

and SEL values shown in table 7-31. For the reasons discussed above, no PAH compounds were retained as final sediment COCs, and PAH compounds in sediments should be dropped from further consideration at Site 5.

Several PAHs were retained as surface soil COPCs since their maximum concentrations exceeded ESVs or because ESVs were not available. Concentrations of most PAHs in surface soil samples located west of the access road and furthest from the burn area (samples 05SS26, 05SS27, and 05SS28; Figure 7-9C) were not significantly elevated. These samples were located in close proximity to the aircraft taxiway, and PAH concentrations in these samples may be the result of runoff.

Concentrations of several PAHs in samples collected closer to the burn pit were significantly elevated over initial ESVs and alternate guidelines. Specifically, concentrations of several PAHs in samples collected along the western edge of the burn area (05SS17, 05SS18, 05SS21, and 05SS22), the southern edge of the burn area (05SS23, 05SS24, and 05SS25), and the eastern edge of the burn area (05SS29 and 05SS30) were considerably elevated. Concentrations of all PAHs were highest in sample 05SS30, reaching a maximum of 200,000 µg/kg (for phenanthrene). Several individual PAHs and total PAHs east of the access road near the burn area appear to pose potential risks to terrestrial receptors at Site 5, and therefore, are selected as surface soil COCs (Table 7-32).

7.8.5.4 Volatile Organic Compounds

Acetone

Acetone was a COPC in surface soil since an ESV was not available. Acetone was not detected in surface water or sediment. Because acetone is a common laboratory contaminant, and since it was detected in only one soil sample and in no surface water or sediment samples, it should be dropped from further consideration at Site 5.

2-Butanone

2-butanone was detected in one sediment sample and was a COPC since an ESV was not available. Acetone was not detected in surface water or surface soil. Because of its relatively low concentration in one sediment sample (22 µg/kg), and the absence of detections in other media at Site 5, 2-butanone should be dropped from further consideration at Site 5.

Toluene

Toluene was detected in one sediment sample and was a COPC since an ESV was not available. It was not a COPC in surface soil and was not detected in surface water. The only detection of toluene in sediment (4 µg/kg) was much less than its alternate guideline (670 µg/kg), an EPA sediment quality benchmark (Table 7-31). Because of its relatively low concentration in one sediment sample and its absence as a COPC in other media at Site 5, toluene should be dropped from further consideration at Site 5.

7.8.6 Screening Level and Step 3a Uncertainty Analysis

Uncertainty is associated with all aspects of the ERA process. A detailed discussion of the general uncertainties involved in this ERA, and how the uncertainties may affect the final risk values and

conclusions, was presented in Section 3.2.5. This section discusses how site-specific uncertainties may affect the results and conclusions of the ERA for Site 5.

Site 5 has probably received contaminant inputs from sources other than former activities at the Fire Training Area. For example, at least some portions of Site 5 probably receive contaminant inputs from the adjacent aircraft taxiway north of the site. The extent that other sources are responsible for the presence of COCs at Site 5 is uncertain. However, the high concentrations of PAHs in the vicinity of the former burn area suggest that the former fire-fighting activities are responsible for the PAH "hot spot" in this area.

Few data are available for investigating risks to reptiles and amphibians. As a result, direct conclusions about the potential risks to reptiles and amphibians cannot be made. However, contaminants do not appear to have migrated to the two nearby ponds from the Fire Training Area. Thus, potential risks to amphibians and aquatic reptiles in the vicinity of the ponds appear to be low.

The maximum detected chemical concentrations were initially used to represent the chemical concentrations to which ecological receptors might be exposed. If the maximum concentration of a chemical in a given medium was collected in a "hot spot" of contamination and was much higher than the remaining values in the data set, potential risks may be grossly over-estimated. However, the uncertainties related to the location of samples were reduced in this ERA by the large number of surface soil samples collected. Fifteen soil samples were collected at a relatively small site. Thus, the soil concentrations probably present a relatively accurate estimate of soil contamination at the site.

7.8.7 Ecological Risk Summary

Several inorganic and organic contaminants were present in Site 5 surface water, sediment, and surface soil samples in concentrations in exceedance of ecological screening levels and were, therefore, retained as COPCs. Several other contaminants in all media assessed in this ERA were retained as COPCs since screening levels were not available. Most of these contaminants were eliminated as COCs in Step 3a of the risk assessment process for one or more reasons, such as low frequency of detection, concentrations comparable to background values (primarily inorganics) or alternative screening levels, and spatial analysis of detections.

Contaminants do not appear to have migrated to the two nearby ponds from the Fire Training Area. Potential risks to aquatic receptors that inhabit the ponds appear to be low. Therefore, no COCs were selected for surface water and sediment.

