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FINAL BASELINE RISK ASSESSMENT FOR OPERABLE UNIT 2 (OU 2) SITE 5 AND SITE 17 VOLUME 2 OF 2 APPENDICES B THROUGH T NAS CECIL FIELD FL

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BASELINE RISK ASSESSMENT
OPERABLE UNIT 2

VOLUME II: APPENDICES B THROUGH T

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

UNIT IDENTIFICATION CODE (UIC): N60200
CONTRACT NO. N62467-89-D-0317

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010

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APPENDIX B

APPENDIX B

USEPA REGION III RISK BASED CONCENTRATION TABLE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III
841 Chestnut Street
Philadelphia, Pennsylvania 19107

March 18, 1994

SUBJECT: Region III Supplementary Risk Assessment Guidance for Superfund

FROM: Roy L. Smith, Ph.D., Senior Toxicologist
Technical Support Section (3HW13)

TO: Risk Assessment Guidance Package Addressees

Since 1990, the EPA Region III risk assessors have developed several technical guidance documents clarifying and extending EPA's national risk assessment guidance for Superfund. In the past, the Region has distributed each document as it became final, and afterward provided copies on request. The Region now sees a need for a more formal distribution method.

This new procedure will begin by providing all current Region III risk assessment guidance documents to persons who (1) have Region III mailing addresses, and (2) are now enrolled in our mailing list for the Risk-Based Concentration Table. The documents are attached to this memo. If you are not currently on this mailing list, but would like to be, please fax Anna Poulton (215-597-9890) and give her your name, address, and phone and fax numbers. Please say whether you would like to receive the risk assessment guidance, the Risk-Based Concentration Table, or both. If you are already on the mailing list, you need not respond.

The Region will also use the mailing list to disseminate new guidance documents, and will also periodically distribute fresh copies of the complete guidance package. Of course, we will continue to respond to direct requests for copies at any time. Please make these requests via fax to Anna Poulton.

Each Region III risk assessment guidance document has been reviewed by Regional and Headquarters program personnel and scientists in EPA's Office of Research and Development, and revised in response to comments. Regional Superfund management has concurred with the recommendations, and each document carries the Division Director's signature.. The recommendations are now being applied by Region III technical support personnel in writing and reviewing Superfund risk assessments in the Region.

Questions about how the guidance should be applied to particular sites should be referred to the EPA toxicologist working with that site. Please call me at 215-597-6682 with other comments and observations about the distribution process.

Attachments

United States
Environmental Protection Agency

Region III
Philadelphia, PA 19107

EPA/903/R-93-001
January 1993

Region III
Technical Guidance Manual
Risk Assessment

Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening

EPA Contact: Dr. Roy L. Smith

EPA
Region III

Hazardous Waste Management Division
Office of Superfund Programs
January 1993

Human health risk assessment includes effort-intensive steps which require many detailed calculations by experts. Most baseline risk assessments are dominated by a few chemicals and a few routes of exposure. Effort expended on minor contaminants and exposure routes, i.e., those which do not influence overall risk, is essentially wasted. This guidance is intended to identify and focus on dominant contaminants of concern and exposure routes at the earliest feasible point in the baseline risk assessment. Use of these methods will decrease effort and time spent assessing risk, without loss of protectiveness. This guidance is not intended for other risk assessment activities, such as determining preliminary remediation goals.

SELECTING CONTAMINANTS AND EXPOSURE ROUTES OF CONCERN

Most samples from hazardous waste sites are analyzed for 103 target compounds and analytes recommended by the EPA Superfund program. Semi-volatile analysis can detect additional tentatively identified compounds not on the target lists. Special analytical services procedures, if used, may find still more contaminants. The combined number of contaminants detected at a site sometimes exceeds one hundred.

While EPA considers it necessary to gather information on many contaminants, very little of this data actually influences the overall quantitative assessment of health risk. For most sites, baseline risk assessments are dominated by a few contaminants and a few routes of exposure. The remaining tens, or hundreds, of detected contaminants have a minimal influence on total risk. This small impact is lost by rounding. Entire environmental media may contain not a single contaminant at a concentration which could adversely affect public health. Quantitative risk calculations using data from such "risk-free" media have no effect on the overall risk estimate for the site.

The EPA baseline risk assessment process at several points requires careful data evaluation by scientific experts. These evaluations, which are contaminant-specific, include: (1) statistical comparisons between site-related and background samples, (2) special handling of undetected contaminants, (3) calculation of toxicity equivalence, (4) evaluation of frequency of detection, and (5) comparison with ARARs. Because overall risk is usually driven by a few contaminants and exposure routes, effort spent in detailed evaluation of minor contaminants and routes of exposure is essentially wasted. For some sites, this wasted effort exceeds 90% of the total.

The baseline risk assessment process can be made more efficient by focusing on dominant contaminants and routes of exposure at the earliest feasible stage. The mechanisms recommended for this are (1) a re-ordering of the process of eliminating contaminants and routes of exposure, and (2) use of a risk-based concentration screen. Appropriately used, this process can dramatically reduce the effort of risk assessment, while not changing the result significantly.

EXISTING GUIDANCE

Chapter 5 of "RAGS IA" (Risk Assessment Guidance Superfund, Volume I, Human Health Evaluation Manual (Part A); EPA, 1989) provides a detailed procedure for evaluating data for a baseline risk assessment. This

based concentrations. Similarly, the risk assessor can use the same equations to calculate alternate risk levels (i.e., other than a systemic hazard quotient of 0.1 and lifetime cancer risk of 10^{-6}) to be the basis for screening.

SUMMARY

The process by which contaminants and exposure routes are selected in quantitative risk assessment can be made less effort-intensive by two simple changes. First, high-effort steps should be postponed until later in the selection process, because performing these operations on trivial contaminants and exposure routes is pointless. Second, changing from a relative concentration toxicity screen to an absolute risk-based concentration screen improves the risk assessor's ability to focus on dominant contaminants and exposure routes at an earlier stage.

REFERENCES

EPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors". OSWER Directive 9285.6-03, Office of Emergency and Remedial Response, March 25, 1991.

EPA, 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response, December, 1989. EPA/540/1-89/002.

For additional information, call (215) 597-6682.

Approved by: _____

Thomas C. Voltaggio, Director
Hazardous Waste Management Division

Table 2. EPA Region III guidance on selecting contaminants and exposure routes of concern
A. Data quality evaluation
1. Determine if methods are appropriate
2. Determine if qualifiers are appropriate
3. Determine if significant blank contamination exists
4. Determine if special analyses for tentatively identified compounds are needed
B. Reduce data set using risk-based concentration screen
5. Consult with RPM
6. Use risk-based concentration table to screen contaminants and exposure routes of concern
7. Document rationale for eliminating chemicals and exposure routes
C. Consider re-including eliminated chemicals and routes, based on:
8. Historical information
9. Exceptional toxicity, mobility, persistence, or bioaccumulation
10. Special exposure routes
11. Special treatability problems
12. ARARs exceedance
13. Toxicity equivalence of chemical class (*e.g.*, CDD/CDFs, PAHs)
D. Make further specific reductions in data set (optional)
14. Evaluate essentiality
15. Evaluate frequency of detection
16. Compare site samples to background

VARIABLE	UNITS	VALUE	LABEL
Exposure duration, age 1-6	y	6	EDc
Volatilization factor	L/m3	0.5	VF
3-Occupational			
Exposure frequency, occupational	d/y	250	EFo
Exposure duration, occupational	y	25	EDo
* = Contaminant-specific toxicity parameters			

The priority among sources of toxicological constants was as follows: (1) IRIS, (2) HEAST, (3) HEAST alternative method, (4) ECAO-Cincinnati, (5) withdrawn from IRIS, (6) withdrawn from HEAST, and (7) other EPA documents. Each source was used only if numbers from higher-priority sources were unavailable.

Algorithms:

1. Age-adjusted factors: Because contact rates with tap water, ambient air, and residential soil are different for children and adults, carcinogenic risks during the first 30 years of life were calculated using age-adjusted factors. These factors approximated the integrated exposure from birth until age 30 by combining contact rates, body weights, and exposure durations for two age groups - small children and adults. The age-adjusted factor for soil was obtained from RAGS IB; the others were developed by analogy.

a. Air inhalation ([$m^3 \cdot y$]/[kg· d]):

$$IFAadj = \frac{EDc \cdot IRAc}{BWc} + \frac{(EDtot - EDc) \cdot IRAa}{BWa}$$

b. Tap water ingestion ([L· y]/[kg· d]):

$$IFWadj = \frac{EDc \cdot IRWc}{BWc} + \frac{(EDtot - EDc) \cdot IRWa}{BWa}$$

c. Soil ingestion ([mg· y]/[kg· d]):

$$IFSadj = \frac{EDc \cdot IRSc}{BWc} + \frac{(EDtot - EDc) \cdot IRSa}{BWa}$$

b. Non-carcinogens: Calculations were based on adult exposure.

$$\frac{THQ \cdot RfDo \cdot BWa \cdot ATn}{EFr \cdot EDtot \cdot \frac{IRF}{1000\frac{g}{kg}}}$$

5. Soil commercial/industrial (mg/kg): The default exposure assumption that only 50% of incidental soil ingestion occurs at work has been omitted. Calculations were based on adult occupational exposure.

a. Carcinogens:

$$\frac{TR \cdot BWa \cdot ATc}{EFo \cdot EDo \cdot \frac{IRSa}{10^6 \frac{mg}{kg}} \cdot CPSo}$$

b. Non-carcinogens:

$$\frac{THQ \cdot RfDo \cdot BWa \cdot ATn}{EFo \cdot EDo \cdot \frac{IRSa}{10^6 \frac{mg}{kg}}}$$

6. Soil residential (mg/kg):

a. Carcinogens: Calculations were based on combined childhood and adult exposure.

$$\frac{TR \cdot ATc}{EFr \cdot \frac{IFSadj}{10^6 \frac{mg}{kg}} \cdot CPSo}$$

b. Non-carcinogens: Calculations were based on childhood exposure only.

$$\frac{THQ \cdot RfDo \cdot BWc \cdot ATn}{EFr \cdot EDc \cdot \frac{IRSc}{10^6 \frac{mg}{kg}}}$$

Sources: i=IRIS h=HEAST a=HEAST alt. w=Withdrawn from IRIS or HEAST e=EPA-ECAO o=Other EPA documents *F=final D=draft P=proposed T=tentative | c=carcinogen n=noncarcinogen*

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	VOC	MCL mg/L	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
Assure	76578148	9.00E-03 i						33 n	3.3 n	1.2 n	920 n	70 n
Asulam	3337711	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
Atrazine	1912249	3.50E-02 i		2.22E-01 h			0.003 F	0.3 c	0.028 c	0.014 c	13 c	2.9 c
Avermectin B1	65195553	4.00E-04 i						1.5 n	0.15 n	0.054 n	41 n	3.1 n
Azobenzene	103333			1.10E-01 i	1.08E-01 i			0.61 c	0.058 c	0.029 c	26 c	5.8 c
Barium and compounds	7440393	7.00E-02 i	1.43E-04 h				2 F	260 n	0.052 n	9.5 n	7200 n	550 n
Baygon	114261	4.00E-03 i						15 n	1.5 n	0.54 n	410 n	31 n
Bayleton	43121433	3.00E-02 i						110 n	11 n	4.1 n	3100 n	230 n
Baythroid	68359375	2.50E-02 i						91 n	9.1 n	3.4 n	2600 n	200 n
Benefin	1861401	3.00E-01 i						1100 n	110 n	41 n	31000 n	2300 n
Benomyl	17804352	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
Bentazon	25057890	2.50E-03 i						9.1 n	0.91 n	0.34 n	260 n	20 n
Benzaldehyde	100527	1.00E-01 i				***		61 n	37 n	14 n	10000 n	780 n
Benzene	71432		1.43E-04 e	2.90E-02 i	2.90E-02 i	***	0.005 F	0.087 n	0.052 n	0.11 c	99 c	22 c
Benzidine	92875	3.00E-03 i		2.30E+02 i	2.35E+02 i			0.00029 c	0.00003 c	0.00001 c	0.012 c	0.0028 c
Benzoic acid	65850	4.00E+00 i						15000 n	1500 n	540 n	410000 n	31000 n
Benzotrichloride	98077			1.30E+01 i				0.0052 c	0.00048 c	0.00024 c	0.22 c	0.049 c
Benzyl alcohol	100516	3.00E-01 h						1100 n	110 n	41 n	31000 n	2300 n
Benzyl chloride	100447			1.70E-01 i		***		0.062 c	0.037 c	0.019 c	17 c	3.8 c
Beryllium and compounds	7440417	5.00E-03 i		4.30E+00 i	8.40E+00 i		0.004 F	0.016 c	0.00075 c	0.00073 c	0.67 c	0.15 c
Bidrin	141662	1.00E-04 i						0.37 n	0.037 n	0.014 n	10 n	0.78 n
Biphenthrin (Talstar)	82657043	1.50E-02 i						55 n	5.5 n	2 n	1500 n	120 n
1,1-Biphenyl	92524	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
Bis(2-chloroethyl)ether	111444			1.10E+00 i	1.16E+00 i	***		0.0092 c	0.0054 c	0.0029 c	2.6 c	0.58 c
Bis(2-chloroisopropyl)ether	39638329	4.00E-02 i		7.00E-02 h	3.50E-02 h	***		0.26 c	0.18 c	0.045 c	41 c	9.1 c
Bis(chloromethyl)ether	542881			2.20E+02 i	2.17E+02 i	***		0.00005 c	0.00003 c	0.00001 c	0.013 c	0.0029 c
Bis(2-chloro-1-methylethyl)ether				7.00E-02 w	7.00E-02 w			0.96 c	0.089 c	0.045 c	41 c	9.1 c
Bis(2-ethylhexyl)phthalate (DEHP)	117817	2.00E-02 i		1.40E-02 i			0.006 F	4.8 c	0.45 c	0.23 c	200 c	46 c
Bisphenol A	80057	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
Boron (and borates)	7440428	9.00E-02 i	5.71E-03 h					330 n	2.1 n	12 n	9200 n	700 n
Boron trifluoride	7637072		2.00E-04 h					0.73 n	0.073 n			
Bromodichloromethane	75274	2.00E-02 i		6.20E-02 i		***	0.1 T	0.17 c	0.1 c	0.051 c	46 c	10 c
Bromoethene	593602				1.10E-01 h	***		0.096 c	0.057 c			
Bromoform (tribromomethane)	75252	2.00E-02 i		7.90E-03 i	3.85E-03 i	***	0.1 T	2.4 c	1.6 c	0.4 c	360 c	81 c
Bromomethane	74839	1.40E-03 i	1.43E-03 i			***		0.87 n	0.52 n	0.19 n	140 n	11 n
4-Bromophenyl phenyl ether	101553	5.80E-02 o						210 n	21 n	7.8 n	5900 n	450 n
Bromophos	2104963	5.00E-03 h						18 n	1.8 n	0.68 n	510 n	39 n
Bromoxynil	1689845	2.00E-02 i						73 n	7.3 n	2.7 n	2000 n	160 n
Bromoxynil octanoate	1689992	2.00E-02 i						73 n	7.3 n	2.7 n	2000 n	160 n

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Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	VOC	MCL mg/L	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
Chloromethane	74873			1.30E-02 h	6.30E-03 h	***		1.4 c	0.99 c	0.24 c	220 c	49 c
4-Chloro-2,2-methylaniline hydrochloride	3165933			4.60E-01 h				0.15 c	0.014 c	0.0069 c	6.2 c	1.4 c
4-Chloro-2-methylaniline	95692			5.80E-01 h				0.12 c	0.011 c	0.0054 c	4.9 c	1.1 c
beta-Chloronaphthalene	91587	8.00E-02 i						290 n	29 n	11 n	8200 n	630 n
o-Chloronitrobenzene	88733			2.50E-02 h		***		0.42 c	0.25 c	0.13 c	110 c	26 c
p-Chloronitrobenzene	121733			1.80E-02 h		***		0.59 c	0.35 c	0.18 c	160 c	35 c
2-Chlorophenol	95578	5.00E-03 i						18 n	1.8 n	0.68 n	510 n	39 n
2-Chloropropane	75296		2.86E-02 h			***		17 n	10 n			
Chlorothalonil	1897456	1.50E-02 i		1.10E-02 h				6.1 c	0.57 c	0.29 c	260 c	58 c
o-Chlorotoluene	95498	2.00E-02 i				***		12 n	7.3 n	2.7 n	2000 n	160 n
Chlorpropham	101213	2.00E-01 i						730 n	73 n	27 n	20000 n	1600 n
Chlorpyrifos	2921882	3.00E-03 i						11 n	1.1 n	0.41 n	310 n	23 n
Chlorpyrifos-methyl	5598130	1.00E-02 h						37 n	3.7 n	1.4 n	1000 n	78 n
Chlorsulfuron	64902723	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
Chlorthiophos	60238564	8.00E-04 h						2.9 n	0.29 n	0.11 n	82 n	6.3 n
Chromium III and compounds	16065831	1.00E+00 i	5.71E-07 w				0.1 F	3700 n	0.00021 n	140 n	100000 n	7800 n
Chromium VI and compounds	7440473	5.00E-03 i			4.20E+01 i		0.1 F	18 n	0.00015 c	0.68 n	510 n	39 n
Coal tar	8001589				2.20E+00 w				0.0028 c			
Coke Oven Emissions	8007452				2.17E+00 i				0.0029 c			
Copper and compounds	7440508	3.71E-02 h						140 n	14 n	5 n	3800 n	290 n
Crotonaldehyde	123739	1.00E-02 w		1.90E+00 h	1.90E+00 w			0.035 c	0.0033 c	0.0017 c	1.5 c	0.34 c
Cumene	98828	4.00E-02 i	2.57E-03 h					150 n	0.94 n	5.4 n	4100 n	310 n
Cyanides:							0.2 P					
Barium cyanide	542621	1.00E-01 h						370 n	37 n	14 n	10000 n	780 n
Calcium cyanide	592018	4.00E-02 i						150 n	15 n	5.4 n	4100 n	310 n
Copper cyanide	544923	5.00E-03 i						18 n	1.8 n	0.68 n	510 n	39 n
Cyanazine	21725462	2.00E-03 h		8.40E-01 h				0.08 c	0.0075 c	0.0038 c	3.4 c	0.76 c
Cyanogen	460195	4.00E-02 i						150 n	15 n	5.4 n	4100 n	310 n
Cyanogen bromide	506683	9.00E-02 i						330 n	33 n	12 n	9200 n	700 n
Cyanogen chloride	506774	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
Free cyanide	57125	2.00E-02 i						73 n	7.3 n	2.7 n	2000 n	160 n
Hydrogen cyanide	74908	2.00E-02 i						73 n	7.3 n	2.7 n	2000 n	160 n
Potassium cyanide	151508	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
Potassium silver cyanide	506616	2.00E-01 i						730 n	73 n	27 n	20000 n	1600 n
Silver cyanide	506649	1.00E-01 i						370 n	37 n	14 n	10000 n	780 n
Sodium cyanide	143339	4.00E-02 i						150 n	15 n	5.4 n	4100 n	310 n
Zinc cyanide	557211	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
Cyclohexanone	108941	5.00E+00 i				***		3000 n	1800 n	680 n	510000 n	39000 n
Cyclohexlamine	108918	2.00E-01 i						730 n	73 n	27 n	20000	1600 n

Sources: i=IRIS h=HEAST a=HEAST alt. w=Withdrawn from IRIS or HEAST e=EPA-ECAO o=Other EPA documents *F=final D=draft P=proposed T=tentative / c=carcinogen n=noncarcinogen*

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	VOC	MCL mg/L	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
Dicyclopentadiene	77736	3.00E-02 h	5.71E-05 h			***		0.042 n	0.021 n	4.1 n	3100 n	230 n
Dieldrin	60571	5.00E-05 i		1.60E+01 i	1.61E+01 i			0.0042 c	0.00039 c	0.0002 c	0.18 c	0.04 c
Diesel emissions			1.43E-03 i					5.2 n	0.52 n			
Diethyl phthalate	84662	8.00E-01 i						2900 n	290 n	110 n	82000 n	6300 n
Diethylene glycol, monobutyl ether	112345		5.71E-03 h					21 n	2.1 n			
Diethylene glycol, monoethyl ether	111900	2.00E+00 h						7300 n	730 n	270 n	200000 n	16000 n
Diethylforamide	617845	1.10E-02 h						40 n	4 n	1.5 n	1100 n	86 n
Di(2-ethylhexyl)adipate	103231	6.00E-01 i		1.20E-03 i			0.4 F	56 c	5.2 c	2.6 c	2400 c	530 c
Diethylstilbestrol	56531			4.70E+03 h				0.00001 c	1E-06 c	7E-07 c	0.00061 c	0.00014 c
Difenzoquat (Avenge)	43222486	8.00E-02 i						290 n	29 n	11 n	8200 n	630 n
Diflubenzuron	35367385	2.00E-02 i						73 n	7.3 n	2.7 n	2000 n	160 n
Diisopropyl methylphosphonate (DIMP)	1445756	8.00E-02 i						290 n	29 n	11 n	8200 n	630 n
Dimethipin	55290647	2.00E-02 i						73 n	7.3 n	2.7 n	2000 n	160 n
Dimethoate	60515	2.00E-04 i						0.73 n	0.073 n	0.027 n	20 n	1.6 n
3,3'-Dimethoxybenzidine	119904			1.40E-02 h				4.8 c	0.45 c	0.23 c	200 c	46 c
Dimethyl phthalate	131113	1.00E+01 h						37000 n	3700 n	1400 n	1000000 n	78000 n
Dimethyl terephthalate	120616	1.00E-01 i						370 n	37 n	14 n	10000 n	780 n
Dimethylamine	124403		5.71E-06 w					0.021 n	0.0021 n			
2,4-Dimethylaniline hydrochloride	21436964			5.80E-01 h				0.12 c	0.011 c	0.0054 c	4.9 c	1.1 c
2,4-Dimethylaniline	95681			7.50E-01 h				0.09 c	0.0083 c	0.0042 c	3.8 c	0.85 c
N-N-Dimethylaniline	121697	2.00E-03 i						7.3 n	0.73 n	0.27 n	200 n	16 n
3,3'-Dimethylbenzidine	119937			9.20E+00 h				0.0073 c	0.00068 c	0.00034 c	0.31 c	0.069 c
N,N-Dimethylformamide	68122	1.00E-01 h	8.57E-03 i					370 n	3.1 n	14 n	10000 n	780 n
1,1-Dimethylhydrazine	57147			2.60E+00 h	3.50E+00 h			0.026 c	0.0018 c	0.0012 c	1.1 c	0.25 c
1,2-Dimethylhydrazine	540738			3.70E+01 w	3.70E+01 w			0.0018 c	0.00017 c	0.00009 c	0.077 c	0.017 c
2,4-Dimethylphenol	105679	2.00E-02 i						73 n	7.3 n	2.7 n	2000 n	160 n
2,6-Dimethylphenol	576261	6.00E-04 i						2.2 n	0.22 n	0.081 n	61 n	4.7 n
3,4-Dimethylphenol	95658	1.00E-03 i						3.7 n	0.37 n	0.14 n	100 n	7.8 n
1,2-Dinitrobenzene	528290	4.00E-04 h						1.5 n	0.15 n	0.054 n	41 n	3.1 n
1,3-Dinitrobenzene	99650	1.00E-04 i						0.37 n	0.037 n	0.014 n	10 n	0.78 n
1,4-Dinitrobenzene	100254	4.00E-04 h						1.5 n	0.15 n	0.054 n	41 n	3.1 n
4,6-Dinitro-o-cyclohexyl phenol	131895	2.00E-03 i						7.3 n	0.73 n	0.27 n	200 n	16 n
2,4-Dinitrophenol	51285	2.00E-03 i						7.3 n	0.73 n	0.27 n	200 n	16 n
Dinitrotoluene mixture				6.80E-01 i				0.099 c	0.0092 c	0.0046 c	4.2 c	0.94 c
2,4-Dinitrotoluene	121142	2.00E-03 i						7.3 n	0.73 n	0.27 n	200 n	16 n
2,6-Dinitrotoluene	606202	1.00E-03 h						3.7 n	0.37 n	0.14 n	100 n	7.8 n
Dinoseb	88857	1.00E-03 i					0.007 F	3.7 n	0.37 n	0.14 n	100 n	7.8 n
di-n-Octyl phthalate	117840	2.00E-02 h						73 n	7.3 n	2.7 n	2000 n	160 n
1,4-Dioxane	123911			1.10E-02 i				6.1 c	0.57 c	0.29 c	260 c	58 c