The number and location of surface soil samples appear to be sufficient to delineate the nature and extent of surface soil contamination at Site 5. Organic compounds that could pose potential risks to terrestrial receptors on and near Site 5 are limited to PAH compounds. Concentrations of PAHs in surface soil samples collected west of the access road that borders the burn area were only slightly elevated, and that area may receive PAH inputs from the taxiway to the north. Conversely, concentrations of several PAHs in samples collected around the burn pit greatly exceeded screening levels for individual and total PAHs. Therefore, these PAHs are selected as COCs in Site 5 surface soils around the burn area. The high concentrations of PAHs in the vicinity of the former burn area suggest that the former fire-fighting activities are responsible for the PAH "hot spot" in this area. Lead was the only inorganic COC in Site 5 surface soil, and appears to pose potential ecological risks only in the area that is also the hot spot for PAH compounds. Although terrestrial habitat in this area is marginal, it is utilized by ecological receptors such as mammals and birds. Since the area of highest lead and PAH contamination is relatively discrete and does not contain mature trees, wetlands, or other aquatic habitats, remediation of contaminated soils appears to be possible with minimal damage to the existing ecology of the site.

TABLE 7-30
STEP 3A: REFINEMENT OF CONTAMINANTS OF POTENTIAL CONCERN – SURFACE WATER
SITE 5 - FIRE TRAINING AREA
NASJRB WILLOW GROVE

COPC	Maximum Concentration	Mean Concentration	Initial Screening Level	BTAG Screening Level	Alternate Screening Level	Mean/Max Background	Retained as Final COC?
Metals (ug/L)							
Aluminum	926.0	926	25	25	87[a]/460[b]	561[e]	No
Barium	44.8	34.1	3.9	10,000	4.0[c]	101/112	No
Iron	1170.0	716	1,000	320	158[b]	321/635	No
Lead	3.0	2.2	2.5	3.2	1.32[a]/12.3[b]	0.538/0.8	No
Pesticides (ug/L)							
Dieldrin	0.06	0.055	0.0019	0.0019	0.062[d]	ND	No

a AWQC (USEPA, 1995)
b ORNL Lowest Chronic Value (Suter and Tsao, 1996)
c Secondary Chronic Value (Suter and Tsao, 1996)
d Final Chronic Value (USEPA, 1996b)
e Aluminum was analyzed in only one background surface water sample.
ND = not detected.

TABLE 7-31
STEP 3A: REFINEMENT OF CONTAMINANTS OF POTENTIAL CONCERN – SEDIMENT
SITE 5 - FIRE TRAINING AREA
NASJRB WILLOW GROVE

COPC	Maximum Concentration	Mean Concentration	Initial Screening Level	BTAG Screening Level	ER-M[a]	PEL[b]	ARCS PEC[c]	Ontario MOE[d]	Other Screening Level	Mean/Max. Background	Retained as Final COC?
Metals (mg/kg)											
Aluminum	12000.00	11600	NA	NA	NA	NA	58030	NA	NA	6620/8950	No
Barium	74.30	72.1	NA	NA	NA	NA	NA	NA	20-60[g]	98.2/160.5	No
Beryllium	0.77	0.675	NA	NA	NA	NA	NA	NA	NA	0.878/1.2	No
Cobalt	7.10	7.1	NA	NA	NA	NA	NA	NA	50[h]	7.21/12.4	No
Iron	11900.00	11500	NA	NA	NA	NA	NA	20,000/40,000	NA	16500/35400	No
Manganese	222.00	165	NA	NA	NA	NA	1081	460/1110	300-500[g]	514/759	No
Vanadium	21.20	18.4	NA	NA	NA	NA	NA	NA	NA	22.6/52.6	No
Pesticides/PCBs (ug/kg)											
Aldrin	11.00	6.05	NA	NA	NA	NA	NA	2/80	NA	ND	No
Dieldrin	220.00	119	NA	NA	NA	4.3	NA	2/910	52[e]	2.26/3.1	No
SVOCS (ug/kg)											
Anthracene	160.00	160	85.3	85.3	1100	245	547.7	220/3700	NA	ND	No
Benz(a)anthracene	850.00	750	261	261	1600	693	4200	320/14800	NA	275/580	No
Benzo(a)pyrene	910.00	715	430	430	1600	763	393.7	370/14400	NA	268/530	No
Benzo(k)fluoranthene	700.00	565	NA	NA	NA	NA	NA	240/13400	NA	240/300	No
Chrysene	1200.00	960	384	384	2800	846	5200	340/4600	NA	238/640	No
Dibenz(a,h)anthracene	120.00	170	63.4	63.4	260	135	28.2	60/1300	NA	ND	No
Fluoranthene	1800.00	1550	600	600	5100	1494	834.27	750/10200	2900[e]	221/510	No
Phenanthrene	880.00	750	240	240	1500	544	NA	560/9500	850[e]	235/260	No
Pyrene	1900.00	1700	660	665	2600	1398	3225	490/8500	NA	315/1300	No
Total PAHs	10,900	8480	4,000	NA	44792	16,770	13660	4000/100,000	NA	834/4790	No
VOCS (ug/kg)											
2-Butanone	22.00	14.3	NA	NA	NA	NA	NA	NA	NA	ND	No
Toluene	4.00	5.25	NA	NA	NA	NA	NA	NA	670[f]	ND	No

a. Effects Range - Median (Long et al., 1995).
b. Probable Effects Levels (FDEP, 1994).
c. Assessment and Remediation of Contaminated Sediments Program; Probable Effects Concentration (USEPA 1996c).
d. Ontario Ministry of the Environment: LEL = lowest effect level / SEL = severe effect level (Jones et al, 1997).
e. EPA Sediment Quality Criteria (USEPA, 1996b)
f. EPA Sediment Quality Benchmark (USEPA, 1996b)
g. EPA Region 5 guideline indicating moderate pollution (Giesy & Hoeke, 1990).
h. Open water disposal guideline, Ontario Ministry of the Environment (Jones et al, 1997)

NA = not available or not applicable.
ND = not detected.