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Fluoridone	59756604	8.00E-02 i						290 n	29 n	11 n	8200 n	630 n
Flurprimidol	56425913	2.00E-02 i						73 n	7.3 n	2.7 n	2000 n	160 n
Flutolanil	66332965	6.00E-02 i						220 n	22 n	8.1 n	6100 n	470 n
Fluvalinate	69409945	1.00E-02 i						37 n	3.7 n	1.4 n	1000 n	78 n
Folpet	133073	1.00E-01 i		3.50E-03 i				19 c	1.8 c	0.9 c	820 c	180 c
Fomesafen	72178020			1.90E-01 i				0.35 c	0.033 c	0.017 c	15 c	3.4 c
Fonofos	944229	2.00E-03 i						7.3 n	0.73 n	0.27 n	200 n	16 n
Formaldehyde	50000	2.00E-01 i			4.55E-02 i			730 n	0.14 c	27 n	20000 n	1600 n
Formic Acid	64186	2.00E+00 h						7300 n	730 n	270 n	200000 n	16000 n
Fosetyl-al	39148248	3.00E+00 i						11000 n	1100 n	410 n	310000 n	23000 n
Furan	110009	1.00E-03 i						3.7 n	0.37 n	0.14 n	100 n	7.8 n
Furazolidone	67458			3.80E+00 h				0.018 c	0.0016 c	0.00083 c	0.75 c	0.17 c
Furfural	98011	3.00E-03 i	1.43E-02 h					11 n	5.2 n	0.41 n	310 n	23 n
Furium	531828			5.00E+01 h				0.0013 c	0.00013 c	0.00006 c	0.057 c	0.013 c
Furmecyclox	60568050			3.00E-02 i				2.2 c	0.21 c	0.11 c	95 c	21 c
Glufosinate-ammonium	77182822	4.00E-04 i						1.5 n	0.15 n	0.054 n	41 n	3.1 n
Glycidaldehyde	765344	4.00E-04 i	2.86E-04 h					1.5 n	0.1 n	0.054 n	41 n	3.1 n
Glyphosate	1071836	1.00E-01 i					0.7 F	370 n	37 n	14 n	10000 n	780 n
Haloxyfop-methyl	69806402	5.00E-05 i						0.18 n	0.018 n	0.0068 n	5.1 n	0.39 n
Harmony	79277273	1.30E-02 i						47 n	4.7 n	1.8 n	1300 n	100 n
HCH (alpha)	319846			6.30E+00 i	6.30E+00 i			0.011 c	0.00099 c	0.0005 c	0.45 c	0.1 c
HCH (beta)	319857			1.80E+00 i	1.80E+00 i			0.037 c	0.0035 c	0.0018 c	1.6 c	0.35 c
HCH (gamma) Lindane	58899	3.00E-04 i		1.30E+00 h			0.0002 F	0.052 c	0.0048 c	0.0024 c	2.2 c	0.49 c
HCH-technical	608731			1.80E+00 i	1.79E+00 i			0.037 c	0.0035 c	0.0018 c	1.6 c	0.35 c
Heptachlor	76448	5.00E-04 i		4.50E+00 i	4.55E+00 i	***	0.0004 F	0.0023 c	0.0014 c	0.0007 c	0.64 c	0.14 c
Heptachlor epoxide	1024573	1.30E-05 i		9.10E+00 i	9.10E+00 i	***	0.0002 F	0.0012 c	0.00069 c	0.00035 c	0.31 c	0.07 c
Hexabromobenzene	87821	2.00E-03 i				***		1.2 n	0.73 n	0.27 n	200 n	16 n
Hexachlorobenzene	118741	8.00E-04 i		1.60E+00 i	1.61E+00 i	***	0.001 F	0.0066 c	0.0039 c	0.002 c	1.8 c	0.4 c
Hexachlorobutadiene	87683	2.00E-04 h		7.80E-02 i	7.70E-02 i	***		0.12 n	0.073 n	0.027 n	20 n	1.6 n
Hexachlorocyclopentadiene	77474	7.00E-03 i	2.00E-05 h			***	0.05 F	0.015 n	0.0073 n	0.95 n	720 n	55 n
Hexachlorodibenzo-p-dioxin mixture	19408743			6.20E+03 i	4.55E+03 i			0.00001 c	1E-06 c	5E-07 c	0.00046 c	0.0001 c
Hexachloroethane	67721	1.00E-03 i		1.40E-02 i	1.40E-02 i	***		0.61 n	0.37 n	0.14 n	100 n	7.8 n
Hexachlorophene	70304	3.00E-04 i						1.1 n	0.11 n	0.041 n	31 n	2.3 n
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121824	3.00E-03 i		1.10E-01 i				0.61 o	0.057 o	0.029 o	26 o	5.8 o
n-Hexane	110543	6.00E-02 h	5.71E-02 i			***		35 n	21 n	8.1 n	6100 n	470 n
Hexazinone	51235042	3.30E-02 i						120 n	12 n	4.5 n	3400 n	260 n
Hydrazine, hydrazine sulfate	302012			3.00E+00 i	1.71E+01 i			0.022 o	0.00037 o	0.0011 o	0.95 o	0.21 o
Hydrogen chloride	7647010		2.00E-03 i					7.3 n	0.73 n			
Hydrogen sulf	7783064	3.00E-03 i	2.57E-04 i					11 n	0.094 n	0.41 n	31[illegible]	23 n

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Methyl acrylate	96333	3.00E-02 h						110 n	11 n	4.1 n	3100 n	230 n
2-Methylaniline hydrochloride	636215			1.80E-01 h				0.37 c	0.035 c	0.018 c	16 c	3.5 c
2-Methylaniline	95534			2.40E-01 h				0.28 c	0.026 c	0.013 c	12 c	2.7 c
Methyl chlorocarbonate	79221	1.00E+00 w						3700 n	370 n	140 n	100000 n	7800 n
4-(2-Methyl-4-chlorophenoxy) butyric acid	94815	1.00E-02 i						37 n	3.7 n	1.4 n	1000 n	78 n
2-Methyl-4-chlorophenoxyacetic acid	94746	5.00E-04 i						1.8 n	0.18 n	0.068 n	51 n	3.9 n
2-(2-Methyl-14-chlorophenoxy)propionic acid	93652	1.00E-03 i						3.7 n	0.37 n	0.14 n	100 n	7.8 n
Methylcyclohexane	108872		8.57E-01 h					3100 n	310 n			
Methylene bromide	74953	1.00E-02 h				***		6.1 n	3.7 n	1.4 n	1000 n	78 n
Methylene chloride	75092	6.00E-02 i	8.57E-01 h	7.50E-03 i	1.64E-03 i	***	0.005 F	4.1 c	3.8 c	0.42 c	380 c	85 c
4,4'-Methylene bis(2-chloroaniline)	101144	7.00E-04 h		1.30E-01 h	1.30E-01 h			0.52 c	0.048 c	0.024 c	22 c	4.9 c
4,4'-Methylenebisbenzeneamine	101779			2.50E-01 h				0.27 c	0.025 c	0.013 c	11 c	2.6 c
4,4'-Methylene bis(N,N'-dimethyl)aniline	101611			4.60E-02 i				1.5 c	0.14 c	0.069 c	62 c	14 c
4,4'-Methylenediphenyl isocyanate	101688		5.71E-06 h			***		0.0035 n	0.0021 n			
Methyl ethyl ketone	78933	6.00E-01 i	2.86E-01 i					2200 n	100 n	81 n	61000 n	4700 n
Methyl hydrazine	60344			1.10E+00 h				0.061 c	0.0057 c	0.0029 c	2.6 c	0.58 c
Methyl isobutyl ketone	108101	5.00E-02 h	2.29E-02 h					180 n	8.4 n	6.8 n	5100 n	390 n
Methyl methacrylate	80626	8.00E-02 h						290 n	29 n	11 n	8200 n	630 n
2-Methyl-5-nitroaniline	99558			3.30E-02 h				2 c	0.19 c	0.096 c	87 c	19 c
Methyl parathion	298000	2.50E-04 i						0.91 n	0.091 n	0.034 n	26 n	2 n
2-Methylphenol (o-cresol)	95487	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
3-Methylphenol (m-cresol)	103394	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
4-Methylphenol (p-cresol)	106445	5.00E-03 h						18 n	1.8 n	0.68 n	510 n	39 n
Methyl styrene (mixture)	25013154	6.00E-03 h	1.14E-02 h			***		6 n	4.2 n	0.81 n	610 n	47 n
Methyl styrene (alpha)	98839	7.00E-02 h				***		43 n	26 n	9.5 n	7200 n	550 n
Methyl tertbutyl ether (MTBE)	1634044	5.00E-03 e	8.57E-01 i			***		18 n	310 n	0.68 n	510 n	39 n
Metolaclor (Dual)	51218452	1.50E-01 i						550 n	55 n	20 n	15000 n	1200 n
Metribuzin	21807649	2.50E-02 i						91 n	9.1 n	3.4 n	2600 n	200 n
Mirex	2385855	2.00E-04 i		1.80E+00 h				0.037 c	0.0035 c	0.0018 c	1.6 c	0.35 c
Molinate	2212671	2.00E-03 i						7.3 n	0.73 n	0.27 n	200 n	16 n
Molybdenum	7439987	5.00E-03 i						18 n	1.8 n	0.68 n	510 n	39 n
Monochloramine	10599903	1.00E-01 i						370 n	37 n	14 n	10000 n	780 n
Naled	300765	2.00E-03 i						7.3 n	0.73 n	0.27 n	200 n	16 n
Napropamide	15299997	1.00E-01 i						370 n	37 n	14 n	10000 n	780 n
Nickel refinery dust					8.40E-01 i				0.0075 c			
Nickel (soluble salts)	7440020	2.00E-02 i					0.1 F	73 n	7.3 n	2.7 n	2000 n	160 n
Nickel subsulfide	12035722				1.70E+00 i				0.0037 c			
Nitrapyrin	1929824	1.50E-03 w						5.5 n	0.55 n	0.2 n	150 n	12 n
Nitrate	14797558	1.60E+00 i					10 F	5800 n	580 n	220 n	160000 n	13000 n

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Pentachlorobenzene	608935	8.00E-04 i				•••		0.49 n	0.29 n	0.11 n	82 n	6.3 n
Pentachloronitrobenzene	82688	3.00E-03 i		2.60E-01 h		•••		0.041 c	0.024 c	0.012 c	11 c	2.5 c
Pentachlorophenol	87865	3.00E-02 i		1.20E-01 i			0.001 F	0.56 c	0.052 c	0.026 c	24 c	5.3 c
Permethrin	52645531	5.00E-02 i						180 n	18 n	6.8 n	5100 n	390 n
Phenmedipham	13684634	2.50E-01 i						910 n	91 n	34 n	26000 n	2000 n
Phenol	108952	6.00E-01 i						2200 n	220 n	81 n	61000 n	4700 n
m-Phenylenediamine	108452	6.00E-03 i						22 n	2.2 n	0.81 n	610 n	47 n
o-Phenylenediamine	95545	6.00E-03 h						22 n	2.2 n	0.81 n	610 n	47 n
p-Phenylenediamine	106503	1.90E-01 h						690 n	69 n	26 n	19000 n	1500 n
Phenylmercuric acetate	62384	8.00E-05 i						0.29 n	0.029 n	0.011 n	8.2 n	0.63 n
2-Phenylphenol	90437			1.94E-03 h				35 c	3.2 c	1.6 c	1500 c	330 c
Phorate	298022	2.00E-04 h						0.73 n	0.073 n	0.027 n	20 n	1.6 n
Phosmet	732116	2.00E-02 i						73 n	7.3 n	2.7 n	2000 n	160 n
Phosphine	7803512	3.00E-04 i	8.57E-06 h					1.1 n	0.0031 n	0.041 n	31 n	2.3 n
Phosphorus (white)	7723140	2.00E-05 i						0.073 n	0.0073 n	0.0027 n	2 n	0.16 n
p-Phthalic acid	100210	1.00E+00 h						3700 n	370 n	140 n	100000 n	7800 n
Phthalic anhydride	85449	2.00E+00 i	3.43E-01 h					7300 n	130 n	270 n	200000 n	16000 n
Picloram	1918021	7.00E-02 i					0.5 F	260 n	26 n	9.5 n	7200 n	550 n
Pirimiphos-methyl	29232937	1.00E-02 i						37 n	3.7 n	1.4 n	1000 n	78 n
Polybrominated biphenyls		7.00E-06 h		8.90E+00 h				0.0076 c	0.0007 c	0.00035 c	0.32 c	0.055 n
Polychlorinated biphenyls (PCBs)	1336363			7.70E+00 i			0.0005 F	0.0087 c	0.00081 c	0.00041 c	0.37 c	0.083 c
Aroclor 1016	12674112	7.00E-05 i						0.26 n	0.026 n	0.0095 n	7.2 n	0.55 n
Polychlorinated terphenyls (PCTs)				4.50E+00 e				0.015 c	0.0014 c	0.0007 c	0.64 c	0.14 c
Polynuclear aromatic hydrocarbons												
Acenaphthene	83329	6.00E-02 i						220 n	22 n	8.1 n	6100 n	470 n
Anthracene	120127	3.00E-01 i						1100 n	110 n	41 n	31000 n	2300 n
Benzo[a]pyrene	50328			7.30E+00 i	6.10E+00 h		0.0002 F	0.0092 c	0.001 c	0.00043 c	0.39 c	0.088 c
Benzo[b]fluoranthene	205992			7.30E-01 e	6.10E-01 e		0.0002 P	0.092 c	0.01 c	0.0043 c	3.9 c	0.88 c
Benzo[k]fluoranthene	207089			7.30E-02 e	6.10E-02 e		0.0002 P	0.92 c	0.1 c	0.043 c	39 c	8.8 c
Benz[a]anthracene	56553			7.30E-01 e	6.10E-01 e		0.0001 P	0.092 c	0.01 c	0.0043 c	3.9 c	0.88 c
Chrysene	218019			7.30E-03 e	6.10E-03 e		0.0002 P	9.2 c	1 c	0.43 c	390 c	88 c
Dibenz[ah]anthracene	53703			7.30E+00 e	6.10E+00 e		0.0003 P	0.0092 c	0.001 c	0.00043 c	0.39 c	0.088 c
Fluoranthene	206440	4.00E-02 i						150 n	15 n	5.4 n	4100 n	310 n
Fluorene	86737	4.00E-02 i						150 n	15 n	5.4 n	4100 n	310 n
Indeno[1,2,3-cd]pyrene	193395			7.30E-01 e	6.10E-01 e		0.0004 P	0.092 c	0.01 c	0.0043 c	3.9 c	0.88 c
Naphthalene	91203	4.00E-02 w						150 n	15 n	5.4 n	4100 n	310 n
Pyrene	129000	3.00E-02 i						110 n	11 n	4.1 n	3100 n	230 n
Prochloraz	67747095	9.00E-03 i		1.5[illegible]-01 i				0.45 c	0.042 c	0.021 c	1[illegible]	4.3 c
Profluralin	26399360	6.00E-03 h						22 n	2.2 n	0.81 n	6[illegible]	47 n

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Temephos	3383968	2.00E-02 h						73 n	7.3 n	2.7 n	2000 n	160 n
Terbacil	5902512	1.30E-02 i						47 n	4.7 n	1.8 n	1300 n	100 n
Terbufos	13071799	2.50E-05 h						0.091 n	0.0091 n	0.0034 n	2.6 n	0.2 n
Terbutryn	886500	1.00E-03 i						3.7 n	0.37 n	0.14 n	100 n	7.8 n
1,2,4,5-Tetrachlorobenzene	95943	3.00E-04 i				***		0.18 n	0.11 n	0.041 n	31 n	2.3 n
1,1,1,2-Tetrachloroethane	630206	3.00E-02 i		2.60E-02 i	2.59E-02 i	***		0.41 c	0.24 c	0.12 c	110 c	25 c
1,1,2,2-Tetrachloroethane	630206			2.00E-01 i	2.03E-01 i	***		0.052 c	0.031 c	0.016 c	14 c	3.2 c
Tetrachloroethylene (PCE)	127184	1.00E-02 i		5.20E-02 e	2.03E-03 e	***	0.005 F	1.1 c	3.1 c	0.061 c	55 c	12 c
2,3,4,6-Tetrachlorophenol	58902	3.00E-02 i						110 n	11 n	4.1 n	3100 n	230 n
p,a,a,a-Tetrachlorotoluene	5216251			2.00E+01 h		***		0.00053 c	0.00031 c	0.00016 c	0.14 c	0.032 c
Tetrachlorovinphos	961115	3.00E-02 i		2.40E-02 h				2.8 c	0.26 c	0.13 c	120 c	27 c
Tetraethyldithiopyrophosphate	3689245	5.00E-04 i						1.8 n	0.18 n	0.068 n	51 n	3.9 n
Thallic oxide	1314325	7.00E-05 h						0.26 n	0.026 n	0.0095 n	7.2 n	0.55 n
Thallium							0.002 F					
Thallium acetate	563688	9.00E-05 i						0.33 n	0.033 n	0.012 n	9.2 n	0.7 n
Thallium carbonate	6533739	8.00E-05 i						0.29 n	0.029 n	0.011 n	8.2 n	0.63 n
Thallium chloride	7791120	8.00E-05 i						0.29 n	0.029 n	0.011 n	8.2 n	0.63 n
Thallium nitrate	10102451	9.00E-05 i						0.33 n	0.033 n	0.012 n	9.2 n	0.7 n
Thallium selenite	12039520	9.00E-05 w						0.33 n	0.033 n	0.012 n	9.2 n	0.7 n
Thallium sulfate	7446186	8.00E-05 i						0.29 n	0.029 n	0.011 n	8.2 n	0.63 n
Thiobencarb	28249776	1.00E-02 i						37 n	3.7 n	1.4 n	1000 n	78 n
2-(Thiocyanomethylthio)-benzothiazole	21564170	3.00E-02 h						110 n	11 n	4.1 n	3100 n	230 n
Thiofanox	39196184	3.00E-04 h						1.1 n	0.11 n	0.041 n	31 n	2.3 n
Thiophanate-methyl	23564058	8.00E-02 i						290 n	29 n	11 n	8200 n	630 n
Thiram	137268	5.00E-03 i						18 n	1.8 n	0.68 n	510 n	39 n
Tin and compounds		6.00E-01 h						2200 n	220 n	81 n	61000 n	4700 n
Toluene	108883	2.00E-01 i	1.14E-01 w			***	1 F	75 n	42 n	27 n	20000 n	1600 n
Toluene-2,4-diamine	95807			3.20E+00 h				0.021 c	0.002 c	0.00099 c	0.89 c	0.2 c
Toluene-2,5-diamine	95705	6.00E-01 h						2200 n	220 n	81 n	61000 n	4700 n
Toluene-2,6-diamine	823405	2.00E-01 h						730 n	73 n	27 n	20000 n	1600 n
p-Toluidine	106490			1.90E-01 h				0.35 c	0.033 c	0.017 c	15 c	3.4 c
Toxaphene	8001352			1.10E+00 i	1.12E+00 i		0.003 F	0.061 c	0.0056 c	0.0029 c	2.6 c	0.58 c
Tralomethrin	66841256	7.50E-03 i						27 n	2.7 n	1 n	770 n	59 n
Triallate	2303175	1.30E-02 i						47 n	4.7 n	1.8 n	1300 n	100 n
Triasulfuron	82097505	1.00E-02 i						37 n	3.7 n	1.4 n	1000 n	78 n
1,2,4-Tribromobenzene	615543	5.00E-03 i				***		3 n	1.8 n	0.68 n	510 n	39 n
Tributyltin oxide (TBTO)	56359	3.00E-05 i						0.11 n	0.011 n	0.0041 n	3.1 n	0.23 n
2,4,6-Trichloroaniline hydrochloride	33663502			2.90E-02 h				2.3 c	0.22 c	0.11 c	99 c	22 c
2,4,6-Trichloroaniline	634935			3.40E-02 h				2 c	0.18 c	0.093 c	84 c	19 c

Sources: i=IRIS h=HEAST a=HEAST alt. w=Withdrawn from IRIS or HEAST e=EPA-ECAO o=Other EPA documents *F=final D=draft P=proposed T=tentative | c=carcinogen n=noncarcinogen*

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	VOC	MCL mg/L	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
Zineb	12122677	5.00E-02 *i*						180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*

APPENDIX C

HUMAN HEALTH EXPOSURE EQUATIONS

Basis for Exposure Frequencies

Child and Adult Trespasser - For surface soil ingestion, inhalation and dermal contact the exposure frequency is 30 days/year for the child and 24 days per year for the adult. The adult trespasser exposure frequency is based on 2 days per week (8 days per month) for a 3-month period. The child scenario assumes that the child is in contact with this one site for 2 days per week for a total of 15 weeks.

For sediment and surface water, the exposure frequency for both the child and adult transient is 45 days/year. This value is based on guidance from U.S. Environmental Protection Agency (USEPA), which states that the value for exposure frequency to these media should be 45 days per year (the swimming value).

Child and Adult Resident - The exposure frequency of 100 days per year for surface water and sediment exposure is an assumption made based on the climate. This assumes that these individuals will come in contact with surface water and sediment for 2 days per week for 50 weeks.

Surface Area Assumptions

Adult - The surface area represents the head, hands, forearms, and lower legs. USEPA simplifies this and states that the surface area exposed is equal to roughly 25 percent of total body surface area.

Table C-1
Exposure Parameters for Surface Soil Ingestion, Inhalation, and Dermal Contact Resident (Adult and Child)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{ing} = \frac{CS \times IR_{soil} \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$INTAKE_{dermal} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$INTAKE_{inh} = \frac{CA \times IR_{air} \times ET \times EF \times ED}{BW \times AT \times 356\ days/year}$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Parameter	Symbol	Child Value (Age 1-6)	Adult Value	Units	Source
Concentration in Soil	CS	Chemical Specific		Chemical Specific	
Soil Ingestion Rate	IR_{soil}	200	100	mg/day	[2]
Fraction Ingested	FI	100%	100%	unitless	Assumption
Conversion Factor					
Inorganics	CF	1×10^{-6}	1×10^{-6}	kg/mg	
Organics	CF	1×10^{-9}	1×10^{-9}	kg/μg	
Exposure Frequency	EF	350	350	days/year	[2]
Exposure Duration	ED	6	24	years	[2]
Exposure Time [1]	ET	16	16	hours/day	Assumption
Averaging Time	AT				
Cancer		70	70	years	[2]
Non-cancer		6	24	years	[2]
Surface Area	SA	See Appendix D	5750	cm^2	[3]

Table C-1 (Continued)
Exposure Parameters for Surface Soil Ingestion, Inhalation, and Dermal Contact
Resident (Adult and Child)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Parameter	Symbol	Child Value (Age 1-6)	Adult Value	Units	Source
Inhalation Rate	IR_{air}	0.833	0.833	m^3/hour	[2]
Body Weight	BW	15	70	kg	[2]
Adherence Factor	AF	1	1	mg/cm^2-event	[3]
Absorption Fraction	ABS_d	Chemical Specific		unitless	[4]
Concentration in Air	CA	Chemical Specific		mg/m^3	See Appendix D

References:

[1] Exposure Time is a parameter used only in Inhalation of Particulate Dust Scenario; See Appendix D.
[2] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03; march 25, 1991.
[3] USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January, 1992. See Appendix D.
[4] USEPA, 1992. USEPA Region IV Guidance Memo February 10, 1992.

Table C-2
Exposure Parameters for Surface Soil Ingestion, Inhalation, and Dermal Contact Transient (Adult and Child)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{ing} = \frac{CS \times IR_{soil} \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$INTAKE_{dermal} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$INTAKE_{inh} = \frac{CA \times IR_{air} \times ET \times EF \times ED}{BW \times AT \times 356\ days/year}$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Parameter	Symbol	Child Value (Age 6-16)	Adult Value	Units	Source
Concentration in Soil	CS	Chemical Specific		Chemical Specific	
Soil Ingestion Rate	IR_{soil}	100	100	mg/day	[2]
Fraction Ingested	FI	100%	100%	unitless	Assumption
Conversion Factor					
Inorganics	CF	1×10^{-6}	1×10^{-6}	kg/mg	
Organics	CF	1×10^{-9}	1×10^{-9}	kg/μg	
Exposure Frequency	EF	30	24	days/year	Assumption
Exposure Duration	ED	11	19	years	[2]
Exposure Time [1]	ET	4	4	hours/day	Assumption
Averaging Time	AT				
Cancer		70	70	years	[2]
Non-cancer		11	19	years	[2]

Table C-2 (Continued)
Exposure Parameters for Surface Soil Ingestion, Inhalation, and Dermal Contact Transient (Adult and Child)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Parameter	Symbol	Child Value (Age 6-16)	Adult Value	Units	Source
Surface Area	SA	See Appendix D	5750	cm^2	[3]
Inhalation Rate	IR_{air}	0.833	0.833	m^3/hour	[2]
Body Weight	BW	40	70	kg	[2,5]
Adherence Factor	AF	1	1	mg/cm^2-event	[3]
Absorption Fraction	ABS_d	Chemical Specific		unitless	[4]
Concentration in Air	CA	Chemical Specific		mg/m^3	See Appendix D

References:

[1] Exposure Time is a parameter used only in Inhalation of Particulate Dust Scenario; See Appendix D.
[2] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03; March 25, 1991.
[3] USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January, 1992. See Appendix D.
[4] USEPA, 1992. USEPA Region IV Guidance Memo February 10, 1992.
[5] USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; July 1989.

Table C-3
Exposure Parameters for Surface Soil Ingestion, Inhalation, and Dermal Contact
Site Worker (Adult)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{ing} = \frac{CS \times IR_{soil} \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$INTAKE_{dermal} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

$$INTAKE_{inh} = \frac{CA \times IR_{air} \times ET \times EF \times ED}{BW \times AT \times 356\ days/year}$$

Parameter	Symbol	Adult Value	Units	Source
Concentration in Soil	CS	Chemical Specific	Chemical Specific	
Soil Ingestion Rate	IR_{soil}	100	mg/day	[2]
Fraction Ingested	FI	100%	unitless	Assumption
Conversion Factor				
Inorganics	CF	1×10^{-6}	kg/mg	
Organics	CF	1×10^{-9}	kg/μg	
Exposure Frequency	EF	12	days/year	Assumption
Exposure Duration	ED	25	years	[2]
Exposure Time [1]	ET	8	hours/day	Assumption
Averaging Time	AT			
Cancer		70	years	[2]
Non-cancer		25	years	[2]
Surface Area	SA	5750	cm^2	[3]
Inhalation Rate	IR_{air}	0.833	m^3/hour	[2]
Body Weight	BW	70	kg	[2]

Table C-3 (Continued)
Exposure Parameters for Surface Soil Ingestion, Inhalation, and Dermal Contact
Site Worker (Adult)
Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Parameter	Symbol	Adult Value	Units	Source
Adherence Factor	AF	1	mg/cm^2-event	[3]
Absorption Fraction	ABS_d	Chemical Specific	unitless	[4]
Concentration in Air	CA	Chemical Specific	mg/m^3	See Appendix D

References:

[1] Exposure Time is a parameter used only in Inhalation of Particulate Dust Scenario;See Appendix D.
[2] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03; March 25, 1991.
[3] USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January, 1992. See Appendix D.
[4] USEPA, 1992. USEPA Region IV Guidance Memo February 10, 1992

Table C-4
Exposure Parameters for Surface and Subsurface Soil Ingestion, Inhalation, and Dermal Contact
Excavation Worker (Adult)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{ing} = \frac{CS \times IR_{soil} \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$INTAKE_{dermal} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$INTAKE_{inh} = \frac{CA \times IR_{air} \times ET \times EF \times ED}{BW \times AT \times 356\ days/year}$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Parameter	Symbol	Adult Value	Units	Source
Concentration in Soil	CS	Chemical Specific	Chemical Specific	
Soil Ingestion Rate	IR_{soil}	480	mg/day	[2]
Fraction Ingested	FI	100%	unitless	Assumption
Conversion Factor				
Inorganics	CF	1×10^{-6}	kg/mg	
Organics	CF	1×10^{-9}	kg/μg	
Exposure Frequency	EF	30	days/year	Assumption
Exposure Duration	ED	1	years	[2]
Exposure Time [1]	ET	8	hours/day	Assumption
Averaging Time	AT			
Cancer		70	years	[2]
Non-cancer		1	years	[2]
Surface Area	SA	5,750	cm^2	[3]
Inhalation Rate	IR_{air}	2.5	m^3/hour	[2]
Body Weight	BW	70	kg	[2]

Table C-4 (Continued)
Exposure Parameters for Surface and Subsurface Soil Ingestion, Inhalation, and Dermal Contact
Excavation Worker (Adult)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Parameter	Symbol	Adult Value	Units	Source
Adherence Factor	AF	1	mg/cm^2-event	[3]
Absorption Fraction	ABS_d	Chemical Specific	unitless	[4]
Concentration in Air	CA	Chemical Specific	mg/m^3	See Appendix D

References:

[1] Exposure Time is a parameter used only in Inhalation of Particulate Dust Scenario; See Appendix D.
[2] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03; March 25, 1991.
[3] USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January, 1992. See Appendix D.
[4] USEPA, 1992. USEPA Region IV Guidance Memo February 10, 1992.