TABLE 7-32
STEP 3A: REFINEMENT OF CONTAMINANTS OF POTENTIAL CONCERN – SURFACE SOIL
SITE 5 - FIRE TRAINING AREA
NASJRB WILLOW GROVE

Contaminant	Maximum Concentration	95% UCL	Mean Concentration	Initial Screening Level	BTAG Screening Level	ORNL[a,b]	Dutch B[c]	CCME[d]	Mean/Max. Background	Retained as Final COC?
Metals (mg/kg)										
Aluminum	12400.00	10600	9840	1.0	1.0	600[a]	NA	NA	11300/15000	No
Antimony	9.20	9.89	4.82	5	0.46	5[b]	NA	NA	ND	No
Arsenic	10.5	6.04	4.87	10	328	60[a]/10[b]	30	19	6.6/10.6	No
Cadmium	4.70	1.73	1.17	3	2.5	20[a]/4[b]	5.0	3.8	ND	No
Chromium	56.50	23.8	18.6	10	0.0075	0.4[a]/1.0[b]	250	64	15.3/20.8	No
Iron	21600.00	16700	14400	12	12	200[a]	NA	NA	14800/17600	No
Lead	412.00	217	90	50	0.01	500[a]	150	70	30.6/64.7	Yes
Manganese	873.00	582	494	330	330	100[a]/500[b]	NA	NA	642/1190	No
Thallium	0.39	0.26	0.202	0.001	0.001	1.0[b]	NA	NA	0.226/0.34	No
Vanadium	36.3	27.7	24.3	20	0.5	20[a]/2[b]	NA	130	24.9/28.2	No
Zinc	137.00	87.6	59.6	50	10	100[a]/50[b]	200	NA	90.1/597	No
SVOCs (ug/kg)										
2-methylnaphthalene	16000.0	1270	1170	NA	NA	NA	NA	NA	ND	Yes
Acenaphthene	36000.0	4370	2560	100	100	20,000[b]	NA	NA	178/64	Yes
Acenaphthylene	2300.0	643	356	NA	NA	NA	NA	NA	177/62	No
Anthracene	54000.0	11800	4290	2050	100	NA	10,000	NA	154/160	Yes
Benzo(a)anthracene	48000.0	45400	711	2050	100	NA	NA	NA	306/940	Yes
Benzo(a)pyrene	36000.0	26700	5760	2050	100	NA	1,000	750	394/1100	Yes
Benzo(b)fluoranthene	35000.0	39100	7260	2050	100	NA	NA	NA	507/1500	Yes
Benzo(g,h,i)perylene	13000.0	5910	2290	2050	100	NA	NA	NA	225/490	Yes
Benzo(k)fluoranthene	29000.0	22800	4630	2050	100	NA	NA	NA	370/920	Yes
Carbazole	19000.0	3200	1780	NA	NA	NA	NA	NA	213/310	No
Chrysene	45000.0	37500	7290	2050	100	NA	NA	NA	420/1200	Yes
Dibenz(a,h)anthracene	4800.0	1710	843	2050	100	NA	NA	NA	161/160	Yes
Dibenzofuran	34000.0	3120	2380	NA	NA	NA	NA	NA	172/120	No
Fluoranthene	140000.0	151000	17600	2050	100	NA	10,000	NA	902/2600	Yes
Fluorene	56000.0	5560	3890	2050	100	30,000[a]	400,000	NA	184/160	Yes

Contaminant	Maximum Concentration	95% UCL	Mean Concentration	Initial Screening Level	BTAG Screening Level	ORNL[a,b]	Dutch B[c]	CCME[d]	Mean/Max. Background	Retained as Final COC?
Indeno(1,2,3-cd)pyrene	18000.0	9700	3180	2050	100	NA	NA	NA	251/640	Yes
Naphthalene	22000.0	1610	1540	2050	100	NA	5,000	600	ND	Yes
Phenanthrene	200000.0	106000	18100	2050	100	NA	5,000	NA	667/1700	Yes
Pyrene	120000.0	135000	15800	2050	100	NA	10,000	NA	723/2100	Yes
Total PAHs	926,000	5,410,000	107,000	4,000	NA	NA	20,000	NA	4,450/14,100	Yes
VOCs (ug/kg)										
Acetone	17.0	16.8	7.7	NA	NA	NA	NA	NA	ND	No

a. Oak Ridge National Laboratory (ORNL) screening levels; a = lowest valve for earthworms and soil micro-organisms (Efroymson et al, 1997a).
b. ORNL screening levels; b = soil phytotoxicity (Efroymson et al, 1997b).
c. Dutch "B" soil valve: moderate soil contamination that requires further study (Beyer, 1990).
d. Canadian Council of Ministers of the Environment Soil Quality Guidelines (CCME, 1997).