Table C-5
Exposure Parameters for Surface Soil Ingestion, Inhalation, and Dermal Contact Occupational Worker (Adult)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{inh} = \frac{CA \times IR_{air} \times ET \times EF \times ED}{BW \times AT \times 356\ days/year}$$

$$INTAKE_{dermal} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

$$INTAKE_{ing} = \frac{CS \times IR_{soil} \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/year}$$

Parameter	Symbol	Adult Value	Units	Source
Concentration in Soil	CS	Chemical Specific	Chemical Specific	
Soil Ingestion Rate	IR_{soil}	100	mg/day	[2]
Fraction Ingested	FI	100%	unitless	Assumption
Conversion Factor				
Inorganics	CF	1×10^{-6}	kg/mg	
Organics	CF	1×10^{-9}	kg/μg	
Exposure Frequency	EF	250	days/year	[2]
Exposure Duration	ED	25	years	[2]
Exposure Time [1]	ET	8	hours/day	Assumption
Averaging Time	AT			
Cancer		70	years	[2]
Non-cancer		25	years	[2]
Surface Area	SA	2300	cm^2	[3]
Inhalation Rate	IR_{air}	0.833	m^3/hour	[2]

Table C-5 (Continued)
Exposure Parameters for Surface Soil Ingestion, Inhalation, and Dermal Contact
Occupational Worker (Adult)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Parameter	Symbol	Adult Value	Units	Source
Body Weight	BW	70	kg	[2]
Concentration in Air	CA	Chemical Specific	mg/m^3	See Appendix D
Adherence Factor	AF	1	mg/cm^2-event	[3]
Absorption Fraction	ABS_d	Chemical Specific	unitless	[4]

References:

[1] Exposure Time is a parameter used only in Inhalation of Particulate Dust Scenario; See Appendix D.
[2] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03; March 25, 1991.
[3] USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January, 1992. Represents surface area of the head and forearms (See Appendix D).
[4] USEPA, 1992. USEPA Region IV Guidance Memo February 10, 1992.

Table C-6
Exposure Parameters for Sediment Ingestion and Dermal Contact Resident (Adult and Child)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{ing} = \frac{CS \times IR_{sediment} \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

$$INTAKE_{dermal} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/year}$$

Parameter	Symbol	Child Value (Age 1-6)	Adult Value	Units	Source
Concentration in Sediment	CS	Chemical Specific		Chemical Specific	
Sediment Ingestion Rate	$IR_{sediment}$	200	100	mg/day	[1]
Fraction Ingested	FI	100%	100%	unitless	Assumption
Conversion Factor					
Inorganics	CF	1×10^{-6}	1×10^{-6}	kg/mg	
Organics	CF	1×10^{-9}	1×10^{-9}	kg/μg	
Exposure Frequency	EF	100	100	days/year	Assumption
Exposure Duration	ED	6	24	years	[1]
Averaging Time	AT				
Cancer		70	70	years	[1]
Non-cancer		6	24	years	[1]
Surface Area	SA	See Appendix D	5750	cm^2	[2]
Body Weight	BW	15	70	kg	[2]
Adherence Factor	AF	1	1	mg/cm^2-event	[2]
Absorption Fraction	ABS_d	Chemical Specific		unitless	[3]

References:

[1] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03; March 25, 1991.

[2] USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January, 1992. See Appendix D.

[3] USEPA, 1992. USEPA Region IV Guidance Memo February 10, 1992.

Table C-7
Exposure Parameters for Sediment Ingestion and Dermal Contact Transient (Adult and Child)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{ing} = \frac{CS \times IR_{sediment} \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

$$INTAKE_{dermal} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/year}$$

Parameter	Symbol	Child Value (Age 6-16)	Adult Value	Units	Source
Concentration in Sediment	CS	Chemical Specific		Chemical Specific	
Sediment Ingestion Rate	$IR_{sediment}$	100	100	mg/day	[1]
Fraction Ingested	FI	100%	100%	unitless	Assumption
Conversion Factor					
Inorganics	CF	1×10^{-6}	1×10^{-6}	kg/mg	
Organics	CF	1×10^{-9}	1×10^{-9}	kg/μg	
Exposure Frequency	EF	45	45	days/year	Assumption
Exposure Duration	ED	11	19	years	[1]
Averaging Time	AT				
Cancer		70	70	years	[1]
Non-cancer		11	19	years	[1]
Surface Area	SA	See Appendix D	5,750	cm^2	[2]
Body Weight	BW	40	70	kg	[1,4]
Adherence Factor	AF	1	1	mg/cm^2-event	[2]
Absorption Fraction	ABS_d	Chemical Specific		unitless	[3]

References:

[1] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03; march 25, 1991.

[2] USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January, 1992. See Appendix D.

[3] USEPA, 1992. USEPA Region IV Guidance Memo February 10, 1992.

[4] USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; July 1989.

Table C-8
Exposure Parameters for Surface Water Ingestion and Dermal Contact Resident (Adult and Child)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{ing} = \frac{CW \times IR_{surface\ water} \times CF1 \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$DA_{event} = PC_{event} \times CW \times CF1 \times CF2$$

$$INTAKE_{dermal} = \frac{DA_{event} \times SA \times EF \times ED \times EV}{BW \times AT \times 365\ days/year}$$

Parameter	Symbol	Child Value (Age 1-6)	Adult Value	Units	Source
Concentration in Surface Water	CW	Chemical Specific		Chemical Specific	
Surface Water Ingestion Rate	$IR_{surface\ water}$	0.13	0.13	liters/day	[1]
Conversion Factor					
	CF1	0.001	0.001	mg/μg	
	CF2	0.001	0.001	liters/cm^3	
Exposure Frequency	EF	100	100	days/year	Assumption
Exposure Duration	ED	6	24	years	Assumption
Event Frequency	EV	1	1	events/day	Assumption
Averaging Time	AT				
Cancer		70	70	years	[2]
Non-cancer		6	24	years	[2]
Surface Area	SA	See Appendix D	5,750	cm^2	[3]
Body Weight	BW	15	70	kg	[2]
Diffusion Depth per Event	PC_{event}	Chemical Specific		cm/event	[4]
Exposure Time	ET	2.6		hours/day	Assumption

References:

[1] USEPA, 1988. Superfund Exposure Assessment Manual; EPA/540//1-88/001; April 1989.
[2] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03; March 25, 1991.
[3] USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January, 1992. See Appendix D.
[4] Calculated per USEPA, 1992 [3].

Table C-9
Exposure Parameters for Surface Water Ingestion and Dermal Contact Transient (Adult and Child)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{ing} = \frac{CW \times IR_{surface\ water} \times CF1 \times EF \times ED}{BW \times AT \times 365\ days/year}$$

$$DA_{event} = PC_{event} \times CW \times CF1 \times CF2$$

$$INTAKE_{dermal} = \frac{DA_{event} \times SA \times EF \times ED \times EV}{BW \times AT \times 365\ days/year}$$

Parameter	Symbol	Child Value (Age 6-16)	Adult Value	Units	Source
Concentration in Surface Water	CS	Chemical Specific		Chemical Specific	
Surface Water Ingestion Rate	$IR_{surface\ water}$	0.13	0.13	liters/day	[1]
Fraction Ingested	FI	100%	100%	unitless	Assumption
Conversion Factor					
	CF1	0.001	0.001	mg/μg	
	CF2	0.001	0.001	liters/cm^3	
Exposure Frequency	EF	45	45	days/year	Assumption
Exposure Duration	ED	11	19	years	[2]
Event Frequency	EV	1	1	events/day	Assumption
Averaging Time	AT				
Cancer		70	70	years	[2]
Non-cancer		11	19	years	[2]
Surface Area	SA	See Appenidx D	5,750	cm^2	[3]
Body Weight	BW	40	70	kg	[2,5]
Diffusion Depth per Event	PC_{event}	Chemical Specific		cm/event	[4]

References:

[1] USEPA, 1988. Superfund Exposure Assessment Manual; EPA/540/1-88/001; April 1988.
[2] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03; March 25, 1991.
[3] USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January, 1992. See Appendix D.
[4] Calculated per USEPA, 1992 [3].
[5] USEPA, 1989, Exposure Factors Handbook; EPA/600/8-89/043; May 1989.

Table C-10
Exposure Parameters for Groundwater Ingestion and Inhalation
Adult Residents

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

$$INTAKE_{inh} = \frac{CA_{air} \times ET \times EF \times ED}{CF2 \times AT \times 356\ days/year}$$

$$Intake_{ing} = \frac{CW \times IR_{groundwater} \times CF1 \times EF \times ED}{BW \times AT \times 365\ days/year}$$

Parameter	Symbol	Adult Value	Units	Source
Concentration in Groundwater	CW	Chemical Specific	μg/liter	
Water Ingestion Rate	IR_{water}	2	liters/day	[2]
Conversion Factor	CF1 CF2	0.001 24	mg/μg hours/day	
Exposure Frequency	EF	350	days/year	[2]
Exposure Duration	ED	30	years	[2]
Averaging Time	AT			
Cancer		70	years	[2]
Non-cancer		30	years	[2]
Body Weight	BW	70	kg	[2]
Concentration Shower Air	CA_{air}	See Appendix D	$\mu g/m^3$	[3]
Exposure Time [1]	ET	0.2	hours/day	[4]

References:
[1] Exposure Time is a parameter used only in inhalation of volatiles while showering; See Appendix D .
[2] USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factos"; OSWER Directive 9285.6-03; March 25, 1991.
[3] This parameter is modeled; See Appendix D.
[4] USEPA, 1989. Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part A) EPA/540/1-89/002; December, 1989.

APPENDIX D

INHALATION OF PARTICULATES FROM SOIL

INHALATION OF VAPORS WHILE SHOWERING

DERMAL ABSORPTION FROM WATER

DERMAL ABSORPTION FROM SOIL

D.1 INHALATION OF PARTICULATES FROM SOIL

This evaluation has been conducted to estimate levels of site contaminants that would occur in ambient air as a result of wind erosion at NAS Cecil Field, Sites 5 and 17. To estimate atmospheric concentrations of fugitive air contaminants, a three step modelling process was conducted. In the first step, respirable particle-phase emission rates are calculated. In the second, contaminant emission rates on a unit basis are calculated. In the third phase, downwind ambient concentrations are estimated using air dispersion modeling. Each of these steps are discussed below. Calculations for the theoretical site are shown in the attached tables (Table D-1)

STEP 1: ESTIMATION OF PM_{10} EMISSIONS FROM WIND EROSION

Emission rates for respirable particle-phase contaminants were estimated using equations developed by the USEPA for wind erosion by Cowherd and others (1985). Airborne respirable particulate matter is defined as particles with an aerodynamic diameter less than or equal to 10 μm and is denoted with the symbol PM_{10}. Ambient air concentrations were then estimated using air dispersion modeling.

The equations presented in Cowherd and others, are intended to provide a methodology for rapid assessment of the inhalation exposure to respirable particulate emissions from surface contamination sites under emergency situations. Consequently, the models are based on a number of simplifying assumptions and yield order-of-magnitude estimates of atmospheric concentrations. The results of this quantitative assessment of potential inhalation exposure at this site should be reviewed with this fact in mind.

For estimating emissions from wind erosion for surface areas not completely covered by vegetation, two emission factor equations have been developed by Cowherd and others, 1985. Selection of the appropriate equation depends on whether the contaminated site's surface material is classified as having a "limited reservoir" or an "unlimited reservoir" of erodible surface particles. The critical feature of "unlimited" erosion potential is that contaminated soil is entrained at a lower wind velocity than for the "limited" case. Surface soil containing a high percentage of silts and lacking either vegetation or large nonerodible elements are assumed to contain an unlimited reservoir of surface erodible particles. This is based on the aggregate size distribution of surface particles, which is best determined with a sieve size analysis. In the absence of such an analysis at NAS Cecil Field, an unlimited reservoir was assumed. The application of the unlimited reservoir model to this site represents a conservative case as the surface soil are unlikely to contain a large percentage of silts because of the geological age of the soil (i.e., the majority of the silts have already been eroded).

A conservative estimate of the PM_{10} emission factor (E_{10}) for the contaminated surface with "unlimited" erosion potential was calculated using an emission factor derived by Gillette (1981) based on field measurements of highly erodible soil. The following equation was used:

$$E_{10} = 1x10^{-5}\ (1-V)\ \left(\frac{[u]}{u_t}\right)^3 F(x)$$

Table D-1

Step 1: Calculate PM_{10} Emissions from Wind Erosion

EQUATION 1*

$E_{10} = (1x10^{-5}) \times (1-V) \times ([u]/u_t)^3 \times F(x)$ Cowherd, Eqn. 4-4

where:

E_{10}	=	PM_{10} emission factor (g/m^2-s)
1×10^{-5}	=	empirical constant
V	=	fraction of the contaminated surface area with continuous vegatative cover
[u]	=	mean annual wind speed (m/s) (Cowherd, Table 4-1)
u_t	=	threshold value of wind speed at 7 m (m/s)
F(x)	=	function plotted in Cowherd, Fig. 4-3
x	=	dimentionless ratio = 0.866 x ut/[u]

EQUATION 2

$u_t = (1/0.4) \times \ln(z/z_0) \times u^*$ Cowherd, Eqn. 4-3

where:

z	=	height above surface (m)
z_0	=	roughness height (m)
u^*	=	friction velocity (m/s)

EQUATION 3

for x>2:

$F(x) = 0.18 \times (8x^3 + 12x) \times (\exp(-x^2))$ Cowherd, Appendix B

Variable		Value		Units		Source
z		7		m		Cowherd
z_0		0.02		m		Cowherd, Figure 3-6
u^*		0.63		m/s		Assumption
u_t		9.14		m/s		Calculated from Equation 2
[u]		3.8		m/s		Cowherd, Table 4-1, Jacksonville, Florida
x		2.13		unitless		Calculated from 0.886 x u_t/[u]
F(x)		0.2		unitless		Calculated from Equation 3 or Cowherd Figure 4-3
V		0.6		fraction		Assumption based on site visit
E_{10}		5.68×10^{-8}		m/s		Calculated from Equation 1

Table D-1 (continued)

Step 2: Calculate Contaminant Emission Rate

EQUATION 4

$Q_{10} = f \times E_{10} \times A$ Cowherd Eqn.

where:

Q_{10}	=	contaminant emission rate (ug contaminant/s)
f	=	fraction of PM_{10} with contaminant (mg contaminant/kg soil) (assumed to equal soil concentration in mg contaminant/kg soil)
E_{10}	=	PM_{10} emission rate (g PM_{10}/m^2-s)
A	=	area (m^2)
1	=	conversion (1000 ug contaminant/mg contaminant) x (kg PM_{10}/1000 g PM_{10})

Variable		Value		Units		Source
f		1		mg/kg		Assumption
A		33600		m^2		Assumption
E_{10}		5.68×10^{-8}		g PM_{10}/m^2-s		Calculated from Step 1 (Equation 1)
Q_{10}		1.91×10^{-3}		ug/s		Calculated from Equation 4

Table D-1 (continued)

Step 3: Calculate Airborne Contaminant Concentration

EQUATION 5

$$C_{10} = \frac{Q_{10} \times a}{\text{Ventilation Rate}}$$ Box Model

$$= \frac{Q_{10} \times a}{U \times H \times W}$$

where:

C_{10}	=	airborne contaminant concentration (ug/m^3)
Q_{10}	=	contaminant emission rate (ug/s)
U	=	wind speed (same as [u] from Step 1) (m/s)
H	=	downwind mixing height (m)
W	=	width of area perpendicular to wind (m)
a	=	fraction of 24 hours during which activity occurs

EQUATION 6

H is calculated in an iterative fashion based on the desired value of X from the following equation:

$$X = 6.25 \times (z_0) \times [(H/z_0) \times \ln(H/z_0) - 1.58 \times (H/z_0) + 1.58]$$ Pasquill, 1975

where:

X	=	downwind distance from leading edge of area source to receptor (m)
H	=	downwind mixing height (m)
z_0	=	roughness height (same as in Step 1) (m)

Variable	Value	Units	Source
Q_{10}	1.91×10^{-3}	ug/s	Calculated from Step 2 (Equation 4)
a	1	unitless	
U	2.45	m/s	Cowherd, Table 4-1, Jacksonville, Florida (same as [u] from Step 1)
H	0.276	m	Calculated in Equation 6
W	140	m/s	
z_0	0.02	m	Cowherd, Figure 3-6 (same as Step 1)
X	1	m	Calculated from Equation 3 or Cowherd Figure 4-3
C_{10}	2.02×10^{-6}	ug/m^3 per mg/kg	Calculated from Equation 5

where:

E_{10} = PM_{10} emission factor (g/m^2-sec)
$1x10^{-5}$ = empirical constant (g/m^2-sec)
V = fraction of the contaminated surface area with continuous vegetative cover
[u] = mean annual wind speed (m/s)
u_t = threshold value of wind speed at 7 m (m/s)
F(x) = function to estimate unlimited erosion
x = dimensionless ratio = 0.886 u_t/[u].

and:

$$u_t = \frac{1}{0.4} \; x \; \ln\frac{z}{z_0} \; x \; u^*$$

where:

u^* = friction velocity
z = height above surface (m)
z_0 = roughness height (m)

For values of x greater then 2:

$$F(x) = 0.18 \; (8 \; x^3 + 12 \; x) \; e^{-x^2}$$

All parameters in the above equation were calculated from site-specific data where possible. The values used in estimating the emission factor for wind erosion are given in Step 1 of Table D-1.

STEP 2. ESTIMATION OF CONTAMINANT EMISSION RATES

Contaminant-specific emission rates were estimated from (1) the PM_{10} emission factors, (2) the mass fraction of contaminant in PM_{10} emissions, and (3) the contaminated surface area. These parameters were used in the following equation to calculate contaminant emission rates (Q_{10}):

$$Q_{10} = 1 \; x \; f \; x \; E_{10} \; x \; A$$

where: Q_{10} = contaminant emission rate as PM_{10} (μg/sec)
f = mass fraction of contaminant in PM_{10} emissions (mg contaminant/kg PM_{10})
E_{10} = PM_{10} emission rate (g PM_{10}/m^2-sec)
A = contaminated surface area (m^2), and
1 = conversion factor (1000 ug contaminant/mg contaminant)* (kg PM_{10}/1000 g PM_{10})

The values for f were estimated by assuming that the mass fraction of the contaminant in the inhalable particles emitted (PM_{10}) is equal to the mass fraction of the contaminant in the soil. The surface area available for wind erosion was assumed to be the area of the excavation for each scenario.

STEP 3. AIRBORNE CONTAMINANT CONCENTRATION

Air dispersion modeling is used to predict off-site contaminant air concentrations based on the PM_{10} emission rate. Many different forms of dispersion models exist

for a variety of applications. For this situation, the box model was selected because it is most appropriate to use when receptors are less than 100 meters from the edge of an area source. The model overpredicts concentrations by a factor of approximately four to six when compared with the Gaussian dispersion model, ISCST, for the "downwind distances" to exposure points of interest in this assessment (McCarthy and Burbank, 1990). The box model is a good screening model for a public health risk assessment because the concentrations estimated with the box model are protective of public health. If no risk is indicated using box model concentrations, the potential for adverse impacts to public health are considered negligible.

The box model is a basic analytical and physical model representing diffusion from an area source. The box encloses the area source and is bounded by the ground as its base and the mixing height (H) of the mean vertical displacement of emissions, which is a function of atmospheric stability and downwind distance to the point of exposure. Within the box, mixing is assumed to be complete. The box has a width (W) equal to the width of the area source and the box is aligned so that its length lies in the direction of the wind, which passes through its end with a constant velocity (U). The ventilation rate, defined as the volume of air passing through the box, is equal to U x H x W. The downwind mixing height (H) of the box is determined from the following equation presented by Pasquill (1975) for neutral stability:

$$X = 6.25 \; x \; z_0 \; [(\frac{H}{z_0}) \; \ln(\frac{H}{z_0}) - 1.58 \; (\frac{H}{z_0}) + 1.58]$$

where:

X	= downwind distance from the leading edge of the area source to the receptor (m)
H	= downwind mixing height (m)
z_0	= roughness height (m)

The roughness height, z_0, was selected to be 0.02 meters based on the roughness height of grassland provided by Cowherd and others, 1985. This roughness height provides a more conservative estimate of emissions than assuming non-vegetated conditions. The downwind distance to the receptor is measured to the closest exposure points for potentially exposed populations. For the purposes of this evaluation, a distance of 1 meter was assumed (the receptor is at the source). The ambient 24-hour contaminant concentration (C_{10}) was estimated by the following box model equation:

$$C_{10} = \frac{Q_{10} \; x \; a}{U \; x \; H \; x \; W}$$

where:

C_{10}	= concentration of contaminant at distance X ($\mu g/m^3$)
Q_{10}	= particle-phase emission rate from wind erosion ($\mu g/sec$)
a	= fraction of 24 hours during which emissions occur
U	= average wind speed (m/sec)
H	= downwind mixing height (m)
W	= width of area perpendicular to wind (m)

The input values for this equation are shown in Step 3 in Table D-1. This results in a conservative estimate of the 24-hour average concentration of contaminants

to which an individual may be exposed to at the contaminant source on days in which wind erosion occurs. This concentration, the downwind contaminant concentration resulting from wind erosion, per unit of contaminant soil concentration (C_{10})is multiplied by the concentration of each CPC to obtain individual downwind contaminant concentrations.

These downwind contaminant concentrations are used to calculate the particulate emission factor (PEF) in the following equation.

$$PEF = \frac{\textit{Soil Concentration of Chemical X}}{C_{10} \textit{ of Chemical X}}$$

For this particular site, the PEF is 4.97E+7 m^3/kg.

The PEF represents the relationship between the contaminant concentration in soil with the concentration of respirable particles (PM_{10}) in air due to fugitive dust emissions from the surface contamination. The PM_{10} in $\mu g/m^3$ is calculated by taking the inverse of the PEF and multiplying by a conversion factor of 1E+9 $\mu g/kg$. The PM_{10} associated with this PEF is roughly 20 $\mu g/m^3$.

D.2 INHALATION OF VAPORS WHILE SHOWERING

ABB Environmental Services, Inc. (ABB-ES) calculated concentrations of volatile organic compounds (VOCs) in groundwater that could volatilize during a shower. After reviewing the literature, the model selected by ABB-ES to predict indoor (bathroom) concentrations is that presented by Foster and Chrostowski (1987). This theoretical approach is based on the experimental work of Andelman (1985). Andelman measured air concentrations of trichloroethylene and chloroform in a bench scale shower assembly. Foster and Chrostowski (1987) developed a model from these experimental data. ABB-ES modified the input parameters from the bench scale design to be representative of a typical bathroom.

CALCULATIONS

Parameter values used in the following equations can be found in Table D-2. The equation used to calculate air concentrations in the bathroom is shown below:

$$C(voc) = \frac{S}{R} \times (e^{RD_s} - 1) \times e^{-Rt} \qquad (Equation\ 1)$$

where:

C(voc)	= concentration of VOC in bathroom ($\mu g/m^3$)
S	= VOC generation rate ($\mu g/m^3$-min)
R	= air exchange rate (min^{-1})
D_s	= duration of shower (min)
t	= time at which concentration is being calculated (min)

R, the air exchange rate, is calculated as the volumetric flowrate through the bathroom (m^3/min) divided by the volume of the bathroom (m^3).

Table D-2

Empirical Constants for the Shower Model

Constant	Symbol	Value	Unit	Source
Liquid-film mass transfer for CO_2	$K_l(CO_2)$	20	cm/hr	Calculated
Gas-film mass transfer fro H_2O	$K_g(H_2O)$	3000	cm/hr	Calculated
Molar gas constant x Temperature	RT	0.024	atm-m^3/mole	
Reference temperature	T_1	293	K	
Temperature of shower water	T_s	318	K	Assumption
Viscosity of water at shower temperature	u_s	0.6178	cp	Calculated
Viscosity of water at reference temperature	u_1	0.65	cp	Calculated
Shower droplet free-fall time	t_s	1.5	sec	Assumptions
Droplet diameter	d	1	mm	Foster and Chrostowski, 1987
Flow rate in shower	FR	20	l/min	Assumption
Volume of shower area	SV	12	m^3	Assumption
Air exchange rate	R	0.03	min^{-1}	Calculated
Time in shower	D_s	12	min	USEPA, 1989
Time at which concentration is being calculated	t	12	min	Assumption

Foster, S.A. and Chrostowski, P.C., 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989

S, the VOC source generation rate, is calculated based on the concentration of the contaminant in the water, emission of compound from a droplet, flowrate of water, and volume of room for dilution. S is calculated from the following series of equations:

$$S = \frac{C_{wd} \times FR}{SV} \qquad (Equation\ 2)$$

where:

C_{wd} = concentration in water droplet ($\mu g/\ell$)
FR = flow rate in shower (l/min)
SV = shower volume (m^3)

C_{wd} is calculated as follows:

$$C_{wd} = C_{wo} \times [1 - e^{(\frac{-K_{al} \times t_s}{60d})}] \qquad (Equation\ 3)$$

where:

C_{wo} = concentration in groundwater ($\mu g/\ell$)
K_{al} = temperature correction of the mass transfer coefficient, K_L ((cm/hr)
t_s = shower water droplet free-fall time (sec)
d = droplet diameter (mm)

The term $K_{al}/60d$ combines both the rate of transfer and the available interfacial area across which volatilization can occur. The value 1/60d equals the specific interfacial area, 6/d, for a spherical shower droplet of diameter d multiplied by conversion factors (hr/3600 sec and 10 mm/cm).

K_{al} is calculated according to:

$$K_{al} = K_L \times [\frac{T_1 \times u_s}{T_s \times u_1}]^{-0.5} \qquad (Equation\ 4)$$

where:

K_L = mass-transfer coefficient (cm/hr)
T_1 = reference temperature (K)
u_s = viscosity of water at reference temperature (cp)
T_s = temperature of shower water (K)
u_1 = viscosity of water at shower temperature (cp)

K_L is calculated according to:

$$K_L(voc) = \frac{1}{\frac{1}{k_l(voc)} + \frac{RT}{H \times k_g(voc)}} \qquad (Equation\ 5)$$

where:

$k_l(voc)$	=	chemical-specific liquid mass-transfer coefficient (cm/hr)
$k_g(voc)$	=	chemical-specific gas mass-transfer coefficient (cm/hr)
RT	=	molecular gas constant (R) x temperature (T) (atm-m^3/mole)
H	=	Henry's Law Constant (atm-m^3/mole)

The input values of k_l and k_g are based on the mass transfer coefficients of CO_2 and water. They are calculated for the particular compound of interest according to the following equations:

$$k_l(voc) = k_l(CO_2) \times [\frac{44}{MW(voc)}]^{0.5} \qquad (Equation\ 6)$$

$$k_g(voc) = k_g(H_2O) \times [\frac{18}{MW(voc)}]^{0.5} \qquad (Equation\ 7)$$

where:

$k_l(CO_2)$	=	liquid mass-transfer coefficient for carbon dioxide (cm/hr)
$k_g(H_2O)$	=	gas mass-transfer coefficient for water (cm/hr)
MW(voc)	=	molecular weight of VOC

ASSUMPTIONS

Several assumptions were made to complete this modeling effort. The more important ones involve the volume of the bathroom and the air exchange rate (see Equations 1 and 2). A bathroom volume of 12m^3 was assumed. For the purposes of this model, it was also assumed that the air between the shower area and the rest of the bathroom was well mixed. The volumetric flowrate through the bathroom was assumed to be 0.4 m^3/min, which gives an effective air exchange rate of 1.8 air changes/hour. Few measurements have been done on ventilation rate in bathrooms. ABB-ES considers this value to be a conservative estimate given that most homes have air exchange rates of 0.5 to 2.0 changes/hour. Bathrooms may have higher ventilation rates than the entire house due to the effect of local exhaust fans, if present, or the opening of windows.