NA = not available or not applicable.
ND = not detected.

APPENDIX M

LOW-FLOW PURGE AND SAMPLE PROCEDURES

ESD

EPA
REGION III
QA DIRECTIVES

HWMD

Bulletin No. QAD023 August 8, 1994

RECOMMENDED PROCEDURES FOR LOW-FLOW PURGING AND SAMPLING OF GROUND-WATER MONITORING WELLS

1.0 OBJECTIVE

Recommended procedures for collection of ground-water samples in small-diameter wells with short-screened intervals using low-flow purging and sampling are provided. While these procedures pertain to the Superfund program in Region III, the low-flow purging and sampling method is not appropriate for use in all hydrogeologic regimes, and certain ground-water monitoring well installations may make the method unsuitable. Therefore, please confer with a Region III hydrologist or geologist before using these procedures at a site.

2.0 DISCUSSION

Past scientific research (Barcelona et al., 1983; Nielson and Yeates, 1985) and EPA guidance have discussed sampling devices in terms of their compatibility with contaminants being sampled, and well construction, depth, and diameter. Although some sampling devices have been used in order to provide more representative ground-water samples in certain situations, most of these incorporate high-volume withdrawal techniques (i.e., in excess of the "natural" recharge rate of ground-water flow through the well screen) for both purging and sampling.

Recent research conducted by Puls et al. (1992), Puls and Powell (1992), and Powell and Puls (1993) has shown that high-volume purging and sampling cause significant turbidity and suspended particulate artifacts that can result in high-bias metals analyses. Additionally, purging can cause pressure changes and bailing can cause aeration that can strip VOCs from the sample (Pennino, 1988). The use of low-flow pumping devices (preferably dedicated) for purging and sampling minimizes both the disturbance of water in well casing and the potential for mobilization of colloidal material (Barcelona et al., 1994). Low-flow purging with maintenance of water level in the well and stabilization of indicator parameters (especially turbidity) allows collection of ground-water samples that are more representative of truly mobile contaminants in the subsurface under natural flow conditions without filtering (U.S. EPA, 1993; Backhus et al., 1993). In many cases, use of a low-flow pump to purge and sample monitoring wells decreases sampling time, reduces the need to handle large volumes of purge water and lowers the cost associated with its disposal, and allows collection of samples for inorganic analyses without filtering.

3.0 EQUIPMENT

- low-flow adjustable-rate, positive-displacement pump
- generator (if needed), but not one over-sized for the pump
- teflon-lined polyethylene tubing of thickness 3/8 to 1/2 inch
- polyethylene sheeting
- in-line, flow-through cell equipped with pH, Eh, dissolved oxygen (DO), specific conductivity, and temperature electrodes
- turbidity meter
- photoionization detector (PID), or equivalent
- electronic water-level indicator or equivalent (marked in 0.01-foot increments)
- nylon stay-ties
- logbook
- sampling gloves

4.0 PURGING AND SAMPLING PROCEDURES

This section describes the procedures for the low-flow purging and sampling method. Equipment calibration, logbook documentation, sample bottle filling and preservation, and shipping will be conducted in accordance with the procedures specified in the site-specific Quality Assurance Project Plan (QAPjP). Personal protective equipment will be donned in accordance with the requirements of the site-specific Health and Safety Plan. Wells will be sampled in the order of least contaminated to most contaminated.

1. Check the conditions of the well and look for any damage or evidence of tampering and record.

2. Remove the well cap.

3. Measure well headspace with a PID and record the reading in the logbook.

4. Measure the depth to water with an electronic water-level device and record the measurement in the logbook. Do not measure the depth to the bottom of the well at this time (in order to avoid disturbing any accumulated sediment and to prevent mixing of stagnant water with water in the screened interval). Obtain depth to bottom information from well installation log. Calculate standing water volume as: depth of water column times cross-sectional area of the well. [For wells where an LNAPL has been detected, a stilling tube should be inserted into the well prior to purging. Refer to Section 7.2.4 of EPA (1992) for the procedure to follow. If wells are constructed so that DNAPLs could accumulate, their detection and/or sampling should occur on a day prior to that for ground-water sampling.]

5. Lay out the polyethylene sheeting and place all equipment on the sheeting. To avoid cross-contamination, do not let any downhole equipment touch the ground surface.

6. Measure the depth to water in the well again. If the measurement has changed more than 1/100th of a foot, check and record the measurement again.

7. Attach and secure the polyethylene tubing to the low-flow pump. As the pump is slowly lowered into the well, secure the safety drop cable, tubing, and electrical lines to each other using nylon stay-ties.

8. The pump should be set at approximately the middle of the screen. If the static water table is below the top of the screen, the pump should be lowered to the middle of the water column. Place the pump intake a sufficient distance above the bottom of the well to avoid mobilization of any accumulated sediments. Start purging the well at 0.2 to 0.5 liters per minute. Avoid surging. Observe air bubbles displaced from discharge tube to assess progress of steady pumping until water arrives at the surface.