Another assumption is implicit in the use of Equation 1. This equation calculates VOC concentrations at time (t), which is assumed to equal the duration of shower use (D_S). Thus, the resulting concentrations represent maximum concentrations at the end of the shower. In reality, an individual would experience an integrated exposure that would gradually increase during shower usage and decrease again after the water was turned off. ABB-ES made the simplifying assumption that the peak concentrations would persist for the duration of exposure. This is a conservative assumption that is protective of public health.

D.3 ABSORBED DOSE CALCULATION - DERMAL EXPOSURE TO WATER

The absorbed dose is calculated per the USEPA *Dermal Exposure Assessment: Principles and Applications*, Interim Report, January 1992. The permeability constant approach is used for dermal exposures to contaminants in water.

The **steady state approach for inorganics** is used here. The dose absorbed per unit area per event is:

$$DA_{event} = PC_{event} \times C_w \times CF_1 \times CF_2$$

where:

DA_{event} = Dose absorbed per unit area per event (mg/cm^2-event)

$$PC_{event} = K_{pw} \times t_{event}$$

PC_{event} = Diffusion depth per event (cm/event)
K_{pw} = Permeability constant from water (cm/hr)
C_w = Concentration of chemical in water (μg/ℓ)
t_{event} = Duration of a single event (hr/event)
CF_1 = Units conversion factor (liter/ 10^3 cm^3)
CF_2 = Units conversion factor (mg/ 10^3 ug)

The **"unsteady-state approach for organics"** is used here. The dose absorbed per unit area per event is:

$$DA_{event} = PC_{event} \times C_W \times CF_3 \times CF_4$$

$$PC_{event} = 2 \times K_p \times (6\tau t_{event} / \pi)^{0.5}$$

where: $t < t^*$

and

$$DA_{event} = PC_{event} \times C_W \times CF_5 \times CF_6$$

$$PC_{event} = K_p \times ((t_{event} / (1 + B)) + 2\tau ((1 + 3B) / (1 + B))$$

where: $t > t^*$ and

where:

K_p = Permeability constant from water (cm/hr)
C_w = Concentration of chemical in water (μg/ℓ)
τ = l_{sc}^2 / 6 D_{sc} (hr)
l_{sc} = Thickness of stratum corneum (10 um)
D_{sc} = Stratum corneum diffusion coefficient (cm^2/hr)
t_{event} = Duration of a single event (hr/event)
π = Pi (dimensionless)
t^* = Time to reach steady state (hr)

B	=	Octanol water partition coefficient divided by 10^4 (dimensionless)
CF_3	=	Units conversion factor (mg/10^3 ug)
CF_4	=	Units conversion factor (liter/10^3 cm^3)
CF_5	=	Units conversion factor (mg/10^3 ug)
CF_6	=	Units conversion factor (liter/10^3 cm^3)

For a given compound, the values for B, K_p τ, and t^* can be found in Table 5-8 of the dermal guidance document (USEPA, 1992).

Once the dose per event (DA_{event}) is calculated, the dermally absorbed dose (DAD) for use in risk calculations can be derived as follows:

Dermally absorbed dose for use in risk calculations is derived generally (for adults who are no longer growing) as follows:

$$DAD_{adult} = DA_{event} \times EV \times EF \times ED \times SA \ / \ BW \times AT$$

For children, to account for changing surface areas and bodyweights, the dermally absorbed dose is calculated as follows:

$$DAD_{child} = (DA_{event} \times EV \times EF \ / \ AT) \sum_{i=m}^{n} (SA_i \times ED_i \ / \ BW_i)$$

where:

EV	=	Event frequency (events/day)
EF	=	Exposure frequency (days/year)
AT	=	Averaging time (days). For noncarcinogenic effects, AT = ED, and for carcinogenic effects AT = 70 years or 25,550 days.
SA_i	=	Surface area exposed at age i (cm^2)
ED_i	=	Exposure duration at age i (years)
BW_i	=	Bodyweight at age i (kg)

Bathing or Swimming Exposure. For bathing and swimming, USEPA recommends that whole body surface area be used to represent skin surface area available for contact with water. For adults, using 50th and 95th percentile whole body SA values, the default SA values are 20,000 cm^2 and 23,000 cm^2 (Table D-3). For children, the default values for each age group would be equal to the 50th percentile and 95th percentile whole body SA values. Estimated bodyweights are the average of the 50 th percentile female and male weights (Table D-3).

Values of

$$\sum_{i=m}^{n} (SA_i \times ED_i \ / \ BW_i)$$

for commonly used age ranges are presented in Table D-4.

Wading Exposure. For wading, it is assumed that the entire surface area of the feet, lower legs, and hands is exposed to the surface water during the entire exposure event. This assumption is for shallow water situations. Averaging surface areas over the 6 childhood years yields the following: hands represent

Table D-3

Exposure Parameters for Dermal Contact With Water

Age	Total Surface Area (cm2)				Body Weight (kg)			Derivation of DAevent (Dose absorbed / unit area / event)			
	Bathing and Swimming		Wading (25% Total Surface Area)								
	Male 50th Percentile[1]	Male 95th Percentile[1]	Male 50th Percentile	Male 95th Percentile	Male 50th Percentile[2]	Female 50th Percentile[2]	Average of Male and Female	Swimmer 50th Percentile	Swimmer 95th Percentile	Wader 50th Percentile	Wader 50th Percentile
1<2[3]	5398	6104	1350	1526	11.5	10.5	11	490.7	554.9	122.7	138.7
2<3	6030	6820	1508	1705	13.4	12.6	13	463.8	524.6	116.0	131.2
3<4	6640	7640	1660	1910	15.3	14.6	14.95	444.1	511.0	111.0	127.8
4<5	7310	8450	1828	2112.5	17.4	16.4	16.9	432.5	500.0	108.1	125.0
5<6	7930	9180	1983	2295	19.3	18.8	19.05	416.3	481.9	104.1	120.5
6<7	8660	10600	2165	2650	21.9	21	21.45	403.7	494.2	100.9	123.5
7<8	9360	11100	2340	2775	24.4	23.5	23.95	390.8	463.5	97.7	115.9
8<9	10000	12400	2500	3100	27.3	27.3	27.3	366.3	454.2	91.6	113.6
9<10	10700	12900	2675	3225	29.7	29.6	29.65	360.9	435.1	90.2	108.8
10<11	11800	14800	2950	3700	34.5	34.3	34.4	343.0	430.2	85.8	107.6
11<12	12300	16000	3075	4000	36.4	40	38.2	322.0	418.8	80.5	104.7
12<13	13400	17600	3350	4400	42.1	45.2	43.65	307.0	403.2	76.7	100.8
13<14	14700	18100	3675	4525	47.7	48.6	48.15	305.3	375.9	76.3	94.0
14<15	16100	19100	4025	4775	55.5	52.8	54.15	297.3	352.7	74.3	88.2
15<16	17000	20200	4250	5050	60.2	53.9	57.05	298.0	354.1	74.5	88.5
16<17	17600	21600	4400	5400	63.6	55.3	59.45	296.0	363.3	74.0	90.8
17<18	18000	20900	4500	5225	65.7	58.3	62	290.3	337.1	72.6	84.3
18<75	20000	23000	5000	5750	75.9	61.5	68.7	291.1	334.8	72.8	83.7
					Child - 6 years old (Sum ages 1<7)			2651.3	3066.6	662.8	766.7
					Child from 2 to 8 years (Sum ages 2<8)			2551.4	2975.2	637.8	743.8
					Child from 6 to 16 years (Sum ages 6<17)			3690.4	4545.3	922.6	1136.3
					Adult - 24 years old (18<75 multiplied by 24)			6986.9	8034.9	1746.7	2008.7
					Adult - 30 years old (Sum Child+ Adult)			9638.2	11101.6	2409.5	2775.4

[1] USEPA, 1989. Exposure Factors Handbook. EPA/600/8-89/043 (Table 4B-3)
[2] USEPA, 1989. Exposure Factors Handbook. EPA/600/8-89/043 (Table 5A-3)
[3] SAs based on equation $SA = K \times BW^{(2/3)}$.
K calculated from age 2<3 data.

Table D-4

Summary of Age Adjusted, Bodyweight-Normalized Surface Area Exposed While Bathing or Swimming[1]

Age Range	Duration of Exposure to Water (Bathing or Swimming)	Sum of terms for Average Case (50th Percentile) (area x duration/bodyweight) (cm^2-yr/kg)	Sum of Terms for Reasonable Maximum Exposure (95th Percentile) (area x duration/bodyweight) (cm^2-yr/kg)
1 thru 6	6 years	2651.3	3066.6
2 thru 8	6 years	2551.4	2975.2
6 thru 16	11 years	3690.4	4545.3
18 thru 41	24 years	6986.9	8034.9
1 thru 30	30 years	9638.2	11101.6

[1] See Table D-3.

5.5 percent of total body surface area, lower leg represents 12.8 percent of total body surface area, and the feet represent 7 percent of total body surface area. Therefore, the feet, lower legs and hands represent approximately 25 percent of total body surface area for children ages 1 through 6 (Table D-5). This value is the same value which USEPA identifies as the per cent of total body surface area which is available for soil contact (USEPA, 1992). This value, 25 percent of total body surface area is used here to represent surface area available for waders of all ages. Table D-6 presents the wading information for typically evaluated age groups.

D.4 ABSORBED DOSE CALCULATION - DERMAL EXPOSURE TO SOIL

The absorbed dose is calculated per the USEPA *Dermal Exposure Assessment: Principles and Applications*, Interim Report, January 1992. The calculation of the estimated dermally absorbed dose per unit area per event is:

$$DA_{event} = C_{soil} \times AF \times ABS \times CF$$

where:

DA_{event}	=	Dose absorbed per unit area per event (mg/cm^2-event)
C_{soil}	=	Contaminant concentration in soil (mg/kg)
AF	=	Adherence factor of soil to skin (mg/cm^2-event)
ABS	=	Absorption fraction (dimensionless)
CF	=	Units conversion factor (10^{-6} kg/mg)

Dermally absorbed dose for use in risk calculations is derived generally (for adults who are no longer growing) as follows:

$$DA_{adult} = DA_{event} \times EF \times ED \times SA \;/\; BW \times AT$$

For children, to account for changing surface areas and bodyweights, the dermally absorbed dose is calculated as follows:

$$DA_{child} = (DA_{event} \times EF \;/\; AT) \sum_{i=m}^{n} (SA_i \times ED_i \;/\; BW_i)$$

where:

EF	=	Exposure frequency (events/year)
AT	=	Averaging time (days). For noncarcinogenic effects, AT = ED, and for carcinogenic effects AT = 70 years or 25,550 days.
SA_i	=	Surface area exposed at age i (cm^2)
ED_i	=	Exposure duration at age i (years)
BW_i	=	Bodyweight at age i (kg)

For the typical case, USEPA recommends SA for head and hands only and for the "reasonable worst case," the SA of the head, hands, forearms, and lower legs as the SA available for contact with soil. USEPA simplifies these assumptions by saying that 25 percent of the total body surface area would be available for soil contact. For adults, using 50th and 95th percentile whole body SA values, the default SA values are 5000 cm^2 and 5800 cm^2 (Table D-7). For children, the default

Table D-5

Surface Area Exposed to Surface Water for Waders (Child)

Age	Mean Percentage (%) of Whole Body Surface Area			95th Percentile Whole Body Surface Area[3] (cm^2)	Estimated Surface Area (cm2) (Mean % Whole Body SA x Whole Body SA)			Estimated SA for Hands, Lower Legs, and Feet Ages 1 thru 6 (cm^2)
	Hands[1]	Lower Legs[2]	Feet[1]		Hands[1]	Lower Legs[2]	Feet[1]	
1<2	5.68	12.8	6.27	[4]6104	346.7	781.3	382.7	1510.7
2<3	5.3	12.8	7.07	6820	361.5	873.0	482.2	1716.6
3<4	6.07	12.8	7.21	7640	463.7	977.9	550.8	1992.5
4<5	5.7	12.8	7.29	8450	481.7	1081.6	616.0	2179.3
5<6	5.7	12.8	7.29	9180	523.3	1175.0	669.2	2367.5
6<7	4.71	12.8	6.9	10600	499.3	1356.8	731.4	2587.5
Mean (Age 1 thru 6)	5.5	12.8	7.0	8132	449.4	1040.9	569.6	2060.0

[1] USEPA, 1989. Exposure Factors Handbook. EPA/600/8-89/043 (Table 4-3)
[2] USEPA, 1989. Exposure Factors Handbook. EPA/600/8-89/043 (Table 4-2)
The percent of whole body surface area for the lower legs is taken from table 4-2 (adults) because no value for children is reported.
[3] USEPA, 1989. Exposure Factors Handbook. EPA/600/8-89/043 (Table 4B-3)
[4] See Table D-3.

Table D-6

Summary of Age Adjusted, Bodyweight-Normalized Surface Area Exposed While Wading[1]

Age Range	Duration of Exposure to Water (Wading)	Sum of terms for Average Case (50th Percentile) (area x duration/bodyweight) (cm^2-yr/kg)	Sum of Terms for Reasonable Maximum Exposure (95th Percentile) (area x duration/bodyweight) (cm^2-yr/kg)
1 thru 6	6 years	662.8	766.7
2 thru 8	6 years	637.8	743.8
6 thru 16	11 years	922.6	1136.3
18 thru 41	24 years	1746.7	2008.7
1 thru 30	30 years	2409.5	2775.4

[1] See Table D-3.

Table D-7

Exposure Parameters for Dermal Contact With Soil

Age	Total Surface Area (cm2)		SA Available for Soil Contact (cm^2) (.25 x Total Surface Area)		Body Weight (kg)			Derivation of DAevent (Dose absorbed / unit area / event)	
	Male 50th Percentile[1]	Male 95th Percentile[1]	Male 50th Percentile	Male 95th Percentile	Male 50th Percentile[2]	Female 50th Percentile[2]	Average of Male and Female	50th Percentile	95th Percentile
1<2[3]	5398	6104	1350	1526	11.5	10.5	11	122.7	138.7
2<3	6030	6820	1508	1705	13.4	12.6	13	116.0	131.2
3<4	6640	7640	1660	1910	15.3	14.6	14.95	111.0	127.8
4<5	7310	8450	1828	2113	17.4	16.4	16.9	108.1	125.0
5<6	7930	9180	1983	2295	19.3	18.8	19.05	104.1	120.5
6<7	8660	10600	2165	2650	21.9	21	21.45	100.9	123.5
7<8	9360	11100	2340	2775	24.4	23.5	23.95	97.7	115.9
8<9	10000	12400	2500	3100	27.3	27.3	27.3	91.6	113.6
9<10	10700	12900	2675	3225	29.7	29.6	29.65	90.2	108.8
10<11	11800	14800	2950	3700	34.5	34.3	34.4	85.8	107.6
11<12	12300	16000	3075	4000	36.4	40	38.2	80.5	104.7
12<13	13400	17600	3350	4400	42.1	45.2	43.65	76.7	100.8
13<14	14700	18100	3675	4525	47.7	48.6	48.15	76.3	94.0
14<15	16100	19100	4025	4775	55.5	52.8	54.15	74.3	88.2
15<16	17000	20200	4250	5050	60.2	53.9	57.05	74.5	88.5
16<17	17600	21600	4400	5400	63.6	55.3	59.45	74.0	90.8
17<18	18000	20900	4500	5225	65.7	58.3	62	72.6	84.3
18<75	20000	23000	5000	5750	75.9	61.5	68.7	72.8	83.7
					Child - 6 years old (Sum ages 1<7)			662.8	766.7
					Child from 2 to 8 years (Sum ages 2<8)			637.8	743.8
					Child from 6 to 16 years (Sum ages 6<17)			922.6	1136.3
					Adult - 24 years old (18<75 multiplied by 24)			1746.7	2008.7
					Adult - 30 years old (Sum Child+ Adult)			2409.5	2775.4

[1] USEPA, 1989. Exposure Factors Handbook. EPA/600/8-89/043 (Table 4B-3)
[2] USEPA, 1989. Exposure Factors Handbook. EPA/600/8-89/043 (Table 5A-3)
[3] SAs based on equation SA = K x $BW^{(2/3)}$.
K calculated from age 2<3 data.

values for each age group would be equal to 25 percent of the 50th percentile and 95th percentile whole body SA values. Estimated bodyweights are the average of the 50th percentile female and male weights (Table D-7).

Values of

$$\sum_{i=m}^{n} (SA_i \times ED_i / BW_i)$$

for commonly used age ranges are presented in Table D-8.

Table D-8

Summary of Age Adjusted, Bodyweight-Normalized Surface Area Exposed to Soil[1]

Age Range	Duration of Exposure to Soil	Sum of terms for Average Case (50th Percentile) (area x duration/bodyweight) (cm^2-yr/kg)	Sum of Terms for Reasonable Maximum Exposure (95th Percentile) (area x duration/bodyweight) (cm^2-yr/kg)
1 thru 6	6 years	662.8	766.7
2 thru 8	6 years	637.8	743.8
6 thru 16	11 years	922.6	1136.3
18 thru 41	24 years	1746.7	2008.7
1 thru 30	30 years	2409.5	2775.4

[1] See Table D-7.

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Foster, S.A. and Chrostowski, P.C., 1987, Inhalation Exposures to Volatile Organic Contaminants in the Shower; paper presented at the 80th Annual Meeting of the Air Pollution Control Association; New York, New York; June 1987.

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McCarthy, S.M., and B. Burbank (1990), Assessment of Fenceline Air Concentrations Associated with Construction Activities at Sites with Contaminated Soil, presented at American Waste Management Association - New England Section Conference, Wakefield, MA, February, 1990.

Pasquill, F. (1975), The Dispersion of Materials in the Atmospheric Boundary Layer - The Basis for Generalization, in Lectures on Air Pollution and Environmental Impact Analysis, American Meteorological Society, Boston.

USEPA, 1988, Supplement B to Compilation of Air Pollutant Emissions Factors, Volume I: Stationary Point and Area Sources, USEPA Office of Air Quality Planning and Standards, AP-42, September, 1988.

USEPA, 1989, Exposure Factors Handbook; Office of Health and Environmental Assessment, Washington, D.C.; USEPA/600/8-89/043; 1989.

USEPA, 1992, Dermal Exposure Assessment: Principles and Applications; United States Environmental Protection Agency, Office of Health and Environmental Assessment; Washington, D.C.; Publication EPA/600/8-91/011F; 1992.

USEPA, 1994. Supplemental Guidance to RAGS: Region IV Bulletin (Draft), Bulletin Vol. 1 No. 1. March, 1994.

APPENDIX E

APPENDIX E

HUMAN HEALTH TOXICITY PROFILES

Acenaphthene. Acenaphthene is a member of the polycyclic aromatic hydrocarbons (PAH) class of organic compounds. Unlike a number of PAHs, which have no known use, acenaphthene has a use in the manufacture of plastics, and as an insecticide and fungicide. Toxicological data are extremely limited for acenaphthene. However, as a two ring PAH, acenaphthene is a closer structural analog to naphthalene than it is to multi-ring PAHs such as benzo(a)pyrene, chrysene, or phenanthrene. Therefore, toxicities induced by acenaphthene may be similar to those induced by naphthalene. PAHs as a class of compounds are absorbed by inhalation, oral, and dermal routes, and have been associated with atherosclerosis, cancer, and reproductive effects in humans and animals. However, mutagenicity and cancer tests for acenaphthene were negative.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Public Health Service.

International Agency for Research on Cancer, 1983. *Monograph on the evaluation of carcinogenic risk of chemicals to man: polynuclear aromatic hydrocarbons.* 32:33-43.

USEPA, 1981. An exposure and risk assessment for acenaphthene. USEPA Contract No. 68-01-6017. Office of Water Regulations and Standards, Washington, D.C.

Acenaphthylene. Acenaphthylene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. Acenaphthylene is product of catalytic degradation of acenaphthene, and has no known use. Toxicological data are extremely limited for acenaphthylene. However, as a two ring PAH, acenaphthylene is a closer structural analog to naphthalene than it is to multi-ring PAHs such as benzo(a)pyrene, chrysene, or phenanthrene. Therefore, toxicities induced by acenaphthylene may be similar to those induced by naphthalene. PAHs as a class of compounds are absorbed by inhalation, oral, and dermal routes, and have been associated with atherosclerosis, cancer, and reproductive effects in humans and animals. The USEPA has classified acenaphthylene as a class D carcinogen, not classifiable regarding carcinogenicity.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1993. Toxicological Profile for Polycyclic Aromatic Hydrocarbons - Draft. U.S. Public Health Service.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Acetone. Acetone is found both naturally in the environment, resulting from the breakdown of fat in the body, and is also used as a solvent in manufacturing plastics, fibers, drugs, and other pharmaceuticals. Workers, occupationally exposed to acetone, complained of respiratory tract and eye irritation. At higher doses, workers reported headaches, feelings of light-headedness and confusion. The USEPA toxicity value for acetone is based on changes in liver weight and kidney toxicity observed in rats. Information on the carcinogenicity of acetone is inadequate to classify it as carcinogenic.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1993. Toxicological Profile for Acetone. U.S. Public Health Service.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Aluminum. Aluminum occurs naturally in the soil and makes up approximately 8% of the earth's crust. Higher soil concentrations are associated with industries which burn coal, and aluminum mining and smelting. Human exposures to aluminum may occur through ingestion of foods grown in soil that contains aluminum and use of antacids, antiperspirants, and other drug store items. Aluminum in antiperspirants can cause skin rashes in some people. Factory workers who inhale large amounts of aluminum dust may develop lung problems. Aluminum has caused lower birth weights in some animals. Studies have shown that aluminum accumulates in the brains of people with Alzheimer's disease. However, any causal link between aluminum exposure and this disease is yet to be demonstrated. Both human epidemiological studies and animal experiments strongly suggests that aluminum is not a carcinogen.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Aluminum; U.S. Public Health Service.

Anthracene. Anthracene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. Anthracene is produced commercially by recovery from coal tar distillation. It used as an intermediate in dye production, in smoke screens, scintillation counter crystals, and in the synthesis of chemotherapeutic agents. Gastrointestinal toxicity in humans has been associated with ingestion of anthracene, however no definitive conclusions can be drawn because study limitations. Anthracene tested negative for carcinogenicity when applied dermally to laboratory animals. USEPA classifies the compound as a D carcinogen, inadequate evidence of carcinogenicity.

References:
Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Agency for Toxic Substances and Disease Registry (ATSDR), 1993. Toxicological Profile for Polycyclic Aromatic Hydrocarbons - Draft. U.S. Public Health Service.

Antimony. Antimony enters the environment during the mining and processing of its ores and other related compounds. Small amounts of antimony are also released into the environment by incinerators and coal burning power plants. Antimony will strongly adhere to soil which contains iron, manganese, or aluminum. Antimony was used for medicinal purposes to treat people infected with parasites. However, chronic exposure can cause eye, skin, and lung irritation, as well as heart problems, vomiting and diarrhea. The oral RfD, based on an oral drinking water study in rats, showed changes in glucose and cholesterol metabolism. Antimony has not been evaluated by the USEPA for evidence of human carcinogenic potential.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1991. Toxicological Profile for Antimony. U.S. Public Health Service.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Arsenic. The principle use of arsenic is in products used for wood preservation. It is also used in the manufacture of insecticides, herbicides, algicides, with smaller amounts used in the production glass and nonferrous alloys. Arsenic is an irritant of the skin, mucous membranes, and gastrointestinal tract. Symptoms of acute toxicity include vomiting, diarrhea, convulsions, and a severe drop in blood pressure. Subchronic effects include hyperpigmentation, sensory-motor polyneuropathy, persistent headache, and lethargy. Chronic oral exposure has caused skin lesions, peripheral vascular disease, and peripheral neuropathy. The USEPA has classified arsenic in Group A, human carcinogen, based on increased incidence of lung cancer in occupational studies.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1992. Toxicological Profile for Arsenic. U.S. Public Health Service.

Barium. Barium is used in paints, soap, paper, rubber, and in the manufacture of glass. Some compounds of barium have been used as insecticides. Acute exposure to barium through ingestion can cause gastroenteritis, muscular paralysis, as well as cardiovascular effects. Chronic inhalation of barium containing dust can cause a reversible, benign pneumoconiosis. There is no evidence for carcinogenicity for barium.

References:
Amdur, Mary O., John Doull, Curtis D. Klaassen (Eds), 1991. Toxicology: The Basic Science of Poisons, 4th edition; Pergamon Press, Inc. New York.

Benzene. Benzene is a common industrial solvent which is used in paints, plastics, rubber, and in the manufacture of detergents and pharmaceuticals. It is also a component of gasoline. Several epidemiological studies provide sufficient evidence of a causal relationship between benzene exposure and leukemia in humans. Benzene is a known inducer of aplastic anemia in humans, with a latency period of up to 10 years. It reduces the number of white blood cells and other blood components, which may progress to a reduction in all blood cell types. Exposure to high concentrations of benzene in the air causes Central Nervous System (CNS) depression and cardiovascular effects. Benzene has been reported to cause subjective symptoms (e.g., headache and nausea). Accordingly, benzene has been classified as a Group A carcinogen by the USEPA.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Benzene. U.S. Public Health Service.

Benzo(a)anthracene. Benzo(a)anthracene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. They occur naturally in coal tar, crude oil, and is formed from incomplete combustion of organic material. Benzo(a)anthracene is a

product of pyrolysis in tobacco smoke. It has produced skin tumors in laboratory animals after a dermal application. Although there are no human data that specifically link exposure to benzo(a)anthracene to human cancers, benzo(a)anthracene is a component of mixtures that have been associated with human cancer. As such, benzo(a)anthracene has been classified by EPA as a B2, probable human carcinogen.

References:

Clayton, George D. and Florence E. Clayton, (Eds). 1981. Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition; John Wiley & Sons; New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Benzo(a)pyrene. Benzo(a)pyrene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. They occur naturally in coal tar, crude oil, and is formed from incomplete combustion of organic material. Human data demonstrating a causal relationship linking benzo(a)pyrene to carcinogenicity are lacking. However, multiple animal studies in many species demonstrate benzo(a)pyrene to be carcinogenic following administration by a variety of routes. The mechanism through which benzo(a)pyrene elicits its carcinogenic potential is well understood. Benzo(a)pyrene has produced positive results in numerous genotoxicity assays. Benzo(a)pyrene has been classified by the EPA as a B2, probable human carcinogen.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Public Health Service.

Clayton, George D. and Florence E. Clayton, editors, 1981. Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition; John Wiley & Sons; New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Benzo(b)fluoranthene. Benzo(b)fluoranthene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. They occur naturally in coal tar, crude oil, and is formed from incomplete combustion of organic material. Although there are no human data that specifically link exposure to benzo(b)fluoranthene to human cancers, benzo(b)fluoranthene is a component of mixtures that have been associated with human cancer. Benzo(b)fluoranthene produced tumors in mice after lung implantation, intraperitoneal, or subcutaneous injection, and skin painting experiments. Benzo(b)fluoranthene has been classified as a B2, probable human carcinogen, by the USEPA.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1987 Toxicological Profile for Benzo(b)fluoranthene. U.S. Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Public Health Service.

Benzo(g,h,i)perylene. Benzo(g,h,i)perylene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. They occur naturally in coal tar, crude oil, and is formed from incomplete combustion of organic material. There is no available data regarding human exposures. There is inadequate animal data from lung implant, skin-painting and subcutaneous injection bioassays to determine specific health effects of benzo(g,h,i)perylene. However, it tested negative for carcinogenicity when applied dermally to laboratory animals. The USEPA has classified benzo(g,h,i)perylene as a class D carcinogen, not classifiable regarding carcinogenicity.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Public Health Service.

Benzo(k)fluoranthene. Benzo(k)fluoranthene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. They occur naturally in coal tar, crude oil, and is formed from incomplete combustion of organic material. Although there are no human data that specifically link exposure to benzo(k)fluoranthene to human cancers, benzo(k)fluoranthene is a component of mixtures that have been associated with human cancer. These include coal tar, soot, coke oven emissions and cigarette smoke. Benzo(k)fluoranthene produced tumors after lung implantation in mice and when administered with a promoting agent in skin-painting studies. Benzo(k)fluoranthene has been classified by EPA as a B2, probable human carcinogen.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Public Health Service.

Beryllium. Atmospheric beryllium is derived primarily from the combustion of coal. It eventually deposits in soil and sediment where it is retained in its insoluble form, beryllium oxide. When airborne, the lung is the primary target organ of beryllium toxicity via the inhalation pathway. Exposure to beryllium causes granuloma formation similar to sarcoidosis and miliary tuberculosis. Multi-system involvement includes lymph nodes, spleen, liver, heart, kidney, and bone. It is also a dermal sensitizer and a primary skin irritant that produces contact dermatitis, skin granulomas, and ulcers. Beryllium has been classified as a B2, probable human carcinogen.

References:
United States Environmental Protection Agency (USEPA), 1987. "Health Assessment Document for Beryllium"; Office of Health and Environmental Assessment; USEPA/600/8-84/026F; November 1987.

Bis(2-ethylhexyl)phthalate (DEHP). DEHP is used industrially as a plasticizer for resins and is found in many plastic materials as it makes them more flexible. It is also used in manufacturing organic pump fluids in electrical capacitors.

Acute exposure to DEHP has produced eye and mucous membrane irritation, nausea, and diarrhea. Chronic exposure of laboratory animals to DEHP indicate that the target organs are the liver, causing morphological and biochemical changes, as well as the testes, producing damage to the seminiferous tubules. DEHP has produced developmental and reproductive effects in laboratory animals including spina bifida and reduced fertility. DEHP has been shown to cause a dose-related increase in liver tumors in mice and rats. Thus, the USEPA has designated DEHP as a B2, probable human carcinogen.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1991. Toxicological Profile for Di(2-ethylhexyl)phthalate. U.S. Public Health Service.

Cadmium. Cadmium is commonly used in electroplating and galvanizing due to its non-corrosive properties. It is a local respiratory tract irritant following exposure to cadmium dust or fumes. Acute exposure to cadmium dust/fumes may produce an acute chemical pneumonitis. Acute, oral exposure to cadmium results in nausea, vomiting, salivation, abdominal pain, cramps, and diarrhea. Chronic exposure to cadmium results in osteomalacia and osteoporosis (Itai-Itai disease) secondary to renal damage. The USEPA has classified cadmium as a B1 carcinogen via inhalation based on epidemiological data from Japan and China.

References:

Amdur, Mary O., John Doull, Curtis D. Klaassen (Eds), 1991. Toxicology: The Basic Science of Poisons, 4th edition; Pergamon Press, Inc. New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Calcium.

Chromium. Chromium has been used in plating for corrosion resistance and decorative purposes, in the manufacture of alloys, and in printing, dying, and photography. The toxicity of chromium depends upon its valence state. Hexavalent chromium is more toxic via inhalation than trivalent chromium. The effects of inhalation exposure to hexavalent chromium include ulcers of the upper respiratory tract, nasal inflammation, perforation of the nasal septa and lung cancer. Most trivalent chromium compounds are inactive in short-term genotoxicity assays. Trivalent chromium compounds have not been found to be carcinogenic by any route of exposure. There is epidemiological evidence of an association between chromium and lung cancer. The USEPA has classified hexavalent chromium as an A, human carcinogen, by the inhalation route.

References:

Amdur, Mary O., John Doull, Curtis D. Klaassen (Eds), 1991. Toxicology: The Basic Science of Poisons, 4th edition; Pergamon Press, Inc. New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Chrysene. Chrysene is one of the polycyclic aromatic hydrocarbons (PAH) compounds which are formed during the combustion of organic material. Although there are no human data that specifically link exposure to chrysene to human cancers, chrysene is a component of mixtures that have been associated with human cancer.

These include coal tar, soots, coke oven emissions and cigarette smoke. Chrysene has produced papillomas and carcinomas in mice dermally exposed to chrysene. Chrysene has been classified as a B2, probable human carcinogen, due to its similarities with other carcinogenic PAHs and available experimental evidence.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Public Health Service, October, 1989.

Dibenz(a,h)anthracene. Dibenz(a,h)anthracene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. The primary source of atmospheric PAHs is incomplete combustion of wood and fuel. Human data demonstrating a causal relationship linking dibenz(a,h)anthracene to carcinogenicity are lacking. However, chronic exposure of mice to dibenz(a,h)anthracene demonstrated a dose-response relationship for skin tumors. Dibenz(a,h)anthracene has been classified as a B2, probable human carcinogen, by the USEPA.

References:
Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Agency for Toxic Substances and Disease Registry (ATSDR), 1993. Toxicological Profile for Polycyclic Aromatic Hydrocarbons - Draft. U.S. Public Health Service.

Dibenzofuran. Dibenzofuran is an unsubstituted organic compound that contains two benzene rings fused to a central furan ring. Dibenzofuran is a manmade chemical which may be introduced into the environment as a contaminant of commonly used pesticides (e.g., 2,4,5-T). Extensive toxicological information exists on the chlorinated species of dibenzofurans (chlorodibenzofurans), but minimal information is available concerning the unsubstituted parent molecule. Dibenzofuran, with no chlorine substituent, is believed to have minimal toxicity compared to the chlorinated forms due to its lack of solubility and biological activity. Dibenzofuran is not mutagenic, with or without metabolic activation, in several in vitro mutagenicity tests. There are no data on the possible carcinogenicity of dibenzofuran alone in animals or humans.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1993. "Toxicological Profile for Chlorodibenzofurans"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1993.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

1,2-Dichloroethylene. 1,2-Dichloroethylene (total) (1,2-DCE) has had limited industrial usage in the United States because of its flammability. At one time it was used as a general anesthetic. Acute human exposure to 1,2-DCE has produced irritation of the skin and mucous membranes, vertigo, and nausea. 1,2-DCE produces CNS depression, narcosis, and irritation in laboratory animals. Chronic exposure studies in mice identify the liver and possibly the immune system as

sensitive target organs. 1,2-dichloroethene has not been classified by the USEPA for carcinogenicity.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. "Toxicological Profile for 1,2-Dichloroethene"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October, 1989.

2,4-Dimethylphenol. 2,4-Dimethylphenol is a naturally occurring compound, derived from the cresol fraction of petroleum or coal tars. Currently there are no direct commercial applications for 2,4-dimethylphenol, however it is used in the manufacture of phenolic antioxidants, disinfectants, solvents, pharmaceuticals, insecticides, plasticizers, rubber chemicals, polyphenylene oxide, wetting agents and dyestuffs. Exposure will most likely occur through contamination of groundwater. Oral LD_{50} values were 809 and 3200 mg/kg for mice and rats, respectively. No long term studies of 2,4-dimethylphenol have been conducted, however animals doses with the 2,6- and 3,4- isomers exhibited depressed body weight gain, changes in organ to body weight ratios and cellular changes in the liver. The oral reference dose of 2E-02 mg/kg/day (uncertainty factor of 3000) is based on adverse clinical signs in mice. USEPA weight of evidence category for 2,4-dimethylphenol is D, inadequate evidence of carcinogenicity.

References:
The Installation Restoration Program Toxicology Guide, 1989. 2,4-Dimethylphenol. The Installation Restoration Program Toxicology Guide, Volume 2.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Fluoranthene. Fluoranthene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. The primary source of atmospheric PAHs is incomplete combustion of wood and fuel. Fluoranthene is used as a lining material to protect the interior of steel and ductile-iron drinking water pipes and storage tanks. No data regarding human exposure are available, and animal data suggest that fluoranthene is not carcinogenic. Fluoranthene has been classified by EPA as a D carcinogen.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Public Health Service.

Fluorene. Fluorene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. The primary source of atmospheric PAHs is incomplete combustion of wood and fuel. Fluorene is used as chemical intermediate in many chemical processes and in the formation of polyradicals. There is no available data regarding human exposures. There is inadequate animal data to determine specific health effects of fluorene. Fluorene tested negative for carcinogenicity in mice, however the reliability of the information is not known. There is inadequate evidence of carcinogenicity (USEPA classifies the compound as a D carcinogen).

References:
Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Agency for Toxic Substances and Disease Registry (ATSDR), 1993. Toxicological Profile for Polycyclic Aromatic Hydrocarbons - Draft. U.S. Public Health Service.

alpha-Hexachlorocyclohexane. Technical-grade hexachlorocyclohexane (HCH), a mixture of several chemical forms of HCH, typically contains about 40-45% gamma-HCH (γ-HCH), 18-22% alpha-HCH (α-HCH), 4% beta-HCH (β-HCH), and 20-22% delta-HCH (δ-HCH). It was once used as an insecticide, however it is no longer available for use in the United States. The possible human health effects associated with exposure to HCH are adverse hepatic, and reproductive effects. The significance of renal and immunological effects in humans exposed to HCH are questionable. There is no evidence regarding the presence or absence of carcinogenic effects in humans following exposure by any route. α-HCH has been shown to be a liver carcinogen in mice and rats. It is classified by the USEPA as a B2 or probable carcinogen. Carcinogenic toxicity factors are based on liver tumors in mice following dietary exposure.

References:
Agency for Toxic Substances and Disease Registry, 1992. Toxicological Profile for Alpha-, Beta-, Gamma-, and Delta- Hexachlorocyclohexane - Draft. U.S. Public Health Service.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

beta-Hexachlorocyclohexane. Technical-grade hexachlorocyclohexane (HCH), a mixture of several chemical forms of HCH, typically contains about 40-45% gamma-HCH (γ-HCH), 18-22% alpha-HCH (α-HCH), 4% beta-HCH (β-HCH), and 20-22% delta-HCH (δ-HCH). It was once used as an insecticide, however is no longer available for use in the United States. The possible human health effects associated with exposure to HCH are adverse hematological, hepatic, neurological, and reproductive effects. The significance of renal and immunological effects in humans exposed to HCH are questionable. There is no evidence regarding the presence or absence of carcinogenic effects in humans following exposure by any route. β-HCH has been shown to be a liver carcinogen in mice and rats. β-HCH is classified by the USEPA as a C, or possible, carcinogen. Carcinogenic toxicity factors are based on liver tumors in mice following dietary exposure.

References:
Agency for Toxic Substances and Disease Registry, 1992 Toxicological Profile for Alpha-, Beta-, Gamma-, and Delta- Hexachlorocyclohexane - Draft. U.S. Public Health Service.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

2-Hexanone. 2-Hexanone is a naturally occurring compound that has been detected in blue cheese, nectarines, raw chicken breast and poultry manure. In industry, 2-hexanone is used as a medium-evaporating solvent for nitrocellulose, acrylates, vinyl and alkyl coatings. Exposure of the general population may occur through

in the ingestion of natural or processed foods, where the compound occurs naturally, and through inhalation of vapors from commercial coatings. In humans, acute inhalation exposure caused irritation to the eyes and nose. .Neurotoxic effects, characterized by the development of peripheral neuropathy, were seen following subchronic exposure to 2-hexanone. Testicular atrophy was observed in rats following a ten week oral exposure. Methyl ethyl ketone can potentiate the neurotoxicity of methyl butyl ketone. The USEPA has classified 2-hexanone as a class D carcinogen, not classifiable regarding carcinogenicity.

References:
USEPA, 1990. Health and Environmental Effects Document for 2-Hexanone - Draft. Prepared by: Environmental Criteria and Assessment Office.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Indeno(1,2,3-cd)pyrene. Indeno(1,2,3-cd)pyrene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. The primary source of atmospheric PAHs is incomplete combustion of wood and fuel. Animal data suggest that dermal application indeno(1,2,3-cd)pyrene does not result in skin tumors, however it does exhibit a dose-response relationship as skin tumor initiator. Indeno(1,2,3-cd)pyrene is classified by the USEPA as a B2, or probable carcinogen.

References:
Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Agency for Toxic Substances and Disease Registry (ATSDR), 1993. Toxicological Profile for Polycyclic Aromatic Hydrocarbons - Draft. U.S. Public Health Service.

Iron. Iron is a naturally occurring element which is essential to the biological functions of living systems. Acute iron toxicity may occur after ingestion of more than 0.5 g of iron or 2.5 g of ferrous sulfate. Clinical signs of this condition include bloody vomitus, due to ulceration of the gastrointestinal tract, signs of shock, metabolic acidosis, liver damage and coagulation defects The mechanism of the toxicity is thought to begin with acute mucosal cell damage, absorption of the ferrous ions directly into circulation, which causes capillary endothelial cell damage in liver. Chronic iron overload may be characterized by disturbances in liver function, diabetes mellitus and even endocrine disturbances, and cardiovascular effects. There is inadequate evidence of carcinogenicity (USEPA classifies the compound as a D carcinogen).

References:
Goyer, R.A. 1991. Toxic effects of metals. In: Casarett and Doull's Toxicology: The Basic Science of Poisons, Fourth Edition. Eds: M.O.Amdur, J.Doull, and C.D.Klaassen.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Lead. Lead is used as a component in storage batteries and was widely used in gasoline and paints. It is the most ubiquitous toxic metal in the environment. The most serious effects of chronic exposure are encephalopathy, renal damage, and changes in the hematopoietic system which is the most sensitive indicator of lead exposure. Peripheral nerve dysfunction is observed in adults at blood lead levels of 30 to 50 $\mu g/d\ell$-blood. The nervous systems' of children are reported to be affected at levels of 15 5 $\mu g/d\ell$-blood (Benignus and others, 1981). Chronic lead exposure by workers through inhalation has resulted in statistically significant increases in tumors. Oral exposures of lead salts in animals has been shown to increase tumor formation.

References:
Amdur, Mary O., John Doull, Curtis D. Klaassen, (Eds), 1991. Toxicology: The Basic Science of Poisons, 4th edition; Pergamon Press, Inc. New York.

Benignus, V.A., Otto, D.A., Muller, K.E., Seiple, K.J., 1981. "Effects of Age and Body Lead Burden on CNS Function in Young Children. II:EEG Spectra." Electroencephalograph. Clin. Neurophysiol. 52:240-248.

Magnesium. Magnesium is an essential nutrient whose deficiency causes neuromuscular irritability, calcification, and cardiac and renal damage. Many commonly used antacids or cathartics contain magnesium, as magnesium citrate, oxide, sulfate, hydroxide, or carbonate. The hydroxide of magnesium, milk of magnesium, is used universally as an antidote for poisoning. Magnesium toxicity is rare in the absence of renal failure since the kidney excretes moderate excesses of magnesium. Industrial inhalation exposure of magnesium oxide may result in conjunctivitis, nasal catarrh, and discolored sputum. However, increases in serum magnesium two times normal level, was accompanied by calcium increases, failed to produce ill effects.

References:
Goyer, R.A. 1991. Toxic effects of metals. In: Casarett and Doull's Toxicology: The Basic Science of Poisons, Fourth Edition. Eds: M.O.Amdur, J.Doull, and C.D.Klaassen.

Manganese. Manganese is a naturally occurring substance found in many types of rock. It does not generally occur in the environment as the pure metal, rather, it is found combined with other chemicals such as sulfur, oxygen, and chlorine. Manganese is mixed with iron to make various types of steel. Manganese is a component of some ceramics, pesticides, fertilizers, and in nutritional supplements. In small doses manganese is beneficial to human health. Manganese miners and steel workers exposed to elevated concentrations of manganese have evidenced mental and emotional disturbances, and slow and clumsy body movements. Target organs of manganese are the lung and CNS. When inhaled, manganese dust can also cause lung irritation. EPA has classified manganese as a D, not classifiable as to human carcinogenicity.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1991. Toxicological Profile for Manganese. U.S. Public Health Service.

Mercury. Mercury has been used in the past for medicinal purposes, however, occupational exposure to mercury can occur during mining, smelting, chloralkali

production, and in the manufacturing of mercury containing products. There are three forms in which mercury can exist: elemental, inorganic, and organic. Its chemical form determines its toxicity. Metallic mercury causes behavioral effects and other nervous system damage. Inorganic mercury salts will produce kidney damage. Organic mercury compounds target the CNS. Most organic mercury compounds that contaminate the environment produce a toxic neuroencephalopathy (paresthesias, ataxia, spasticity, tremor, mental status changes, learning defects and neurasthenic symptoms). Some organic mercury compounds readily break down in the body to inorganic compounds and thus produce toxicity similar to that produced by organic mercury compounds. Some studies have indicated that mercury is genotoxic. It has not been classified as to carcinogenicity by the USEPA.

References:
Amdur, Mary O., John Doull, Curtis D. Klaassen (Eds), 1991. Toxicology: The Basic Science of Poisons, 4th edition; Pergamon Press, Inc. New York.

Methylene Chloride. Methylene chloride, (also known as dichloromethane) is used as a solvent, paint stripper, and is component of pesticides and other aerosol products. Acute exposure to methylene chloride can cause nose, eyes, and throat irritation via inhalation. Chronic exposure to methylene chloride can cause CNS effects include irritability, nausea, and headaches. The primary targets of this chemical are the liver and the CNS. A USEPA assessment of one study concluded that methylene chloride ingested in drinking water by mice was associated with significant increases in liver carcinoma. It has classified it as a B2, probable human carcinogen.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Methylene Chloride. U.S. Public Health Service.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

2-Methylnaphthalene. 2-Methylnaphthalene is a member of the polycyclic aromatic hydrocarbons (PAH) class of organic compounds, and is used in the synthesis of chemicals such as insecticides. Toxicological data on 2-methylnaphthalene is extremely limited. However, based on its structural similarity to naphthalene, it is likely to be metabolized through a similar process, and therefore is expected to exert effects similar to those induced by naphthalene. Humans can absorb naphthalene via the inhalation, oral, and dermal routes. Evidence from human and animal studies suggests that naphthalene is metabolized by the P450 mixed function oxidase system to form metabolites that exert toxic effects. The primary target organ for naphthalene metabolites in humans is the red blood cell. Various types and severities of anemias resulting from erythrocyte hemolysis have been documented in humans and animals exposed to naphthalene. Some evidence also suggests that naphthalene metabolites can induce cataracts in humans and animals. No studies were located investigating genotoxicity or cancer in humans.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Naphthalene and 2-Methylnaphthalene. U.S. Public Health Service.

2-Methylphenol/4-Methylphenol. 2-Methylphenol and 4-methylphenol are present in wood and tobacco smoke, crude oil, and coal tar. Anthropogenic sources include

disinfectants and deodorizers. Dermal contact with methylphenols may cause a rash, skin irritation, or nephrotoxicity. Animal studies have indicated that exposure to methylphenols causes nervous system effects including muscle twitching and loss of coordination. Some experiments suggest that methylphenols may act as promoters of carcinogenicity. The USEPA has not classified methylphenols as to carcinogenicity.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1990. Toxicological Profile for Creosols. U.S. Public Health Service.

Naphthalene. In the United States, naphthalene is used in the production of phthalic anhydride, carbaryl (an insecticide), tanning agents, moth repellents, and surfactants. Humans can absorb naphthalene via the inhalation, oral, and dermal routes. Evidence from human and animal studies suggests that naphthalene is metabolized by the P450 mixed function oxidase system to form metabolites that exert toxic effects. The primary target organ for naphthalene metabolites in humans is the red blood cell. Various types and severities of anemias resulting from erythrocyte hemolysis have been documented in humans and animals exposed to naphthalene. Some evidence also suggests that naphthalene metabolites can induce cataracts in humans and animals. There is inadequate evidence of carcinogenicity (USEPA classifies the compound as a D carcinogen).

References:
Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Naphthalene and 2-Methylnaphthalene. U.S. Public Health Service.

Phenanthrene. Phenanthrene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. Phenanthrene is used in the manufacture of dyestuffs and explosives, and in biological research. There is no available data regarding human exposures. There is inadequate animal data to determine specific health effects of phenanthrene. Phenanthrene tested negative for carcinogenicity in mice, however the reliability of the information is not known. There is inadequate evidence of carcinogenicity (USEPA classifies the compound as a D carcinogen).

References:
Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Agency for Toxic Substances and Disease Registry (ATSDR), 1993. Toxicological Profile for Polycyclic Aromatic Hydrocarbons - Draft. U.S Public Health Service.

Polychlorinated Biphenyls (PCBs). PCBs were historically used in electrical capacitors and transformers due to their thermal stability and dielectric capability. There are many different aroclors (PCB congeners) whose toxicological properties vary according to the conger. Acute exposure to PCBs generally produces chloracne, eye irritation, gastrointestinal disturbances, and headaches. Chronic exposure to PCBs even at low levels can cause liver function changes in

humans. Animal studies have indicated that PCBs are teratogenic. PCBs have been classified as B2 carcinogens by the USEPA.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Selected PCBs. U.S. Public Health Service.

Potassium.

Pyrene. Pyrene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. Both natural and anthropogenic sources contribute to the ubiquitous distribution of PAHs in the environment. They occur naturally in coal tar, crude oil, and is formed from incomplete combustion of organic material. Pyrene is reported to be a skin irritant to humans. Rats administered pyrene exhibited blood chemistry changes, as well as liver and kidney damage. Pyrene was shown to be inactive as an initiating agent and thus has been classified as a D carcinogen.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Public Health Service.

Selenium. Selenium is a naturally occurring element which is essential to the biological functions of living systems. Selenium deficiency can cause cardiomyopathy and "white muscle disease," a form of nutritionally induced muscular dystrophy. The oral RfD is based on an epidemiological study of populations in China exposed to elevated dietary concentrations of selenium. The main symptoms of chronic selenosis are brittle hair and nails, skin lesions, and some neurological symptoms including peripheral anesthesias, pain, and hyperflexia. Animal experiments have shown a loss of fertility and an increase in congenital defects. It has not been classified by the USEPA as to carcinogenicity as it is probably not a human carcinogen.

References:
Amdur, Mary O., John Doull, Curtis D. Klaassen (Eds), 1991. Toxicology: The Basic Science of Poisons, 4th edition; Pergamon Press, Inc. New York.

Sodium.

Tetrachloroethene (PCE). PCE is used primarily in the dry cleaning industry, degreasing of metals, and as a chemical intermediate in the synthesis of fluorocarbons. PCE is a CNS depressant that causes headaches, blurred vision, lightheadedness, nausea, vomiting, confusion, and loss of coordination. Long-term exposure in humans have caused effects such as short-term memory defects, ataxia, irritability, disorientation, and sleep disturbances. Effected organ systems in animal studies include the liver, kidney, CNS, and reproductive system. Oral exposure has produced liver cancer in mice, but not rats. A small study of laundry and dry cleaning workers revealed an increased risk for lung and cervical cancers. Tetrachloroethene has been classified as a B2, probable human carcinogen.

References:
Clayton, George D. and Florence E. Clayton, (Eds), 1981. Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition; John Wiley & Sons; New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Thallium. Thallium is used as a catalyst, in certain alloys, optical lenses, jewelry, low temperature thermometers, semiconductors, dyes and pigments, and scintillation counters. It has also been used as a depilatory. Acute thallium toxicity in humans is characterized by gastrointestinal irritation, acute ascending paralysis and psychic disturbances. The estimated lethal dose is 8 to 12 mg/kg. The signs of long-term systemic intake of thallium in humans are fatty infiltration and necrosis of the liver, nephritis, gastroenteritis, pulmonary edema, degenerative changes in the adrenals, degeneration of peripheral and central nervous system, alopecia, and in some cases, death. There is inadequate evidence of carcinogenicity (USEPA classifies the compound as a D carcinogen). The oral reference dose for thallium, 8E-05 mg/kg/day, is based on no observable effects in rats.

References:
Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Goyer, R.A. 1991. Toxic effects of metals. In: Casarett and Doull's Toxicology: The Basic Science of Poisons, Fourth Edition. Eds: M.O.Amdur, J.Doull, and C.D.Klaassen.

Toluene. Toluene is a component of gasoline, paint, lacquers, adhesives, rubber, and printing ink. It is also used as a solvent and industrial degreaser. Acute and chronic exposures to humans of toluene vapor cause eye irritation, headache, nausea, and CNS effects in humans. Acute exposures to very high concentrations can cause narcosis. Similar toxic effects have been observed in both humans and animals. The major target organ in animals is the CNS, with effects produced including impaired motor abilities, narcosis, tremors, changes in levels of brain neurotransmitters, and morphological changes. Evidence from animal studies indicate that toluene is a developmental toxin. Toluene is not thought to be a human carcinogen and has been classified in group D.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. Toxicological Profile for Toluene. U.S. Public Health Service.

Trichloroethylene (TCE). TCE is used as an industrial solvent, in metal degreasing and extraction processes, in the dry-cleaning industry, as a diluent, in paints and adhesives, and in textile processing. Oral exposure to TCE has resulted in nervous system effects such as headache, nausea, facial numbness, and blurred vision. High-level, acute exposure to TCE through both the inhalation and ingestion routes has been shown to cause death in humans. Short term exposures have caused ataxia, sleep disturbances, and trigeminal neuropathy. The most common effect observed in animal studies has been liver enlargement. In-vitro mutagenicity tests have demonstrated weak positive responses. TCE has been shown to be carcinogenic in animals by a mechanism which is very similar to a potential human mechanism. Inhalation and oral exposure produced liver and lung

tumors in mice, and kidney adenocarcinomas and leukemia in rats. It is classified as a B2, probable human carcinogen.