9. A water-level probe should be lowered very slowly into the well behind the pump until it just touches the water. The water level in the well should be monitored during purging and sampling, and ideally, the purge rate should not exceed the well recharge rate so that there is little or no drawdown in the well. (The water level should stabilize for the specific purge rate.) There should be at least one foot of water over the pump intake so there is no risk of the pump suction being broken, or entrainment of air in the sample. Record adjustments in the purge rate and changes in depth to water in the logbook. Purge rates should, if needed, be decreased to the minimum capabilities of the pump (0.1 to 0.2 liters per minute) to avoid affecting well drawdown. The well should not be purged dry. If the recharge rate of the well is so low that the well is purged dry, it is suggested that the contractor wait approximately four hours after water in the screened interval has recharged before collecting the appropriate volume of water for the sample with the pump (Herzog, et al., 1988). For VOC analyses, purge at least the volume of water in the screened interval, then wait for stability.

10. During well purging, use the flow-through cell to monitor the field parameters frequently (every three to five minutes) until all parameters have stabilized to within 10 percent over a minimum of three consecutive readings. Repeatedly collect water samples and assess turbidity. Turbidity is typically the last parameter to stabilize. If any parameter fails to stabilize, collect the sample after purging ~~three well volumes~~ for one hour.

11. Once the field parameters have stabilized, collect the samples directly from the end of the discharge tube. Do not filter any samples, unless a filtered sample is specifically required according to project objectives in addition to the unfiltered sample. All sample bottles should be filled by allowing the water from the discharge tube to flow gently down the inside of the bottle with minimal turbulence. Cap each bottle as it is filled.

12. The pump assembly should be carefully removed from the well. The tubing should be dedicated to each well, and should be placed in a large plastic garbage bag, sealed, and labeled with the appropriate well identification number.

13. Close and lock the well.

5.0 REFERENCES

Backhus, D.A., J.N. Ryan, D.M. Groher, J.K. MacFarlane, and P.M. Gschwend. 1993. Sampling Colloids and Colloid-Associated Contaminants in Ground Water. Ground Water, V. 31, pp. 466-479.

Barcelona, M.J., and R.A. Miller. 1983. A Guide to the Selection of Materials for Monitoring Well Construction and Ground Water Sampling. Illinois State Water Survey Contract. Report 327: 78.

APPENDIX N

SURVEY DATA

Willow Grove - Surface Soil Samples - 9th Street Landfill

GTS #	Sample #	Northing	Easting	Ground Elevation
2006	03SS09	324851.98	2693952.82	340.99
2007	03SS10	324947.34	2693969.80	340.28
2008	03SS11	325083.76	2694001.08	335.67
2009	03SS08	324722.64	2693533.93	337.61
2010	03SS06	324559.56	2693442.10	337.44
2012	03SS12	324486.38	2694060.72	358.54
2015	03SS03	324714.90	2693316.11	330.00
2016	03SS05	324781.75	2693351.68	325.25
2017	03SS04	324497.60	2693376.08	336.14
2018	03SS02	324377.00	2693250.07	332.80
2019	03SS01	324524.29	2693126.77	329.91
2020	03SS07	324878.13	2693452.05	323.14

Willow Grove - Sediment Samples - 9th Street Landfill

GTS #	Sample #	Northing	Easting	Ground Elevation
2011	03SW08/03SD08	324443.74	2694073.10	358.89
2013	03SW09/03SD09	325339.51	2694002.70	320.52
2014	03SD10/TOP OF WATER	325541.12	2694195.43	317.14

GEO-Technical Services,Inc.

Date:7/23/97
File:NAS-WL2.XLS

Willow Grove - Sediment Samples - NAS Background

GTS #	Sample #	Northing	Easting	Ground Elevation
2048	BGSW03/BGSD03	323241.67	2690159.08	300.85
2049	BGSW08/BGSD08	318142.15	2693411.93	298.95
2050	BGSW05/BGSD05	318297.88	2693364.19	298.00
2051	BGSW07/BGSD07	318591.77	2693455.66	294.15
3000	BGSW01/BGSD01	329950.86	2688456.70	228.85
3001	BGSW02/BGSD02	332640.69	2692625.69	220.61
3002	BGSW04/BGSD04	325239.60	2689970.80	272.10
3003	BGSW06/BGSD06	318425.99	2691415.02	323.12

GEO-Technical Services,Inc.

Date:7/23/97
File:NAS-WL2.XLS

Willow Grove - Soil Samples - NAS Background

GTS #	Sample #	Northing	Easting	Ground Elevation
3004	BGSS12	323767.06	2697691.80	355.80
3005	BGSS03	324105.47	2696847.32	355.47
3006	BGSS10	324534.79	2694950.51	358.01
3007	BGSS08	325284.94	2695782.04	346.80
3009	BGSS04	326277.83	2694250.51	325.98
3010	BGSS07	324759.80	2694134.23	348.38
3011	BGSS05	323852.03	2693927.64	370.69
3012	BGSS02	322838.53	2696045.46	344.72
3013	BGSS09	323289.03	2696848.77	348.38
3014	BGSS01	322034.38	2697571.98	338.15
3015	BGSS06	331294.21	2695738.10	280.96
3016	BGSS11	331379.07	2695700.98	279.15

GEO-Technical Services,Inc.