References:
Clayton, George D. and Florence E. Clayton, (Eds), 1981. Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition; John Wiley & Sons; New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Vanadium. Vanadium is widely, but sparsely, distributed in the earth's crust and in the environment. It is invaluable as an alloying agent with steel; ferrovanadium alloys are used in high-stress applications such as bearings, jet engines, and cutting tools. Human and animal studies indicate that vanadium is readily absorbed from the lungs and poorly absorbed from the gastrointestinal tract. It distributes primarily to the bone and kidney. Vanadium is a respiratory irritant. Inhalation of vanadium dusts in both animals and occupationally-exposed workers induces mild to moderate respiratory irritation. The effects are reversible and subside when exposure is discontinued. No studies were located regarding cancer in humans or animals following inhalation, oral, or dermal exposures. However, vanadium has been found to induce DNA damage in human cell cultures, suggesting that vanadium may have the potential to be genotoxic to humans.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1990. Toxicological Profile for Vanadium. U.S. Public Health Service.

APPENDIX F

APPENDIX F

HUMAN HEALTH RISK ASSESSMENT SPREADSHEETS

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-1

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical-specific	
INGESTION RATE	IR	200	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1989
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year *	Assumption
EXPOSURE DURATION	ED	6	years	Assumption
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [1]	SAsoil/adj	766	cm2-year/kg	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAeven	chemical specific	mg/cm2-event	USEPA, 1992a
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

* Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.

[1] In estimating the dermally absorbed dose for children age 6 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 11 age periods, age 6 through 16, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992 and Dermal Exposure Appendix of this document.

USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:

SAsoil/adj = SUM (SA x ED / BW)

DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-1
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	5.3E-07	0.73	3.9E-07	0.01	5.1E-08	0.802	4.1E-08	4.3E-07
Benzo(a)pyrene	O	483.00	ug/kg	5.3E-07	7.3	3.9E-06	0.01	5.1E-08	8.02	4.1E-07	4.3E-06
Benzo(b)fluoranthene	O	773.00	ug/kg	8.5E-07	0.73	6.2E-07	0.01	8.1E-08	0.802	6.5E-08	6.8E-07
Benzo(k)fluroanthene	O	424.00	ug/kg	4.6E-07	0.073	3.4E-08	0.01	4.4E-08	0.0802	3.6E-09	3.7E-08
Chrysene	O	483.00	ug/kg	5.3E-07	0.0073	3.9E-09	0.01	5.1E-08	0.00802	4.1E-10	4.3E-09
Dibenz(a,h)anthracene	O	171.00	ug/kg	1.9E-07	7.3	1.4E-06	0.01	1.8E-08	8.02	1.4E-07	1.5E-06
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	4.4E-07	0.73	3.2E-07	0.01	4.2E-08	0.802	3.4E-08	3.5E-07
Aroclor 1260	O	424.00	ug/kg	4.6E-07	7.7	3.6E-06	0.01	4.4E-08	8.56	3.8E-07	4.0E-06
Beryllium	I	0.39	mg/kg	4.3E-07	4.3	1.8E-06	0.001	4.1E-09	430	1.8E-06	3.6E-06
					SUMMARY CANCER RISK	1.2E-05				3E-06	1E-05

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-1
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	2.6E-08	ND		0.01	2.4E-09	ND		
2-Methylnaphthalene	O	113.50	ug/kg	1.5E-06	0.04	3.6E-05	0.01	1.4E-07	0.04	3.5E-06	4.0E-05
Acenaphthene	O	135.00	ug/kg	1.7E-06	0.06	2.9E-05	0.01	1.7E-07	0.0546	3.0E-06	3.2E-05
Acenapthylene	O	118.00	ug/kg	1.5E-06	0.04	3.8E-05	0.01	1.4E-07	0.04	3.6E-06	4.1E-05
Anthracene	O	230.00	ug/kg	2.9E-06	0.3	9.8E-06	0.01	2.8E-07	0.273	1.0E-06	1.1E-05
Benzo(a)anthracene	O	483.00	ug/kg	6.2E-06	ND		0.01	5.9E-07	ND		
Benzo(a)pyrene	O	483.00	ug/kg	6.2E-06	ND		0.01	5.9E-07	ND		
Benzo(b)fluoranthene	O	773.00	ug/kg	9.9E-06	ND		0.01	9.5E-07	ND		
Benzo(g,h,i)perylene	O	412.00	ug/kg	5.3E-06	ND		0.01	5.0E-07	ND		
Benzo(k)fluroanthene	O	424.00	ug/kg	5.4E-06	ND		0.01	5.2E-07	ND		
Chrysene	O	483.00	ug/kg	6.2E-06	ND		0.01	5.9E-07	ND		
Dibenz(a,h)anthracene	O	171.00	ug/kg	2.2E-06	ND		0.01	2.1E-07	ND		
Dibenzofuran	O	40.00	ug/kg	5.1E-07	ND		0.01	4.9E-08	ND		
Flouranthene	O	812.00	ug/kg	1.0E-05	0.04	2.6E-04	0.01	9.9E-07	0.0364	2.7E-05	2.9E-04
Fluorene	O	110.00	ug/kg	1.4E-06	0.04	3.5E-05	0.01	1.3E-07	0.0364	3.7E-06	3.9E-05
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	5.1E-06	ND		0.01	4.9E-07	ND		
Naphthalene	O	122.50	ug/kg	1.6E-06	0.04	3.9E-05	0.01	1.5E-07	0.04	3.7E-06	4.3E-05
Phenanthrene	O	455.00	ug/kg	5.8E-06	ND		0.01	5.6E-07	ND		
Pyrene	O	626.00	ug/kg	8.0E-06	0.03	2.7E-04	0.01	7.7E-07	0.0273	2.8E-05	2.9E-04
Aroclor 1260	O	424.00	ug/kg	5.4E-06	0.00007	7.7E-02	0.01	5.2E-07	0.000063	8.2E-03	8.6E-02
Beryllium	I	0.39	mg/kg	5.0E-06	0.005	1.0E-03	0.001	4.8E-08	0.00005	9.5E-04	2.0E-03
Calcium	I	125000.00	mg/kg	1.6E+00	ND		0.001	1.5E-02	ND		
Magnesium	I	1130.00	mg/kg	1.4E-02	ND		0.001	1.4E-04	ND		
Manganese	I	27.40	mg/kg	3.5E-04	0.14	2.5E-03	0.001	3.4E-06	0.0056	6.0E-04	3.1E-03
Sodium	I	350.00	mg/kg	4.5E-03	ND		0.001	4.3E-05	ND		
TRPH	O	3229000.00	ug/kg	4.1E-02	ND		0.01	4.0E-03	ND		
SUMMARY HAZARD INDEX						8.2E-02				1E-02	9E-02

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
CHILD RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-2

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical specific	chemical specific	
PART. EMISSION FACTOR	PEF	4.97E+07	m^3/kg	Appendix
CONCENTRATION AIR	CA	chemical specific	mg/m^3	
INHALATION RATE	IR	0.833	m^3/hour	USEPA, 1991
BODY WEIGHT	BW	15	kg	USEPA, 1991
EXPOSURE TIME	ET	16	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	Assumption
EXPOSURE DURATION	ED	6	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
PEF has been derived in the Appendix to this report, Derivation of Particulate Emissions Factor

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day) -1

'HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

INHALATION OF PARTICULATE DUST - SURFACE SOIL
CHILD RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-2
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)⁻¹	CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	7.1E-10	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	7.1E-10	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	1.1E-09	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	6.2E-10	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	7.1E-10	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	2.5E-10	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	5.9E-10	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	6.2E-10	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	5.7E-10	8.4	**4.8E-09**
				SUMMARY CANCER RISK			**5E-09**

ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
CHILD RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-2
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	4.02E-11	3.4E-11	ND	
2-Methylnaphthalene	O	113.50	ug/kg	2.28E-09	1.9E-09	ND	
Acenaphthene	O	135.00	ug/kg	2.72E-09	2.3E-09	ND	
Acenapthylene	O	118.00	ug/kg	2.37E-09	2.0E-09	ND	
Anthracene	O	230.00	ug/kg	4.63E-09	3.9E-09	ND	
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	8.3E-09	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	8.3E-09	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	1.3E-08	ND	
Benzo(g,h,i)perylene	O	412.00	ug/kg	8.29E-09	7.1E-09	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	7.3E-09	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	8.3E-09	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	2.9E-09	ND	
Dibenzofuran	O	40.00	ug/kg	8.05E-10	6.9E-10	ND	
Fluoranthene	O	812.00	ug/kg	1.63E-08	1.4E-08	ND	
Fluorene	O	110.00	ug/kg	2.21E-09	1.9E-09	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	6.8E-09	ND	
Naphthalene	O	122.50	ug/kg	2.46E-09	2.1E-09	ND	
Phenanthrene	O	455.00	ug/kg	9.15E-09	7.8E-09	ND	
Pyrene	O	626.00	ug/kg	1.26E-08	1.1E-08	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	7.3E-09	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	6.7E-09	ND	
Calcium	I	125000.00	mg/kg	2.52E-03	2.1E-03	ND	
Magnesium	I	1130.00	mg/kg	2.27E-05	1.9E-05	ND	
Manganese	I	27.40	mg/kg	5.51E-07	4.7E-07	0.000014	3.4E-02
Sodium	I	350.00	mg/kg	7.04E-06	6.0E-06	ND	
TRPH	O	3229000.00	ug/kg	6.50E-05	5.5E-05	ND	
						SUMMARY HAZARD INDEX	3E-02

ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-3
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year *	Assumption
EXPOSURE DURATION	ED	24	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{\text{CS x IR x FI x CF x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:
DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-3
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	2.3E-07	0.73	1.7E-07	0.01	1.3E-07	0.802	1.0E-07	2.7E-07
Benzo(a)pyrene	O	483.00	ug/kg	2.3E-07	7.3	1.7E-06	0.01	1.3E-07	8.02	1.0E-06	2.7E-06
Benzo(b)fluoranthene	O	773.00	ug/kg	3.6E-07	0.73	2.7E-07	0.01	2.1E-07	0.802	1.7E-07	4.3E-07
Benzo(k)fluroanthene	O	424.00	ug/kg	2.0E-07	0.073	1.5E-08	0.01	1.1E-07	0.0802	9.2E-09	2.4E-08
Chrysene	O	483.00	ug/kg	2.3E-07	0.0073	1.7E-09	0.01	1.3E-07	0.00802	1.0E-09	2.7E-09
Dibenz(a,h)anthracene	O	171.00	ug/kg	8.0E-08	7.3	5.9E-07	0.01	4.6E-08	8.02	3.7E-07	9.6E-07
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	1.9E-07	0.73	1.4E-07	0.01	1.1E-07	0.802	8.6E-08	2.2E-07
Aroclor 1260	O	424.00	ug/kg	2.0E-07	7.7	1.5E-06	0.01	1.1E-07	8.56	9.8E-07	2.5E-06
Beryllium	I	0.39	mg/kg	1.8E-07	4.3	7.9E-07	0.001	1.1E-08	430	4.5E-06	5.3E-06
SUMMARY CANCER RISK						5E-06				7E-06	1E-05

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-3
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	2.7E-09	ND		0.01	1.6E-09	ND		
2-Methylnaphthalene	O	113.50	ug/kg	1.6E-07	0.04	3.9E-06	0.01	8.9E-08	0.04	2.2E-06	6.1E-06
Acenaphthene	O	135.00	ug/kg	1.8E-07	0.06	3.1E-06	0.01	1.1E-07	0.0546	1.9E-06	5.0E-06
Acenapthylene	O	118.00	ug/kg	1.6E-07	0.04	4.0E-06	0.01	9.3E-08	0.04	2.3E-06	6.4E-06
Anthracene	O	230.00	ug/kg	3.2E-07	0.3	1.1E-06	0.01	1.8E-07	0.273	6.6E-07	1.7E-06
Benzo(a)anthracene	O	483.00	ug/kg	6.6E-07	ND		0.01	3.8E-07	ND		
Benzo(a)pyrene	O	483.00	ug/kg	6.6E-07	ND		0.01	3.8E-07	ND		
Benzo(b)fluoranthene	O	773.00	ug/kg	1.1E-06	ND		0.01	6.1E-07	ND		
Benzo(g,h,i)perylene	O	412.00	ug/kg	5.6E-07	ND		0.01	3.2E-07	ND		
Benzo(k)fluroanthene	O	424.00	ug/kg	5.8E-07	ND		0.01	3.3E-07	ND		
Chrysene	O	483.00	ug/kg	6.6E-07	ND		0.01	3.8E-07	ND		
Dibenz(a,h)anthracene	O	171.00	ug/kg	2.3E-07	ND		0.01	1.3E-07	ND		
Dibenzofuran	O	40.00	ug/kg	5.5E-08	ND		0.01	3.2E-08	ND		
Fluoranthene	O	812.00	ug/kg	1.1E-06	0.04	2.8E-05	0.01	6.4E-07	0.0364	1.8E-05	4.5E-05
Fluorene	O	110.00	ug/kg	1.5E-07	0.04	3.8E-06	0.01	8.7E-08	0.0364	2.4E-06	6.1E-06
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	5.5E-07	ND		0.01	3.1E-07	ND		
Naphthalene	O	122.50	ug/kg	1.7E-07	0.04	4.2E-06	0.01	9.6E-08	0.04	2.4E-06	6.6E-06
Phenanthrene	O	455.00	ug/kg	6.2E-07	ND		0.01	3.6E-07	ND		
Pyrene	O	626.00	ug/kg	8.6E-07	0.03	2.9E-05	0.01	4.9E-07	0.0273	1.8E-05	4.7E-05
Aroclor 1260	O	424.00	ug/kg	5.8E-07	0.00007	8.3E-03	0.01	3.3E-07	0.000063	5.3E-03	1.4E-02
Beryllium	I	0.39	mg/kg	5.3E-07	0.005	1.1E-04	0.001	3.1E-08	0.00005	6.1E-04	7.2E-04
Calcium	I	125000.00	mg/kg	1.7E-01	ND		0.001	9.8E-03	ND		
Magnesium	I	1130.00	mg/kg	1.5E-03	ND		0.001	8.9E-05	ND		
Manganese	I	27.40	mg/kg	3.8E-05	0.14	2.7E-04	0.001	2.2E-06	0.0056	3.9E-04	6.5E-04
Sodium	I	350.00	mg/kg	4.8E-07	ND		0.001	2.8E-08	ND		
TRPH	O	3229000.00	ug/kg	4.4E-06	ND		0.01	2.5E-06	ND		
SUMMARY HAZARD INDEX						9E-03				6E-03	2E-02

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-4

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical specific	chemical specific	
PART. EMISSION FACTOR	PEF	4.97E+07	m^3/kg	Appendix
CONCENTRATION AIR	CA	chemical specific	mg/m^3	
INHALATION RATE	IR	0.833	m^3/hour	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	16	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	Assumption
EXPOSURE DURATION	ED	24	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
PEF has been derived in the Appendix to this report, Derivation of Particulate Emissions Factor

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day) -1

'HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

INHALATION OF PARTICULATE DUST - SURFACE SOIL
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-4
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)⁻¹	CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	6.1E-10	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	6.1E-10	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	9.7E-10	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	5.3E-10	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	6.1E-10	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	2.2E-10	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	5.0E-10	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	5.3E-10	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	4.9E-10	8.4	**4.1E-09**
SUMMARY CANCER RISK							4E-09

ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-4
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION R/D (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	4.02E-11	7.3E-12	ND	
2-Methylnaphthalene	O	113.50	ug/kg	2.28E-09	4.2E-10	ND	
Acenaphthene	O	135.00	ug/kg	2.72E-09	5.0E-10	ND	
Acenapthylene	O	118.00	ug/kg	2.37E-09	4.3E-10	ND	
Anthracene	O	230.00	ug/kg	4.63E-09	8.4E-10	ND	
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	1.8E-09	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	1.8E-09	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	2.8E-09	ND	
Benzo(g,h,i)perylene	O	412.00	ug/kg	8.29E-09	1.5E-09	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	1.6E-09	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	1.8E-09	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	6.3E-10	ND	
Dibenzofuran	O	40.00	ug/kg	8.05E-10	1.5E-10	ND	
Fluoranthene	O	812.00	ug/kg	1.63E-08	3.0E-09	ND	
Fluorene	O	110.00	ug/kg	2.21E-09	4.0E-10	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	1.5E-09	ND	
Naphthalene	O	122.50	ug/kg	2.46E-09	4.5E-10	ND	
Phenanthrene	O	455.00	ug/kg	9.15E-09	1.7E-09	ND	
Pyrene	O	626.00	ug/kg	1.26E-08	2.3E-09	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	1.6E-09	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	1.4E-09	ND	
Calcium	I	125000.00	mg/kg	2.52E-03	4.6E-04	ND	
Magnesium	I	1130.00	mg/kg	2.27E-05	4.2E-06	ND	
Manganese	I	27.40	mg/kg	5.51E-07	1.0E-07	0.000014	7.2E-03
Sodium	I	350.00	mg/kg	7.04E-06	1.3E-06	ND	
TRPH	O	3229000.00	ug/kg	6.50E-05	1.2E-05	ND	
						SUMMARY HAZARD INDEX	7E-03

ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-5

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	40	kg	USEPA, 1989
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	30	days/year *	Assumption
EXPOSURE DURATION	ED	11	years	Assumption
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [1]	SAsoil/adj	1136	cm2-year/kg	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAeven	chemical specific	mg/cm2-event	USEPA, 1992a
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	11	years	USEPA, 1991

* Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.

[1] In estimating the dermally absorbed dose for children age 6 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 11 age periods, age 6 through 16, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992 and Dermal Exposure Appendix of this document.

USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:

SAsoil/adj = SUM (SA x ED / BW)

DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-5
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	483	ug/kg	1.6E-08	0.73	1.1E-08	0.01	6.4E-09	0.802	5.2E-09	1.7E-08
Benzo(a)pyrene	O	483	ug/kg	1.6E-08	7.3	1.1E-07	0.01	6.4E-09	8.02	5.2E-08	1.7E-07
Benzo(b)fluoranthene	O	773	ug/kg	2.5E-08	0.73	1.8E-08	0.01	1.0E-08	0.802	8.3E-09	2.6E-08
Benzo(k)fluroanthene	O	424	ug/kg	1.4E-08	0.073	1.0E-09	0.01	5.7E-09	0.0802	4.5E-10	1.5E-09
Chrysene	O	483	ug/kg	1.6E-08	0.0073	1.1E-10	0.01	6.4E-09	0.00802	5.2E-11	1.7E-10
Dibenz(a,h)anthracene	O	171	ug/kg	5.5E-09	7.3	4.0E-08	0.01	2.3E-09	8.02	1.8E-08	5.9E-08
Indeno(1,2,3-cd)pyrene	O	399	ug/kg	1.3E-08	0.73	9.4E-09	0.01	5.3E-09	0.802	4.3E-09	1.4E-08
Aroclor 1260	O	424	ug/kg	1.4E-08	7.7	1.1E-07	0.01	5.7E-09	8.56	4.8E-08	1.5E-07
Beryllium	I	0.39	mg/kg	1.3E-08	4.3	5.4E-08	0.001	5.2E-10	430	2.2E-07	2.8E-07
SUMMARY CANCER RISK						3.5E-07				4E-07	7E-07

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-5
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	2	ug/kg	4.1E-10	ND		0.01	1.7E-10	ND		
2-Methylnaphthalene	O	113.5	ug/kg	2.3E-08	0.04	5.8E-07	0.01	9.6E-09	0.04	2.4E-07	8.2E-07
Acenaphthene	O	135	ug/kg	2.8E-08	0.06	4.6E-07	0.01	1.1E-08	0.0546	2.1E-07	6.7E-07
Acenapthylene	O	118	ug/kg	2.4E-08	0.04	6.1E-07	0.01	1.0E-08	0.04	2.5E-07	8.6E-07
Anthracene	O	230	ug/kg	4.7E-08	0.3	1.6E-07	0.01	2.0E-08	0.273	7.2E-08	2.3E-07
Benzo(a)anthracene	O	483	ug/kg	9.9E-08	ND		0.01	4.1E-08	ND		
Benzo(a)pyrene	O	483	ug/kg	9.9E-08	ND		0.01	4.1E-08	ND		
Benzo(b)fluoranthene	O	773	ug/kg	1.6E-07	ND		0.01	6.6E-08	ND		
Benzo(g,h,i)perylene	O	412	ug/kg	8.5E-08	ND		0.01	3.5E-08	ND		
Benzo(k)fluroanthene	O	424	ug/kg	8.7E-08	ND		0.01	3.6E-08	ND		
Chrysene	O	483	ug/kg	9.9E-08	ND		0.01	4.1E-08	ND		
Dibenz(a,h)anthracene	O	171	ug/kg	3.5E-08	ND		0.01	1.5E-08	ND		
Dibenzofuran	O	40	ug/kg	8.2E-09	ND		0.01	3.4E-09	ND		
Fluoranthene	O	812	ug/kg	1.7E-07	0.04	4.2E-06	0.01	6.9E-08	0.0364	1.9E-06	6.1E-06
Fluorene	O	110	ug/kg	2.3E-08	0.04	5.7E-07	0.01	9.3E-09	0.0364	2.6E-07	8.2E-07
Indeno(1,2,3-cd)pyrene	O	399	ug/kg	8.2E-08	ND		0.01	3.4E-08	ND		
Naphthalene	O	122.5	ug/kg	2.5E-08	0.04	6.3E-07	0.01	1.0E-08	0.04	2.6E-07	8.9E-07
Phenanthrene	O	455	ug/kg	9.3E-08	ND		0.01	3.9E-08	ND		
Pyrene	O	626	ug/kg	1.3E-07	0.03	4.3E-06	0.01	5.3E-08	0.0273	1.9E-06	6.2E-06
Aroclor 1260	O	424	ug/kg	8.7E-08	0.00007	1.2E-03	0.01	3.6E-08	0.000063	5.7E-04	1.8E-03
Beryllium	I	0.39	mg/kg	8.0E-08	0.005	1.6E-05	0.001	3.3E-09	0.00005	6.6E-05	8.2E-05
Calcium	I	125000	mg/kg	2.6E-02	ND		0.001	1.1E-03	ND		
Magnesium	I	1130	mg/kg	2.3E-04	ND		0.001	9.6E-06	ND		
Manganese	I	27.4	mg/kg	5.6E-06	0.14	4.0E-05	0.001	2.3E-07	0.0056	4.2E-05	8.2E-05
Sodium	I	350	mg/kg	7.2E-05	ND		0.001	3.0E-06	ND		
TRPH	O	3229000	ug/kg	6.6E-04	ND		0.01	2.7E-04	ND		
SUMMARY HAZARD INDEX						1.3E-03				7E-04	2E-03

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available
ABB-Environmental Services, Inc.
TABF-5.WK1
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INHALATION OF PARTICULATE DUST - SURFACE SOIL
CHILD TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-6

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical specific	chemical specific	
PART. EMISSION FACTOR	PEF	4.97E+07	m^3/kg	Appendix
CONCENTRATION AIR	CA	chemical specific	mg/m^3	
INHALATION RATE	IR	0.833	m^3/hour	USEPA, 1991
BODY WEIGHT	BW	40	kg	USEPA, 1991
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	11	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	11	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
PEF has been derived in the Appendix to this report, Derivation of Particulate Emissions Factor

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day) -1

'HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

INHALATION OF PARTICULATE DUST - SURFACE SOIL
CHILD TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-6
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION (1)	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)⁻¹	CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	1.0E-11	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	1.0E-11	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	1.7E-11	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	9.2E-12	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	1.0E-11	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	3.7E-12	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	8.6E-12	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	9.2E-12	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	8.4E-12	8.4	7.1E-11
SUMMARY CANCER RISK							7E-11

ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
CHILD TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-6
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	4.02E-11	2.8E-13	ND	
2-Methylnaphthalene	O	113.50	ug/kg	2.28E-09	1.6E-11	ND	
Acenaphthene	O	135.00	ug/kg	2.72E-09	1.9E-11	ND	
Acenapthylene	O	118.00	ug/kg	2.37E-09	1.6E-11	ND	
Anthracene	O	230.00	ug/kg	4.63E-09	3.2E-11	ND	
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	6.7E-11	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	6.7E-11	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	1.1E-10	ND	
Benzo(g,h,i)perylene	O	412.00	ug/kg	8.29E-09	5.7E-11	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	5.8E-11	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	6.7E-11	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	2.4E-11	ND	
Dibenzofuran	O	40.00	ug/kg	8.05E-10	5.5E-12	ND	
Fluoranthene	O	812.00	ug/kg	1.63E-08	1.1E-10	ND	
Fluorene	O	110.00	ug/kg	2.21E-09	1.5E-11	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	5.5E-11	ND	
Naphthalene	O	122.50	ug/kg	2.46E-09	1.7E-11	ND	
Phenanthrene	O	455.00	ug/kg	9.15E-09	6.3E-11	ND	
Pyrene	O	626.00	ug/kg	1.26E-08	8.6E-11	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	5.8E-11	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	5.4E-11	ND	
Calcium	I	125000.00	mg/kg	2.52E-03	1.7E-05	ND	
Magnesium	I	1130.00	mg/kg	2.27E-05	1.6E-07	ND	
Manganese	I	27.40	mg/kg	5.51E-07	3.8E-09	0.000014	2.7E-04
Sodium	I	350.00	mg/kg	7.04E-06	4.8E-08	ND	
TRPH	O	3229000.00	ug/kg	6.50E-05	4.4E-07	ND	
SUMMARY HAZARD INDEX							3E-04

ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-7
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	24	days/year *	Assumption
EXPOSURE DURATION	ED	19	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	19	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:

DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-7
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	1.2E-08	0.73	9.0E-09	0.01	7.1E-09	0.802	5.7E-09	1.5E-08
Benzo(a)pyrene	O	483.00	ug/kg	1.2E-08	7.3	9.0E-08	0.01	7.1E-09	8.02	5.7E-08	1.5E-07
Benzo(b)fluoranthene	O	773.00	ug/kg	2.0E-08	0.73	1.4E-08	0.01	1.1E-08	0.802	9.1E-09	2.3E-08
Benzo(k)fluroanthene	O	424.00	ug/kg	1.1E-08	0.073	7.9E-10	0.01	6.2E-09	0.0802	5.0E-10	1.3E-09
Chrysene	O	483.00	ug/kg	1.2E-08	0.0073	9.0E-11	0.01	7.1E-09	0.00802	5.7E-11	1.5E-10
Dibenz(a,h)anthracene	O	171.00	ug/kg	4.4E-09	7.3	3.2E-08	0.01	2.5E-09	8.02	2.0E-08	5.2E-08
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	1.0E-08	0.73	7.4E-09	0.01	5.8E-09	0.802	4.7E-09	1.2E-08
Aroclor 1260	O	424.00	ug/kg	1.1E-08	7.7	8.3E-08	0.01	6.2E-09	8.56	5.3E-08	1.4E-07
Beryllium	I	0.39	mg/kg	9.9E-09	4.3	4.3E-08	0.001	5.7E-10	430	2.5E-07	2.9E-07
SUMMARY CANCER RISK						3E-07				4E-07	7E-07