Date:7/23/97
File:NAS-WL2.XLS

Willow Grove - Monitoring Wells - 9th Street Landfill

GTS #	Well #	Northing	Easting	Top of steel casing	Notch in top PVC pipe	Ground Elevation
2057	03MW07S	324448.18	2692915.29		324.90	
2058	03MW07S	324448.18	2692915.29	325.16		
2059	03MW07S	324448.18	2692915.29			323.08
2060	03MW02I	325311.43	2693963.75		326.38	
2061	03MW02SI	325311.43	2693963.75		326.33	
2062	03MW02SI&I	325311.43	2693963.75	326.60		
2063	03MW02SI&I	325311.43	2693963.75			324.52
2064	03MW05I	324476.27	2694058.57		360.93	
2065	03MW05I	324476.27	2694058.57	361.19		
2076	03MW05I	324476.27	2694058.57			358.97
2066	03MW05S	324479.53	2694073.53		361.88	
2067	03MW05S	324479.53	2694073.53	362.26		
2075	03MW05S	324479.53	2694073.53			359.04
2068	03MW06S	324297.37	2694099.78		367.00	
2069	03MW06SI	324297.37	2694099.78		366.86	
2070	03MW06	324297.37	2694099.78	367.14		
2074	03MW06	324297.37	2694099.78			364.85
2071	03MW06I	324286.59	2694111.62		366.82	
2072	03MW06I	324286.59	2694111.62	367.02		
2073	03MW06I	324286.59	2694111.62			364.69

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Willow Grove Naval Air Station
Sites 01 & 03
Willow Grove - Pennsylvania

Project #: 3997 April 27, 2006
Horizontal Datum: Pennsylvania State Plane Coordinates NAD 83 - South Zone
Vertical Datum: NAVD 88
Monuments Used: Horizontal: NGS CORS (PARL1) / Vertical: NGS Pitcairn A (PID# KV2150)
Comments: Datums verified against existing data at Site 05 (Fire Training Area)

	Elevations			Coordinates			
Monitoring Wells	Ground	Inner	Protective	Northing	Easting	Date of Survey	Comments
03MW08D	364.25	365.63	365.91	324096.68	2694420.70	April 27, 2006	Common Protective Casing
03MW08S	364.25	365.59	365.91	324096.60	2694420.40	April 27, 2006	Common Protective Casing
01MW09	337.32	338.53	338.84	328398.75	2697345.48	April 27, 2006	
01MW10D	315.58	317.01	317.47	329322.44	2697389.56	April 27, 2006	Common Protective Casing
01MW10S	315.58	317.00	317.47	329322.57	2697389.70	April 27, 2006	Common Protective Casing

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Willow Gove Naval Air Station
Site 03 - 9th Street Landfill
Willow Grove - Pennsylvania

Project #: 3516 May 14, 2007
Horizontal Datum: Pennsylvania State Plane Coordinates NAD 83 - South Zone
Vertical Datum: NAVD 88
Additional Information: Test Pit endpoints are equal to NE, SE, SW, & NW at end of description.
Points ending in a number are samples located between Test Pit endpoints.

	Elevation in Feet	Coordinates in Feet		
Sampling		Y	X	
Point #	Ground	North	East	Date Of Survey
03-TP05-01	328.6	324667.68	2693314.47	May 14, 2007
03-TP05-02	328.1	324664.06	2693310.82	May 14, 2007
03-TP05-NE	331.0	324674.70	2693321.32	May 14, 2007
03-TP05-SW	331.2	324638.21	2693286.70	May 14, 2007
03-TP06-01	334.0	324570.56	2693374.62	May 14, 2007
03-TP06-02	332.7	324583.89	2693371.17	May 14, 2007
03-TP06-03	332.6	324585.15	2693371.15	May 14, 2007
03-TP06-04	333.2	324601.60	2693367.03	May 14, 2007
03-TP06-NW	333.4	324618.12	2693363.87	May 14, 2007
03-TP06-SE	334.3	324567.73	2693374.87	May 14, 2007
03-TP07-01	323.8	324814.51	2693390.65	May 14, 2007
03-TP07-02	325.1	324801.25	2693375.13	May 14, 2007
03-TP07-NE	323.4	324824.94	2693402.09	May 14, 2007
03-TP07-SW	325.0	324791.71	2693363.39	May 14, 2007
03-TP08-01	332.4	324720.60	2693496.91	May 14, 2007
03-TP08-02	328.8	324735.82	2693476.51	May 14, 2007
03-TP08-03	333.4	324718.61	2693499.56	May 14, 2007
03-TP08-NW	328.9	324745.85	2693463.70	May 14, 2007
03-TP08-SE	334.6	324716.89	2693501.86	May 14, 2007
03-TP09-01	341.9	324641.90	2693751.78	May 14, 2007
03-TP09-02	341.3	324639.62	2693734.39	May 14, 2007
03-TP09-NE	342.3	324644.20	2693769.42	May 14, 2007
03-TP09-SW	341.2	324638.23	2693720.87	May 14, 2007
03-TP10-01	341.5	324774.60	2693818.78	May 14, 2007
03-TP10-02	341.2	324785.09	2693832.32	May 14, 2007
03-TP10-NE	341.4	324794.72	2693843.64	May 14, 2007
03-TP10-SW	341.6	324763.60	2693804.88	May 14, 2007
03-TP11-01	340.7	324828.86	2693804.28	May 14, 2007
03-TP11-02	340.6	324844.39	2693792.62	May 14, 2007
03-TP11-NW	340.4	324858.14	2693782.77	May 14, 2007
03-TP11-SE	341.0	324817.05	2693813.73	May 14, 2007
03-TP12-01	340.4	324864.95	2693755.23	May 14, 2007