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-7
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	1.9E-10	ND		0.01	1.1E-10	ND		
2-Methylnaphthalene	O	113.50	ug/kg	1.1E-08	0.04	2.7E-07	0.01	6.1E-09	0.04	1.5E-07	4.2E-07
Acenaphthene	O	135.00	ug/kg	1.3E-08	0.06	2.1E-07	0.01	7.3E-09	0.0546	1.3E-07	3.4E-07
Acenapthylene	O	118.00	ug/kg	1.1E-08	0.04	2.8E-07	0.01	6.4E-09	0.04	1.6E-07	4.4E-07
Anthracene	O	230.00	ug/kg	2.2E-08	0.3	7.2E-08	0.01	1.2E-08	0.273	4.6E-08	1.2E-07
Benzo(a)anthracene	O	483.00	ug/kg	4.5E-08	ND		0.01	2.6E-08	ND		
Benzo(a)pyrene	O	483.00	ug/kg	4.5E-08	ND		0.01	2.6E-08	ND		
Benzo(b)fluoranthene	O	773.00	ug/kg	7.3E-08	ND		0.01	4.2E-08	ND		
Benzo(g,h,i)perylene	O	412.00	ug/kg	3.9E-08	ND		0.01	2.2E-08	ND		
Benzo(k)fluroanthene	O	424.00	ug/kg	4.0E-08	ND		0.01	2.3E-08	ND		
Chrysene	O	483.00	ug/kg	4.5E-08	ND		0.01	2.6E-08	ND		
Dibenz(a,h)anthracene	O	171.00	ug/kg	1.6E-08	ND		0.01	9.2E-09	ND		
Dibenzofuran	O	40.00	ug/kg	3.8E-09	ND		0.01	2.2E-09	ND		
Fluoranthene	O	812.00	ug/kg	7.6E-08	0.04	1.9E-06	0.01	4.4E-08	0.0364	1.2E-06	3.1E-06
Fluorene	O	110.00	ug/kg	1.0E-08	0.04	2.6E-07	0.01	5.9E-09	0.0364	1.6E-07	4.2E-07
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	3.7E-08	ND		0.01	2.2E-08	ND		
Naphthalene	O	122.50	ug/kg	1.2E-08	0.04	2.9E-07	0.01	6.6E-09	0.04	1.7E-07	4.5E-07
Phenanthrene	O	455.00	ug/kg	4.3E-08	ND		0.01	2.5E-08	ND		
Pyrene	O	626.00	ug/kg	5.9E-08	0.03	2.0E-06	0.01	3.4E-08	0.0273	1.2E-06	3.2E-06
Aroclor 1260	O	424.00	ug/kg	4.0E-08	0.00007	5.7E-04	0.01	2.3E-08	0.000063	3.6E-04	9.3E-04
Beryllium	I	0.39	mg/kg	3.7E-08	0.005	7.3E-06	0.001	2.1E-09	0.00005	4.2E-05	4.9E-05
Calcium	I	125000.00	mg/kg	1.2E-02	ND		0.001	6.8E-04	ND		
Magnesium	I	1130.00	mg/kg	1.1E-04	ND		0.001	6.1E-06	ND		
Manganese	I	27.40	mg/kg	2.6E-06	0.14	1.8E-05	0.001	1.5E-07	0.0056	2.6E-05	4.5E-05
Sodium	I	350.00	mg/kg	3.3E-08	ND		0.001	1.9E-09	ND		
TRPH	O	3229000.00	ug/kg	3.0E-07	ND		0.01	1.7E-07	ND		
SUMMARY HAZARD INDEX						6E-04				4E-04	1E-03

[1] USEPA Region IV guidance specifics absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
ADULT TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-8

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical specific	chemical specific	
PART. EMISSION FACTOR	PEF	4.97E+07	m^3/kg	Appendix
CONCENTRATION AIR	CA	chemical specific	mg/m^3	
INHALATION RATE	IR	0.833	m^3/hour	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	24	days/year	Assumption
EXPOSURE DURATION	ED	19	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	19	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
PEF has been derived in the Appendix to this report, Derivation of Particulate Emissions Factor

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day) -1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

INHALATION OF PARTICULATE DUST - SURFACE SOIL
ADULT TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-8
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)⁻¹	CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	8.3E-12	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	8.3E-12	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	1.3E-11	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	7.2E-12	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	8.3E-12	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	2.9E-12	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	6.8E-12	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	7.2E-12	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	6.7E-12	8.4	5.6E-11
SUMMARY CANCER RISK							6E-11

ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
ADULT TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-8
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	4.02E-11	1.3E-13	ND	
2-Methylnaphthalene	O	113.50	ug/kg	2.28E-09	7.1E-12	ND	
Acenaphthene	O	135.00	ug/kg	2.72E-09	8.5E-12	ND	
Acenapthylene	O	118.00	ug/kg	2.37E-09	7.4E-12	ND	
Anthracene	O	230.00	ug/kg	4.63E-09	1.4E-11	ND	
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	3.0E-11	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	3.0E-11	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	4.9E-11	ND	
Benzo(g,h,i)perylene	O	412.00	ug/kg	8.29E-09	2.6E-11	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	2.7E-11	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	3.0E-11	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	1.1E-11	ND	
Dibenzofuran	O	40.00	ug/kg	8.05E-10	2.5E-12	ND	
Fluoranthene	O	812.00	ug/kg	1.63E-08	5.1E-11	ND	
Fluorene	O	110.00	ug/kg	2.21E-09	6.9E-12	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	2.5E-11	ND	
Naphthalene	O	122.50	ug/kg	2.46E-09	7.7E-12	ND	
Phenanthrene	O	455.00	ug/kg	9.15E-09	2.9E-11	ND	
Pyrene	O	626.00	ug/kg	1.26E-08	3.9E-11	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	2.7E-11	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	2.5E-11	ND	
Calcium	I	125000.00	mg/kg	2.52E-03	7.9E-06	ND	
Magnesium	I	1130.00	mg/kg	2.27E-05	7.1E-08	ND	
Manganese	I	27.40	mg/kg	5.51E-07	1.7E-09	0.000014	1.2E-04
Sodium	I	350.00	mg/kg	7.04E-06	2.2E-08	ND	
TRPH	O	3229000.00	ug/kg	6.50E-05	2.0E-07	ND	
						SUMMARY HAZARD INDEX	1E-04

ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE WORKER
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-9
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	12	days/year *	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:
DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE WORKER
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-9
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	8.1E-09	0.73	5.9E-09	0.01	4.7E-09	0.802	3.7E-09	9.7E-09
Benzo(a)pyrene	O	483.00	ug/kg	8.1E-09	7.3	5.9E-08	0.01	4.7E-09	8.02	3.7E-08	9.7E-08
Benzo(b)fluoranthene	O	773.00	ug/kg	1.3E-08	0.73	9.5E-09	0.01	7.5E-09	0.802	6.0E-09	1.5E-08
Benzo(k)fluoranthene	O	424.00	ug/kg	7.1E-09	0.073	5.2E-10	0.01	4.1E-09	0.0802	3.3E-10	8.5E-10
Chrysene	O	483.00	ug/kg	8.1E-09	0.0073	5.9E-11	0.01	4.7E-09	0.00802	3.7E-11	9.7E-11
Dibenz(a,h)anthracene	O	171.00	ug/kg	2.9E-09	7.3	2.1E-08	0.01	1.6E-09	8.02	1.3E-08	3.4E-08
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	6.7E-09	0.73	4.9E-09	0.01	3.8E-09	0.802	3.1E-09	8.0E-09
Aroclor 1260	O	424.00	ug/kg	7.1E-09	7.7	5.5E-08	0.01	4.1E-09	8.56	3.5E-08	9.0E-08
Beryllium	I	0.39	mg/kg	6.5E-09	4.3	2.8E-08	0.001	3.8E-10	430	1.6E-07	1.9E-07
SUMMARY CANCER RISK						2E-07				3E-07	4E-07

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE WORKER
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-9
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	9.4E-11	ND		0.01	5.4E-11	ND		
2-Methylnaphthalene	O	113.50	ug/kg	5.3E-09	0.04	1.3E-07	0.01	3.1E-09	0.04	7.7E-08	2.1E-07
Acenaphthene	O	135.00	ug/kg	6.3E-09	0.06	1.1E-07	0.01	3.6E-09	0.0546	6.7E-08	1.7E-07
Acenapthylene	O	118.00	ug/kg	5.5E-09	0.04	1.4E-07	0.01	3.2E-09	0.04	8.0E-08	2.2E-07
Anthracene	O	230.00	ug/kg	1.1E-08	0.3	3.6E-08	0.01	6.2E-09	0.273	2.3E-08	5.9E-08
Benzo(a)anthracene	O	483.00	ug/kg	2.3E-08	ND		0.01	1.3E-08	ND		
Benzo(a)pyrene	O	483.00	ug/kg	2.3E-08	ND		0.01	1.3E-08	ND		
Benzo(b)fluoranthene	O	773.00	ug/kg	3.6E-08	ND		0.01	2.1E-08	ND		
Benzo(g,h,i)perylene	O	412.00	ug/kg	1.9E-08	ND		0.01	1.1E-08	ND		
Benzo(k)fluroanthene	O	424.00	ug/kg	2.0E-08	ND		0.01	1.1E-08	ND		
Chrysene	O	483.00	ug/kg	2.3E-08	ND		0.01	1.3E-08	ND		
Dibenz(a,h)anthracene	O	171.00	ug/kg	8.0E-09	ND		0.01	4.6E-09	ND		
Dibenzofuran	O	40.00	ug/kg	1.9E-09	ND		0.01	1.1E-09	ND		
Fluoranthene	O	812.00	ug/kg	3.8E-08	0.04	9.5E-07	0.01	2.2E-08	0.0364	6.0E-07	1.6E-06
Fluorene	O	110.00	ug/kg	5.2E-09	0.04	1.3E-07	0.01	3.0E-09	0.0364	8.2E-08	2.1E-07
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	1.9E-08	ND		0.01	1.1E-08	ND		
Naphthalene	O	122.50	ug/kg	5.8E-09	0.04	1.4E-07	0.01	3.3E-09	0.04	8.3E-08	2.3E-07
Phenanthrene	O	455.00	ug/kg	2.1E-08	ND		0.01	1.2E-08	ND		
Pyrene	O	626.00	ug/kg	2.9E-08	0.03	9.8E-07	0.01	1.7E-08	0.0273	6.2E-07	1.6E-06
Aroclor 1260	O	424.00	ug/kg	2.0E-08	0.00007	2.8E-04	0.01	1.1E-08	0.000063	1.8E-04	4.7E-04
Beryllium	I	0.39	mg/kg	1.8E-08	0.005	3.7E-06	0.001	1.1E-09	0.00005	2.1E-05	2.5E-05
Calcium	I	125000.00	mg/kg	5.9E-03	ND		0.001	3.4E-04	ND		
Magnesium	I	1130.00	mg/kg	5.3E-05	ND		0.001	3.1E-06	ND		
Manganese	I	27.40	mg/kg	1.3E-06	0.14	9.2E-06	0.001	7.4E-08	0.0056	1.3E-05	2.2E-05
Sodium	I	350.00	mg/kg	1.6E-08	ND		0.001	9.5E-10	ND		
TRPH	O	3229000.00	ug/kg	1.5E-07	ND		0.01	8.7E-08	ND		
SUMMARY HAZARD INDEX						3E-04				2E-04	5E-04

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
SITE WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical specific	chemical specific	
PART. EMISSION FACTOR	PEF	4.97E+07	m^3/kg	Appendix
CONCENTRATION AIR	CA	chemical specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	12	days/year	Assumption
EXPOSURE DURATION	ED	25	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
PEF has been derived in the Appendix to this report, Derivation of Particulate Emissions Factor

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day) -1

'HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

INHALATION OF PARTICULATE DUST - SURFACE SOIL
SITE WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-10
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	1.1E-11	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	1.1E-11	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	1.7E-11	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	9.5E-12	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	1.1E-11	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	3.8E-12	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	9.0E-12	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	9.5E-12	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	8.8E-12	8.4	7.4E-11
SUMMARY CANCER RISK							7E-11

ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
SITE WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-10
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	4.02E-11	1.3E-13	ND	
2-Methylnaphthalene	O	113.50	ug/kg	2.28E-09	7.1E-12	ND	
Acenaphthene	O	135.00	ug/kg	2.72E-09	8.5E-12	ND	
Acenapthylene	O	118.00	ug/kg	2.37E-09	7.4E-12	ND	
Anthracene	O	230.00	ug/kg	4.63E-09	1.4E-11	ND	
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	3.0E-11	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	3.0E-11	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	4.9E-11	ND	
Benzo(g,h,i)perylene	O	412.00	ug/kg	8.29E-09	2.6E-11	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	2.7E-11	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	3.0E-11	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	1.1E-11	ND	
Dibenzofuran	O	40.00	ug/kg	8.05E-10	2.5E-12	ND	
Fluoranthene	O	812.00	ug/kg	1.63E-08	5.1E-11	ND	
Fluorene	O	110.00	ug/kg	2.21E-09	6.9E-12	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	2.5E-11	ND	
Naphthalene	O	122.50	ug/kg	2.46E-09	7.7E-12	ND	
Phenanthrene	O	455.00	ug/kg	9.15E-09	2.9E-11	ND	
Pyrene	O	626.00	ug/kg	1.26E-08	3.9E-11	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	2.7E-11	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	2.5E-11	ND	
Calcium	I	125000.00	mg/kg	2.52E-03	7.9E-06	ND	
Magnesium	I	1130.00	mg/kg	2.27E-05	7.1E-08	ND	
Manganese	I	27.40	mg/kg	5.51E-07	1.7E-09	0.000014	1.2E-04
Sodium	I	350.00	mg/kg	7.04E-06	2.2E-08	ND	
TRPH	O	3229000.00	ug/kg	6.50E-05	2.0E-07	ND	
SUMMARY HAZARD INDEX							1E-04

ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-11
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year *	Assumption
EXPOSURE DURATION	ED	0.5	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	0.5	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{\text{CS x IR x FI x CF x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:
DAevent= CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-11
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	1.9E-09	0.73	1.4E-09	0.01	2.3E-10	0.802	1.9E-10	1.6E-09
Benzo(a)pyrene	O	483.00	ug/kg	1.9E-09	7.3	1.4E-08	0.01	2.3E-10	8.02	1.9E-09	1.6E-08
Benzo(b)fluoranthene	O	773.00	ug/kg	3.1E-09	0.73	2.3E-09	0.01	3.7E-10	0.802	3.0E-10	2.6E-09
Benzo(k)fluroanthene	O	424.00	ug/kg	1.7E-09	0.073	1.2E-10	0.01	2.0E-10	0.0802	1.6E-11	1.4E-10
Chrysene	O	483.00	ug/kg	1.9E-09	0.0073	1.4E-11	0.01	2.3E-10	0.00802	1.9E-12	1.6E-11
Dibenz(a,h)anthracene	O	171.00	ug/kg	6.9E-10	7.3	5.0E-09	0.01	8.2E-11	8.02	6.6E-10	5.7E-09
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	1.6E-09	0.73	1.2E-09	0.01	1.9E-10	0.802	1.5E-10	1.3E-09
Aroclor 1260	O	424.00	ug/kg	1.7E-09	7.7	1.3E-08	0.01	2.0E-10	8.56	1.8E-09	1.5E-08
Beryllium	I	0.39	mg/kg	1.6E-09	4.3	6.8E-09	0.001	1.9E-11	430	8.1E-09	1.5E-08
SUMMARY CANCER RISK						4E-08				1E-08	6E-08

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-11
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	1.1E-09	ND		0.01	1.4E-10	ND		
2-Methylnaphthalene	O	113.50	ug/kg	6.4E-08	0.04	1.6E-06	0.01	7.7E-09	0.04	1.9E-07	1.8E-06
Acenaphthene	O	135.00	ug/kg	7.6E-08	0.06	1.3E-06	0.01	9.1E-09	0.0546	1.7E-07	1.4E-06
Acenapthylene	O	118.00	ug/kg	6.7E-08	0.04	1.7E-06	0.01	8.0E-09	0.04	2.0E-07	1.9E-06
Anthracene	O	230.00	ug/kg	1.3E-07	0.3	4.3E-07	0.01	1.6E-08	0.273	5.7E-08	4.9E-07
Benzo(a)anthracene	O	483.00	ug/kg	2.7E-07	ND		0.01	3.3E-08	ND		
Benzo(a)pyrene	O	483.00	ug/kg	2.7E-07	ND		0.01	3.3E-08	ND		
Benzo(b)fluoranthene	O	773.00	ug/kg	4.4E-07	ND		0.01	5.2E-08	ND		
Benzo(g,h,i)perylene	O	412.00	ug/kg	2.3E-07	ND		0.01	2.8E-08	ND		
Benzo(k)fluroanthene	O	424.00	ug/kg	2.4E-07	ND		0.01	2.9E-08	ND		
Chrysene	O	483.00	ug/kg	2.7E-07	ND		0.01	3.3E-08	ND		
Dibenz(a,h)anthracene	O	171.00	ug/kg	9.6E-08	ND		0.01	1.2E-08	ND		
Dibenzofuran	O	40.00	ug/kg	2.3E-08	ND		0.01	2.7E-09	ND		
Fluoranthene	O	812.00	ug/kg	4.6E-07	0.04	1.1E-05	0.01	5.5E-08	0.0364	1.5E-06	1.3E-05
Fluorene	O	110.00	ug/kg	6.2E-08	0.04	1.5E-06	0.01	7.4E-09	0.0364	2.0E-07	1.8E-06
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	2.2E-07	ND		0.01	2.7E-08	ND		
Naphthalene	O	122.50	ug/kg	6.9E-08	0.04	1.7E-06	0.01	8.3E-09	0.04	2.1E-07	1.9E-06
Phenanthrene	O	455.00	ug/kg	2.6E-07	ND		0.01	3.1E-08	ND		
Pyrene	O	626.00	ug/kg	3.5E-07	0.03	1.2E-05	0.01	4.2E-08	0.0273	1.5E-06	1.3E-05
Aroclor 1260	O	424.00	ug/kg	2.4E-07	0.00007	3.4E-03	0.01	2.9E-08	0.000063	4.5E-04	3.9E-03
Beryllium	I	0.39	mg/kg	2.2E-07	0.005	4.4E-05	0.001	2.6E-09	0.00005	5.3E-05	9.7E-05
Calcium	I	125000.00	mg/kg	7.0E-02	ND		0.001	8.4E-04	ND		
Magnesium	I	1130.00	mg/kg	6.4E-04	ND		0.001	7.6E-06	ND		
Manganese	I	27.40	mg/kg	1.5E-05	0.14	1.1E-04	0.001	1.8E-07	0.0056	3.3E-05	1.4E-04
Sodium	I	350.00	mg/kg	2.0E-07	ND		0.001	2.4E-09	ND		
TRPH	O	3229000.00	ug/kg	1.8E-06	ND		0.01	2.2E-07	ND		
SUMMARY HAZARD INDEX						4E-03				5E-04	4E-03

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-12

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical specific	chemical specific	
PART. EMISSION FACTOR	PEF	4.97E+07	m^3/kg	Appendix
CONCENTRATION AIR	CA	chemical specific	mg/m^3	
INHALATION RATE	IR	2.5	m^3/hour	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	0.5	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	0.5	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
PEF has been derived in the Appendix to this report, Derivation of Particulate Emissions Factor

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day) -1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

INHALATION OF PARTICULATE DUST - SURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-12
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION HI	UNITS	AIR CONCENTRATION (mg/m3)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	1.6E-12	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	1.6E-12	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	2.6E-12	ND	
Benzo(k)fluoranthene	O	424.00	ug/kg	8.53E-09	1.4E-12	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	1.6E-12	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	5.8E-13	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	1.3E-12	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	1.4E-12	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	1.3E-12	8.4	**1.1E-11**
						SUMMARY CANCER RISK	**1E-11**

ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-12
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	4.02E-11	9.5E-13	ND	
2-Methylnaphthalene	O	113.50	ug/kg	2.28E-09	5.4E-11	ND	
Acenaphthene	O	135.00	ug/kg	2.72E-09	6.4E-11	ND	
Acenapthylene	O	118.00	ug/kg	2.37E-09	5.6E-11	ND	
Anthracene	O	230.00	ug/kg	4.63E-09	1.1E-10	ND	
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	2.3E-10	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	2.3E-10	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	3.7E-10	ND	
Benzo(g,h,i)perylene	O	412.00	ug/kg	8.29E-09	1.9E-10	ND	
Benzo(k)fluoranthene	O	424.00	ug/kg	8.53E-09	2.0E-10	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	2.3E-10	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	8.1E-11	ND	
Dibenzofuran	O	40.00	ug/kg	8.05E-10	1.9E-11	ND	
Fluoranthene	O	812.00	ug/kg	1.63E-08	3.8E-10	ND	
Fluorene	O	110.00	ug/kg	2.21E-09	5.2E-11	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	1.9E-10	ND	
Naphthalene	O	122.50	ug/kg	2.46E-09	5.8E-11	ND	
Phenanthrene	O	455.00	ug/kg	9.15E-09	2.1E-10	ND	
Pyrene	O	626.00	ug/kg	1.26E-08	3.0E-10	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	2.0E-10	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	1.8E-10	ND	
Calcium	I	125000.00	mg/kg	2.52E-03	5.9E-05	ND	
Magnesium	I	1130.00	mg/kg	2.27E-05	5.3E-07	ND	
Manganese	I	27.40	mg/kg	5.51E-07	1.3E-08	0.000014	9.2E-04
Sodium	I	350.00	mg/kg	7.04E-06	1.7E-07	ND	
TRPH	O	3229000.00	ug/kg	6.50E-05	1.5E-06	ND	
SUMMARY HAZARD INDEX							9E-04

ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-13
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year *	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{\text{CS x IR x FI x CF x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:
DAevent= CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-13
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	1.7E-07	0.73	1.2E-07	0.01	9.7E-08	0.802	7.8E-08	2.0E-07
Benzo(a)pyrene	O	483.00	ug/kg	1.7E-07	7.3	1.2E-06	0.01	9.7E-08	8.02	7.8E-07	2.0E-06
Benzo(b)fluoranthene	O	773.00	ug/kg	2.7E-07	0.73	2.0E-07	0.01	1.6E-07	0.802	1.2E-07	3.2E-07
Benzo(k)fluroanthene	O	424.00	ug/kg	1.5E-07	0.073	1.1E-08	0.01	8.5E-08	0.0802	6.8E-09	1.8E-08
Chrysene	O	483.00	ug/kg	1.7E-07	0.0073	1.2E-09	0.01	9.7E-08	0.00802	7.8E-10	2.0E-09
Dibenz(a,h)anthracene	O	171.00	ug/kg	6.0E-08	7.3	4.4E-07	0.01	3.4E-08	8.02	2.8E-07	7.1E-07
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	1.4E-07	0.73	1.0E-07	0.01	8.0E-08	0.802	6.4E-08	1.7E-07
Aroclor 1260	O	424.00	ug/kg	1.5E-07	7.7	1.1E-06	0.01	8.5E-08	8.56	7.3E-07	1.9E-06
Beryllium	I	0.39	mg/kg	1.4E-07	4.3	5.9E-07	0.001	7.8E-09	430	3.4E-06	4.0E-06
SUMMARY CANCER RISK						4E-06				5E-06	9E-06

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
OCCUPATIONAL WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical specific	chemical specific	
PART. EMISSION FACTOR	PEF	4.97E+07	m^3/kg	Appendix
CONCENTRATION AIR	CA	chemical specific	mg/m^3	
INHALATION RATE	IR	0.833	m^3/hour	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	250	days/year	Assumption
EXPOSURE DURATION	ED	25	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
PEF has been derived in the Appendix to this report, Derivation of Particulate Emissions Factor

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day) -1

'HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

INHALATION OF PARTICULATE DUST - SURFACE SOIL
OCCUPATIONAL WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-14
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	2.3E-10	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	2.3E-10	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	3.6E-10	ND	
Benzo(k)fluoranthene	O	424.00	ug/kg	8.53E-09	2.0E-10	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	2.3E-10	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	8.0E-11	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	1.9E-10	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	2.0E-10	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	1.8E-10	8.4	1.5E-09
SUMMARY CANCER RISK							2E-09

ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS CECIL FIELD
OPERABLE UNIT , SITE 5
TABLE F-13
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	2.0E-09	ND		0.01	1.1E-09	ND		
2-Methylnaphthalene	O	113.50	ug/kg	1.1E-07	0.04	2.8E-06	0.01	6.4E-08	0.04	1.6E-06	4.4E-06
Acenaphthene	O	135.00	ug/kg	1.3E-07	0.06	2.2E-06	0.01	7.6E-08	0.0546	1.4E-06	3.6E-06
Acenapthylene	O	118.00	ug/kg	1.2E-07	0.04	2.9E-06	0.01	6.6E-08	0.04	1.7E-06	4.5E-06
Anthracene	O	230.00	ug/kg	2.3E-07	0.3	7.5E-07	0.01	1.3E-07	0.273	4.7E-07	1.2E-06
Benzo(a)anthracene	O	483.00	ug/kg	4.7E-07	ND		0.01	2.7E-07	ND		
Benzo(a)pyrene	O	483.00	ug/kg	4.7E-07	ND		0.01	2.7E-07	ND		
Benzo(b)fluoranthene	O	773.00	ug/kg	7.6E-07	ND		0.01	4.3E-07	ND		
Benzo(g,h,i)perylene	O	412.00	ug/kg	4.0E-07	ND		0.01	2.3E-07	ND		
Benzo(k)furoanthene	O	424.00	ug/kg	4.1E-07	ND		0.01	2.4E-07	ND		
Chrysene	O	483.00	ug/kg	4.7E-07	ND		0.01	2.7E-07	ND		
Dibenz(a,h)anthracene	O	171.00	ug/kg	1.7E-07	ND		0.01	9.6E-08	ND		
Dibenzofuran	O	40.00	ug/kg	3.9E-08	ND		0.01	2.3E-08	ND		
Fluoranthene	O	812.00	ug/kg	7.9E-07	0.04	2.0E-05	0.01	4.6E-07	0.0364	1.3E-05	3.2E-05
Fluorene	O	110.00	ug/kg	1.1E-07	0.04	2.7E-06	0.01	6.2E-08	0.0364	1.7E-06	4.4E-06
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	3.9E-07	ND		0.01	2.2E-07	ND		
Naphthalene	O	122.50	ug/kg	1.2E-07	0.04	3.0E-06	0.01	6.9E-08	0.04	1.7E-06	4.7E-06
Phenanthrene	O	455.00	ug/kg	4.5E-07	ND		0.01	2.6E-07	ND		
Pyrene	O	626.00	ug/kg	6.1E-07	0.03	2.0E-05	0.01	3.5E-07	0.0273	1.3E-05	3.3E-05
Aroclor 1260	O	424.00	ug/kg	4.1E-07	0.00007	5.9E-03	0.01	2.4E-07	0.000063	3.8E-03	9.7E-03
Beryllium	I	0.39	mg/kg	3.8E-07	0.005	7.6E-05	0.001	2.2E-08	0.00005	4.4E-04	5.2E-04
Calcium	I	125000.00	mg/kg	1.2E-01	ND		0.001	7.0E-03	ND		
Magnesium	I	1130.00	mg/kg	1.1E-03	ND		0.001	6.4E-05	ND		
Manganese	I	27.40	mg/kg	2.7E-05	0.14	1.9E-04	0.001	1.5E-06	0.0056	2.8E-04	4.7E-04
Sodium	I	350.00	mg/kg	3.4E-07	ND		0.001	2.0E-08	ND		
TRPH	O	3229000.00	ug/kg	3.2E-06	ND		0.01	1.8E-06	ND		
SUMMARY HAZARD INDEX						6E-03				5E-03	1E-02