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Willow Gove Naval Air Station
Site 03 - 9th Street Landfill
Willow Grove - Pennsylvania

Project #: 3516 May 14, 2007
Horizontal Datum: Pennsylvania State Plane Coordinates NAD 83 - South Zone
Vertical Datum: NAVD 88
Additional Information: Test Pit endpoints are equal to NE, SE, SW, & NW at end of description.
Points ending in a number are samples located between Test Pit endpoints.

	Elevation in Feet	Coordinates in Feet		
Sampling		Y	X	
Point #	Ground	North	East	Date Of Survey
03-TP12-02	340.1	324876.99	2693768.63	May 14, 2007
03-TP12-03	340.2	324870.27	2693761.35	May 14, 2007
03-TP12-NE	340.7	324888.77	2693780.85	May 14, 2007
03-TP12-SW	340.3	324853.87	2693743.80	May 14, 2007
03-TP13-01	330.1	324770.33	2693527.69	May 14, 2007
03-TP13-NW	329.6	324771.58	2693525.14	May 14, 2007
03-TP13-SE	333.4	324762.55	2693541.88	May 14, 2007
03-TP14-01	334.3	324869.74	2693649.74	May 14, 2007
03-TP14-NW	331.9	324877.76	2693641.92	May 14, 2007
03-TP14-SE	337.0	324862.28	2693656.10	May 14, 2007
03-TP15-01	337.1	324494.97	2693400.62	May 14, 2007
03-TP15-NW	337.0	324497.27	2693386.21	May 14, 2007
03-TP15-SE	337.0	324493.63	2693404.73	May 14, 2007
03-TP16-01	332.9	324568.95	2693265.06	May 14, 2007
03-TP16-NW	332.2	324581.35	2693260.91	May 14, 2007
03-TP16-SE	333.4	324559.96	2693269.20	May 14, 2007
03-TP17-01	327.0	324650.94	2693203.97	May 14, 2007
03-TP17-NE	327.0	324660.31	2693215.20	May 14, 2007
03-TP17-SW	327.3	324644.01	2693196.54	May 14, 2007
03-TP18-01	330.1	324684.00	2693415.54	May 14, 2007
03-TP18-NE	329.7	324687.26	2693415.73	May 14, 2007
03-TP18-SW	331.3	324667.19	2693413.32	May 14, 2007

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Willow Grove Air Station
Site 3 - 9th Street Landfill
Sample Points

Project #: 155 October 14, 2009
Horizontal Datum: Pennsylvania State Plane Coordinates NAD 83 South Zone
Vertical Datum: NAVD 88
Monuments Used: Site Datum Provided By Client (Tie To "NGS PITCAIRN A" And Verified)

	Elevation in Feet	Coordinates in Feet		
Sampling		Y	X	
Point #	Ground	North	East	Date Of Survey
SS17	338.5	324810.0	2693650.5	March 2, 2009
SS18	339.7	324585.1	2693654.2	March 2, 2009
SS19	338.8	324596.4	2693575.0	March 2, 2009
SS20	338.2	324609.8	2693489.6	March 2, 2009
SS21	337.4	324558.8	2693461.3	March 2, 2009
SS22	337.2	324435.9	2693423.8	March 2, 2009
SS23	331.0	324612.7	2693350.6	March 2, 2009
SS24	328.9	324674.0	2693295.7	March 2, 2009
SS25	331.0	324606.4	2693245.0	March 2, 2009
SS26	325.4	324731.8	2693242.3	March 2, 2009
SS27	328.4	324731.5	2693342.5	March 2, 2009
SS28	324.8	324889.4	2693516.3	March 2, 2009
SS31	338.3	324791.8	2693635.7	October 14, 2009
SS32	339.9	324592.0	2693655.7	October 14, 2009
SS33	338.8	324585.9	2693565.9	October 14, 2009
SS34	338.4	324611.8	2693477.3	October 14, 2009
SS35	337.4	324568.8	2693464.9	October 14, 2009
SS36	337.3	324430.0	2693421.7	October 14, 2009
SS37	331.1	324613.6	2693347.1	October 14, 2009
SS38	329.0	324671.6	2693299.1	October 14, 2009
SS39	331.3	324597.0	2693246.4	October 14, 2009
SS40	324.7	324741.5	2693227.6	October 14, 2009
SS41	328.3	324734.1	2693353.3	October 14, 2009
SS42	325.2	324882.1	2693511.8	October 14, 2009
SW/SED12	304.6	325259.9	2693494.7	March 2, 2009
SW/SED13	306.5	325272.1	2693568.1	March 2, 2009
SW/SED14	306.5	325290.5	2693613.7	March 2, 2009
SW/SED15	306.8	325316.8	2693675.4	March 2, 2009
SW/SED16	307.7	325358.8	2693709.5	March 2, 2009
SW/SED17	309.7	325409.1	2693748.5	March 2, 2009
TP19N	339.7	324606.4	2693647.9	March 2, 2009
TP19S	343.2	324537.0	2693645.5	March 2, 2009
TP19SB01	339.6	324596.0	2693646.7	March 2, 2009

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Willow Grove Air Station
Site 3 - 9th Street Landfill
Sample Points

Project #: 155 October 14, 2009
Horizontal Datum: Pennsylvania State Plane Coordinates NAD 83 South Zone
Vertical Datum: NAVD 88
Monuments Used: Site Datum Provided By Client (Tie To "NGS PITCAIRN A" And Verified)

	Elevation in Feet	Coordinates in Feet		
Sampling		Y	X	
Point #	Ground	North	East	Date Of Survey
TP19SB02	340.0	324564.7	2693645.0	March 2, 2009
TP20N	337.5	324762.4	2693570.7	March 2, 2009
TP20S	337.9	324715.5	2693564.1	March 2, 2009
TP20SB01	337.0	324752.3	2693569.3	March 2, 2009
TP20SB02	337.3	324733.7	2693566.0	March 2, 2009
TP21AN	331.6	324838.8	2693593.1	March 2, 2009
TP21AS	336.1	324811.3	2693588.4	March 2, 2009
TP21BN	332.3	324836.1	2693597.9	March 2, 2009
TP21BS	336.5	324824.1	2693612.4	March 2, 2009
TP22N	337.4	324514.8	2693433.6	March 2, 2009
TP22S	340.1	324484.5	2693451.3	March 2, 2009
TP23E	337.1	324518.7	2693452.1	March 2, 2009
TP23W	337.3	324495.6	2693424.5	March 2, 2009
TP23SB01	337.4	324504.0	2693434.4	March 2, 2009
TP24N	337.0	324581.8	2693458.8	March 2, 2009
TP24S	337.1	324522.7	2693438.7	March 2, 2009
TP24SB01	336.8	324569.3	2693452.7	March 2, 2009
TP25E	338.0	324625.5	2693490.4	March 2, 2009
TP25W	337.3	324626.4	2693441.1	March 2, 2009
TP25SB01	337.5	324623.6	2693463.7	March 2, 2009
TP25SB02	337.7	324623.5	2693470.7	March 2, 2009
TP26E	328.0	324730.7	2693277.7	March 2, 2009
TP26W	324.9	324720.0	2693227.1	March 2, 2009
TP26SB01	326.9	324729.0	2693269.1	March 2, 2009
TP27N	323.7	324763.6	2693221.5	March 2, 2009
TP27S	325.5	324728.1	2693249.7	March 2, 2009
TP27SB01	323.8	324759.6	2693224.7	March 2, 2009
TP27SB02	324.3	324751.3	2693230.6	March 2, 2009
TP28E	322.9	324798.3	2693245.9	March 2, 2009
TP28W	322.8	324770.6	2693208.5	March 2, 2009
TP28SB01	323.4	324780.2	2693220.8	March 2, 2009
TP29E	326.7	324976.3	2693651.4	March 2, 2009
TP29W	324.9	324978.3	2693626.9	March 2, 2009

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Willow Grove Air Station
Site 3 - 9th Street Landfill
Sample Points

Project #: 155 October 14, 2009
Horizontal Datum: Pennsylvania State Plane Coordinates NAD 83 South Zone
Vertical Datum: NAVD 88
Monuments Used: Site Datum Provided By Client (Tie To "NGS PITCAIRN A" And Verified)

	Elevation in Feet	Coordinates in Feet		
Sampling		Y	X	
Point #	Ground	North	East	Date Of Survey
TP29SB01	325.8	324977.4	2693642.2	March 2, 2009
TP30E	338.3	324543.1	2693592.8	March 2, 2009
TP30W	338.6	324531.3	2693578.1	March 2, 2009
TP30SB01	338.3	324540.4	2693589.4	March 2, 2009

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Willow Grove Air Station
Site 3 - 9th Street Landfill
Wells

Project #: # 0155 March 2, 2010

Horizontal Datum: Pennsylvania State Plane Coordinates NAD 83 South Zone

Vertical Datum: NAVD 88

Monuments Used: Horizontal: NGS "OPUS Program" (PARL, NJTR, PAPH) (CORS 96) (EPOCH 2002.0)

Monuments Used: Vertical: NGS PITCAIRN A 1942 (Elevation: 368.03')

	Elevations			Coordinates		
Points	Ground	Inner	Protective	Northing	Easting	Date of Survey
3MW09I	316.07	318.24	318.55	324969.76	2693348.53	March 2, 2010
3MW09S	316.41	319.22	319.57	324960.99	2693341.61	March 2, 2010