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

INHALATION OF PARTICULATE DUST - SURFACE SOIL
OCCUPATIONAL WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-14
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	2.00	ug/kg	4.02E-11	2.6E-12	ND	
2-Methylnaphthalene	O	113.50	ug/kg	2.28E-09	1.5E-10	ND	
Acenaphthene	O	135.00	ug/kg	2.72E-09	1.8E-10	ND	
Acenapthylene	O	118.00	ug/kg	2.37E-09	1.5E-10	ND	
Anthracene	O	230.00	ug/kg	4.63E-09	3.0E-10	ND	
Benzo(a)anthracene	O	483.00	ug/kg	9.72E-09	6.3E-10	ND	
Benzo(a)pyrene	O	483.00	ug/kg	9.72E-09	6.3E-10	ND	
Benzo(b)fluoranthene	O	773.00	ug/kg	1.56E-08	1.0E-09	ND	
Benzo(g,h,I)perylene	O	412.00	ug/kg	8.29E-09	5.4E-10	ND	
Benzo(k)fluroanthene	O	424.00	ug/kg	8.53E-09	5.6E-10	ND	
Chrysene	O	483.00	ug/kg	9.72E-09	6.3E-10	ND	
Dibenz(a,h)anthracene	O	171.00	ug/kg	3.44E-09	2.2E-10	ND	
Dibenzofuran	O	40.00	ug/kg	8.05E-10	5.2E-11	ND	
Fluoranthene	O	812.00	ug/kg	1.63E-08	1.1E-09	ND	
Fluorene	O	110.00	ug/kg	2.21E-09	1.4E-10	ND	
Indeno(1,2,3-cd)pyrene	O	399.00	ug/kg	8.03E-09	5.2E-10	ND	
Naphthalene	O	122.50	ug/kg	2.46E-09	1.6E-10	ND	
Phenanthrene	O	455.00	ug/kg	9.15E-09	6.0E-10	ND	
Pyrene	O	626.00	ug/kg	1.26E-08	8.2E-10	ND	
Aroclor 1260	O	424.00	ug/kg	8.53E-09	5.6E-10	ND	
Beryllium	I	0.39	mg/kg	7.85E-09	5.1E-10	ND	
Calcium	I	125000.00	mg/kg	2.52E-03	1.6E-04	ND	
Magnesium	I	1130.00	mg/kg	2.27E-05	1.5E-06	ND	
Manganese	I	27.40	mg/kg	5.51E-07	3.6E-08	0.000014	**2.6E-03**
Sodium	I	350.00	mg/kg	7.04E-06	4.6E-07	ND	
TRPH	O	3229000.00	ug/kg	6.50E-05	4.2E-06	ND	
						SUMMARY HAZARD INDEX	3E-03

ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-15
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year *	Assumption
EXPOSURE DURATION	ED	0.5	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	0.5	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{\text{CS x IR x FI x CF x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:
DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-15
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	1650.00	ug/kg	6.6E-09	0.73	4.8E-09	0.01	8.0E-10	0.802	6.4E-10	5.5E-09
Benzo(a)pyrene	O	1085.00	ug/kg	4.4E-09	7.3	3.2E-08	0.01	5.2E-10	8.02	4.2E-09	3.6E-08
Benzo(b)fluoranthene	O	1900.00	ug/kg	7.6E-09	0.73	5.6E-09	0.01	9.2E-10	0.802	7.3E-10	6.3E-09
Benzo(k)fluoranthene	O	510.00	ug/kg	2.1E-09	0.073	1.5E-10	0.01	2.5E-10	0.0802	2.0E-11	1.7E-10
Chrysene	O	1350.00	ug/kg	5.4E-09	0.0073	4.0E-11	0.01	6.5E-10	0.00802	5.2E-12	4.5E-11
Dibenz(a,h)anthracene	O	120.00	ug/kg	4.8E-10	7.3	3.5E-09	0.01	5.8E-11	8.02	4.6E-10	4.0E-09
Indeno(1,2,3-cd)pyrene	O	480.00	ug/kg	1.9E-09	0.73	1.4E-09	0.01	2.3E-10	0.802	1.9E-10	1.6E-09
Aroclor-1260	O	854.00	ug/kg	3.4E-09	7.7	2.6E-08	0.01	4.1E-10	8.56	3.5E-09	3.0E-08
Arsenic	I	1.70	mg/kg	6.8E-09	1.75	1.2E-08	0.001	8.2E-11	1.79	1.5E-10	1.2E-08
SUMMARY CANCER RISK						9E-08				1E-08	1E-07

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-15
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Acenaphthene	O	2400.00	ug/kg	1.4E-06	0.6	2.3E-06	0.01	1.6E-07	0.546	3.0E-07	2.6E-06
Anthracene	O	595.00	ug/kg	3.4E-07	3	1.1E-07	0.01	4.0E-08	2.73	1.5E-08	1.3E-07
Benzo(a)anthracene	O	1650.00	ug/kg	9.3E-07	ND		0.01	1.1E-07	ND		
Benzo(a)pyrene	O	1085.00	ug/kg	6.1E-07	ND		0.01	7.3E-08	ND		
Benzo(b)fluoranthene	O	1900.00	ug/kg	1.1E-06	ND		0.01	1.3E-07	ND		
Benzo(g,h,i)perylene	O	375.00	ug/kg	2.1E-07	ND		0.01	2.5E-08	ND		
Benzo(k)fluoranthene	O	510.00	ug/kg	2.9E-07	ND		0.01	3.4E-08	ND		
Chrysene	O	1350.00	ug/kg	7.6E-07	ND		0.01	9.1E-08	ND		
Dibenz(a,h)anthracene	O	120.00	ug/kg	6.8E-08	ND		0.01	8.1E-09	ND		
Dibenzofuran	O	1572.00	ug/kg	8.9E-07	ND		0.01	1.1E-07	ND		
Fluoranthene	O	3450.00	ug/kg	1.9E-06	0.4	4.9E-06	0.01	2.3E-07	0.364	6.4E-07	5.5E-06
Fluorene	O	2370.00	ug/kg	1.3E-06	0.4	3.3E-06	0.01	1.6E-07	0.364	4.4E-07	3.8E-06
Indeno(1,2,3-cd)pyrene	O	480.00	ug/kg	2.7E-07	ND		0.01	3.2E-08	ND		
2-Methylnaphthalene	O	33000.00	ug/kg	1.9E-05	0.04	4.6E-04	0.01	2.2E-06	0.04	5.6E-05	5.2E-04
4-Methylphenol	O	4817.00	ug/kg	2.7E-06	0.005	5.4E-04	0.01	3.3E-07	0.00475	6.8E-05	6.1E-04
Naphthalene	O	14328.00	ug/kg	8.1E-06	0.04	2.0E-04	0.01	9.7E-07	0.04	2.4E-05	2.3E-04
Phenanthrene	O	2250.00	ug/kg	1.3E-06	ND		0.01	1.5E-07	ND		
Pyrene	O	1850.00	ug/kg	1.0E-06	0.3	3.5E-06	0.01	1.2E-07	0.273	4.6E-07	3.9E-06
Aroclor-1260	O	854.00	ug/kg	4.8E-07	0.00007	6.9E-03	0.01	5.8E-08	0.000063	9.2E-04	7.8E-03
Arsenic	I	1.70	mg/kg	9.6E-07	0.0003	3.2E-03	0.001	1.1E-08	0.000294	3.9E-05	3.2E-03
Calcium	I	3715.00	mg/kg	2.1E-03	ND		0.001	2.5E-05	ND		
Iron	I	1054.00	mg/kg	5.9E-04	ND		0.001	7.1E-06	ND		
Magnesium	I	1330.00	mg/kg	7.5E-04	ND		0.001	9.0E-06	ND		
Potassium	I	270.00	mg/kg	1.5E-04	ND		0.001	1.8E-06	ND		
Sodium	I	445.00	mg/kg	2.5E-07	ND		0.001	3.0E-09	ND		
TRPH	O	27500000.00	ug/kg	1.5E-05	ND		0.01	1.9E-06	ND		
SUMMARY HAZARD INDEX						1E-02				1E-03	1E-02

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

INHALATION OF PARTICULATE DUST - SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical specific	chemical specific	
PART. EMISSION FACTOR	PEF	4.97E+07	m^3/kg	Appendix
CONCENTRATION AIR	CA	chemical specific	mg/m^3	
INHALATION RATE	IR	2.5	$m^3/hour$	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	0.5	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	0.5	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
PEF has been derived in the Appendix to this report, Derivation of Particulate Emissions Factor

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day) -1

'HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

INHALATION OF PARTICULATE DUST - SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-16
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)⁻¹	CANCER RISK
Benzo(a)anthracene	O	1650.00	ug/kg	3.32E-08	5.6E-12	ND	
Benzo(a)pyrene	O	1085.00	ug/kg	2.18E-08	3.7E-12	ND	
Benzo(b)fluoranthene	O	1900.00	ug/kg	3.82E-08	6.4E-12	ND	
Benzo(k)fluoranthene	O	510.00	ug/kg	1.03E-08	1.7E-12	ND	
Chrysene	O	1350.00	ug/kg	2.72E-08	4.6E-12	ND	
Dibenz(a,h)anthracene	O	120.00	ug/kg	2.41E-09	4.1E-13	ND	
Indeno(1,2,3-cd)pyrene	O	480.00	ug/kg	9.66E-09	1.6E-12	ND	
Aroclor-1260	O	854.00	ug/kg	1.72E-08	2.9E-12	ND	
Arsenic	I	1.70	mg/kg	3.42E-08	5.7E-12	50	2.9E-10
SUMMARY CANCER RISK							3E-10

ND = No data available

INHALATION OF PARTICULATE DUST - SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-16
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Acenaphthene	O	2400.00	ug/kg	4.83E-08	1.1E-09	ND	
Anthracene	O	595.00	ug/kg	1.20E-08	2.8E-10	ND	
Benzo(a)anthracene	O	1650.00	ug/kg	3.32E-08	7.8E-10	ND	
Benzo(a)pyrene	O	1085.00	ug/kg	2.18E-08	5.1E-10	ND	
Benzo(b)fluoranthene	O	1900.00	ug/kg	3.82E-08	9.0E-10	ND	
Benzo(g,h,i)perylene	O	375.00	ug/kg	7.55E-09	1.8E-10	ND	
Benzo(k)fluoranthene	O	510.00	ug/kg	1.03E-08	2.4E-10	ND	
Chrysene	O	1350.00	ug/kg	2.72E-08	6.4E-10	ND	
Dibenz(a,h)anthracene	O	120.00	ug/kg	2.41E-09	5.7E-11	ND	
Dibenzofuran	O	1572.00	ug/kg	3.16E-08	7.4E-10	ND	
Fluoranthene	O	3450.00	ug/kg	6.94E-08	1.6E-09	ND	
Fluorene	O	2370.00	ug/kg	4.77E-08	1.1E-09	ND	
Indeno(1,2,3-cd)pyrene	O	480.00	ug/kg	9.66E-09	2.3E-10	ND	
2-Methylnaphthalene	O	33000.00	ug/kg	6.64E-07	1.6E-08	ND	
4-Methylphenol	O	4817.00	ug/kg	9.69E-08	2.3E-09	ND	
Naphthalene	O	14328.00	ug/kg	2.88E-07	6.8E-09	ND	
Phenanthrene	O	2250.00	ug/kg	4.53E-08	1.1E-09	ND	
Pyrene	O	1850.00	ug/kg	3.72E-08	8.7E-10	ND	
Aroclor-1260	O	854.00	ug/kg	1.72E-08	4.0E-10	ND	
Arsenic	I	1.70	mg/kg	3.42E-08	8.0E-10	ND	
Calcium	I	3715.00	mg/kg	7.47E-05	1.8E-06	ND	
Iron	I	1054.00	mg/kg	2.12E-05	5.0E-07	ND	
Magnesium	I	1330.00	mg/kg	2.68E-05	6.3E-07	ND	
Potassium	I	270.00	mg/kg	5.43E-06	1.3E-07	ND	
Sodium	I	445.00	mg/kg	8.95E-06	2.1E-07	ND	
TRPH	O	27500000.00	ug/kg	5.53E-04	1.3E-05	ND	
						SUMMARY HAZARD INDEX	0E+00

ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-17

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMENT	CS	chemical specific	chemical-specific	
INGESTION RATE	IR	200	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	100	days/year *	USEPA, 1991
EXPOSURE DURATION	ED	6	years	USEPA, 1991
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [1]	SAsed/adj	766	cm2-year/kg	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

* Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
[1] In estimating the dermally absorbed dose for children age 6 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 11 age periods, age 6 through 16, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992 and Dermal Exposure Appendix of this document.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:
SAsoil/adj = SUM (SA x ED / BW)
DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-17
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Aroclor-1260	O	330	ug/kg	1.0E-07	7.7	8.0E-07	0.01	9.9E-09	8.56	8.5E-08	8.8E-07
Arsenic	I	4.5	mg/kg	1.4E-06	1.75	2.5E-06	0.001	1.3E-08	1.79	2.4E-08	2.5E-06
Beryllium	I	0.63	mg/kg	2.0E-07	4.3	8.5E-07	0.001	1.9E-09	430	8.1E-07	1.7E-06
SUMMARY CANCER RISK						4.1E-06				9E-07	5E-06

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-17
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Fluorene	O	230	ug/kg	8.4E-07	0.04	2.1E-05	0.01	8.0E-08	0.0364	2.2E-06	2.3E-05
Naphthalene	O	1100	ug/kg	4.0E-06	0.04	1.0E-04	0.01	3.8E-07	0.04	9.6E-06	1.1E-04
2-Methylnaphthalene	O	1500	ug/kg	5.5E-06	0.04	1.4E-04	0.01	5.2E-07	0.04	1.3E-05	1.5E-04
Aroclor-1260	O	330	ug/kg	1.2E-06	0.00007	1.7E-02	0.01	1.2E-07	0.000063	1.8E-03	1.9E-02
Arsenic	I	4.5	mg/kg	1.6E-05	0.0003	5.5E-02	0.001	1.6E-07	0.000294	5.4E-04	5.5E-02
Beryllium	I	0.63	mg/kg	2.3E-06	0.005	4.6E-04	0.001	2.2E-08	0.00005	4.4E-04	9.0E-04
Calcium	I	4140	mg/kg	1.5E-02	ND		0.001	1.4E-04	ND		
Iron	I	3370	mg/kg	1.2E-02	ND		0.001	1.2E-04	ND		
Magnesium	I	341	mg/kg	1.2E-03	ND		0.001	1.2E-05	ND		
Sodium	I	123	mg/kg	4.5E-04	ND		0.001	4.3E-06	ND		
TRPH	O	1450000	ug/kg	5.3E-03	ND		0.01	5.1E-04	ND		
SUMMARY HAZARD INDEX						7.3E-02				3E-03	8E-02

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-18
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMENT	CS	chemical specific	chemical specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	100	days/year *	Assumption
EXPOSURE DURATION	ED	24	years	Assumption
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-18
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Aroclor-1260	O	330	ug/kg	4.4E-08	7.7	3.4E-07	0.01	2.5E-08	8.56	2.2E-07	5.6E-07
Arsenic	I	4.5	mg/kg	6.0E-07	1.75	1.1E-06	0.001	3.5E-08	1.79	6.2E-08	1.1E-06
Beryllium	I	0.63	mg/kg	8.5E-08	4.3	3.6E-07	0.001	4.9E-09	430	2.1E-06	2.5E-06
					SUMMARY CANCER RISK	2E-06				2E-06	4E-06

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-18
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Fluorene	O	230	ug/kg	9.0E-08	0.04	2.3E-06	0.01	5.2E-08	0.0364	1.4E-06	3.7E-06
Naphthalene	O	1100	ug/kg	4.3E-07	0.04	1.1E-05	0.01	2.5E-07	0.04	6.2E-06	1.7E-05
2-Methylnaphthalene	O	1500	ug/kg	5.9E-07	0.04	1.5E-05	0.01	3.4E-07	0.04	8.4E-06	2.3E-05
Aroclor-1260	O	330	ug/kg	1.3E-07	0.00007	1.8E-03	0.01	7.4E-08	0.000063	1.2E-03	3.0E-03
Arsenic	I	4.5	mg/kg	1.8E-06	0.0003	5.9E-03	0.001	1.0E-07	0.000294	3.4E-04	6.2E-03
Beryllium	I	0.63	mg/kg	2.5E-07	0.005	4.9E-05	0.001	1.4E-08	0.00005	2.8E-04	3.3E-04
Calcium	I	4140	mg/kg	1.6E-03	ND		0.001	9.3E-05	ND		
Iron	I	3370	mg/kg	1.3E-03	ND		0.001	7.6E-05	ND		
Magnesium	I	341	mg/kg	1.3E-04	ND		0.001	7.7E-06	ND		
Sodium	I	123	mg/kg	4.8E-05	ND		0.001	2.8E-06	ND		
TRPH	O	1450000	ug/kg	5.7E-04	ND		0.01	3.3E-04	ND		
			SUMMARY HAZARD INDEX			8E-03				2E-03	1E-02

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-19

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMENT	CS	chemical specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	40	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	45	days/year *	USEPA, 1991
EXPOSURE DURATION	ED	11	years	USEPA, 1991
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [1]	SAsed/adj	1136	cm2-year/kg	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	11	years	USEPA, 1991

* Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
[1] In estimating the dermally absorbed dose for children age 6 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 11 age periods, age 6 through 16, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992 and Dermal Exposure Appendix of this document.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:

SAsoil/adj = SUM (SA x ED / BW)

DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-19
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Aroclor-1260	O	330	ug/kg	1.6E-08	7.7	1.2E-07	0.01	6.6E-09	8.56	5.7E-08	1.8E-07
Arsenic	I	4.5	mg/kg	2.2E-07	1.75	3.8E-07	0.001	9.0E-09	1.79	1.6E-08	4.0E-07
Beryllium	I	0.63	mg/kg	3.1E-08	4.3	1.3E-07	0.001	1.3E-09	430	5.4E-07	6.7E-07
					SUMMARY CANCER RISK	6.4E-07				6E-07	1E-06

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-19
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Fluorene	O	230	ug/kg	7.1E-08	0.04	1.8E-06	0.01	2.9E-08	0.0364	8.0E-07	2.6E-06
Naphthalene	O	1100	ug/kg	3.4E-07	0.04	8.5E-06	0.01	1.4E-07	0.04	3.5E-06	1.2E-05
2-Methylnaphthalene	O	1500	ug/kg	4.6E-07	0.04	1.2E-05	0.01	1.9E-07	0.04	4.8E-06	1.6E-05
Aroclor-1260	O	330	ug/kg	1.0E-07	0.00007	1.5E-03	0.01	4.2E-08	0.000063	6.7E-04	2.1E-03
Arsenic	I	4.5	mg/kg	1.4E-06	0.0003	4.6E-03	0.001	5.7E-08	0.000294	1.9E-04	4.8E-03
Beryllium	I	0.63	mg/kg	1.9E-07	0.005	3.9E-05	0.001	8.0E-09	0.00005	1.6E-04	2.0E-04
Calcium	I	4140	mg/kg	1.3E-03	ND		0.001	5.3E-05	ND		
Iron	I	3370	mg/kg	1.0E-03	ND		0.001	4.3E-05	ND		
Magnesium	I	341	mg/kg	1.1E-04	ND		0.001	4.3E-06	ND		
Sodium	I	123	mg/kg	3.8E-05	ND		0.001	1.6E-06	ND		
TRPH	O	1450000	ug/kg	4.5E-04	ND		0.01	1.8E-04	ND		
			SUMMARY HAZARD INDEX			6.1E-03				1E-03	7E-03

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-20
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMENT	CS	chemical specific	chemical specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	45	days/year *	Assumption
EXPOSURE DURATION	ED	19	years	Assumption
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	19	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-20
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Aroclor-1260	O	330	ug/kg	1.6E-08	7.7	1.2E-07	0.01	9.1E-09	8.56	7.8E-08	2.0E-07
Arsenic	I	4.5	mg/kg	2.2E-07	1.75	3.8E-07	0.001	1.2E-08	1.79	2.2E-08	4.0E-07
Beryllium	I	0.63	mg/kg	3.0E-08	4.3	1.3E-07	0.001	1.7E-09	430	7.4E-07	8.7E-07
					SUMMARY CANCER RISK	6E-07				8E-07	1E-06

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT TRANSIENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-20
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Fluorene	O	230	ug/kg	4.1E-08	0.04	1.0E-06	0.01	2.3E-08	0.0364	6.4E-07	1.7E-06
Naphthalene	O	1100	ug/kg	1.9E-07	0.04	4.8E-06	0.01	1.1E-07	0.04	2.8E-06	7.6E-06
2-Methylnaphthalene	O	1500	ug/kg	2.6E-07	0.04	6.6E-06	0.01	1.5E-07	0.04	3.8E-06	1.0E-05
Aroclor-1260	O	330	ug/kg	5.8E-08	0.00007	8.3E-04	0.01	3.3E-08	0.000063	5.3E-04	1.4E-03
Arsenic	I	4.5	mg/kg	7.9E-07	0.0003	2.6E-03	0.001	4.6E-08	0.000294	1.6E-04	2.8E-03
Beryllium	I	0.63	mg/kg	1.1E-07	0.005	2.2E-05	0.001	6.4E-09	0.00005	1.3E-04	1.5E-04
Calcium	I	4140	mg/kg	7.3E-04	ND		0.001	4.2E-05	ND		
Iron	I	3370	mg/kg	5.9E-04	ND		0.001	3.4E-05	ND		
Magnesium	I	341	mg/kg	6.0E-05	ND		0.001	3.5E-06	ND		
Sodium	I	123	mg/kg	2.2E-05	ND		0.001	1.2E-06	ND		
TRPH	O	1450000	ug/kg	2.6E-04	ND		0.01	1.5E-04	ND		
SUMMARY HAZARD INDEX						4E-03				8E-04	4E-03

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD RESIDENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-21
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specifi	ug/liter	
INGESTION RATE	IR	0.13	liters/day	USEPA, 1989
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	15	kg	USEPA, 1989
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
DOSE ABSORBED PER EVENT	DAevent	chemical specifi	mg/cm2-event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	Assumption
EXPOSURE FREQUENCY	EF	100	days/year	Assumption
EXPOSURE DURATION	ED	6	years	Assumption
AGE-SPECIFIC EXPSOURE DURATION	ED	age-specific	years	USEPA, 1989
AGE-WEIGHTED SURFACE AREA [1]	SAsw/adj	766	cm2-yr/kg	Calculated per USEPA, 1992
DIFFUSION DEPTH PER EVENT	PCevent	chemical specifi	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm3	

[1] Age weighted, body weight normalized surface area
PCevent calculated per Dermal Exposure Assessment Appendix of this document.
Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml
Surface Area assumes lower legs, hands, feet are exposed.
USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B and
Dermal Exposure Appendix of this document

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day) -1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{\text{CW x IR x EF x ED x CF1}}{\text{BW x AT x 365 days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{\text{DAevent x EV x EF x SAsw/adj}}{\text{AT x 365 days/yr}}$$

Where:

SAsw/adj = Sum (SA x ED / BW)
DAevent = PCevent x CW x CF1 x CF2

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD RESIDENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-21
CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	PCEVENT [2] (cm/hour)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
SUMMARY CANCER RISK					0E+00				0E+00	0E+00

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] This chemical-specific value has been calculated in a separate spreadsheet.
[3] Calculated from Oral CSFs.
ND = No data available

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD RESIDENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-21
NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PC/EVENT [1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)^-1	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Calcium	20400	ug/liter	4.8E-02	ND		2.60E-03	1.9E-03	ND		
Iron	3610	ug/liter	8.6E-03	ND		2.60E-03	3.3E-04	ND		
Magnesium	2490	ug/liter	5.9E-03	ND		2.60E-03	2.3E-04	ND		
Manganese	41.6	ug/liter	9.9E-05	0.14	7.1E-04	2.60E-03	3.8E-06	0.0056	6.8E-04	**1.4E-03**
Potassium	3790	ug/liter	9.0E-03	ND		2.60E-03	3.4E-04	ND		
Sodium	26500	ug/liter	6.3E-02	ND		2.60E-03	2.4E-03	ND		
Vanadium	44.3	ug/liter	1.1E-04	0.007	1.5E-02	2.60E-03	4.0E-06	0.00021	1.9E-02	**3.4E-02**
				SUMMARY HAZARD INDEX	**2E-02**				**2E-02**	**4E-02**

[1] This chemical-specific value has been calculated in a separate spreadsheet.
[2] calculated from Oral RfDs.
ND = No data available

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT RESIDENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-22
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specifi	ug/liter	
INGESTION RATE	IR	0.13	liters/day	USEPA, 1989
SURFACE AREA	SA	5,750	cm2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	70	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DAevent	chemical specifi	mg/cm2-event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	Assumption
EXPOSURE FREQUENCY	EF	100	days/year	Assumption
EXPOSURE DURATION	ED	24	years	Assumption
DIFFUSION DEPTH PER EVENT	PCevent	chemical-specifi	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm3	

PCevent calculated per Dermal Exposure Assessment Appendix of this document.
Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml
Surface Area assumes lower legs, hands, feet are exposed.
USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991b. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B and
Dermal Exposure Appendix of this document

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365\ days/yr}$$

$$\text{INTAKE-DERMAL} = \frac{DAevent \times EV \times EF \times ED \times SA}{AT \times BW \times 365\ days/yr}$$

Where:
DAevent = PCevent x CW x CF1 x CF2

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT RESIDENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-22
CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	PCEVENT[2] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
				SUMMARY CANCER RISK	0E+00				0E+00	0E+00

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] This chemical-specific value has been calculated in a separate spreadsheet
[3] Calculated from Oral CSFs.
ND = No data available

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT RESIDENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-22
NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)^-1	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Calcium	20400	ug/liter	1.0E-02	ND		2.60E-03	1.2E-03	ND		
Iron	3610	ug/liter	1.8E-03	ND		2.60E-03	2.1E-04	ND		
Magnesium	2490	ug/liter	1.3E-03	ND		2.60E-03	1.5E-04	ND		
Manganese	41.6	ug/liter	2.1E-05	0.14	1.5E-04	2.60E-03	2.4E-06	0.0056	4.3E-04	**5.9E-04**
Potassium	3790	ug/liter	1.9E-03	ND		2.60E-03	2.2E-04	ND		
Sodium	26500	ug/liter	1.3E-02	ND		2.60E-03	1.6E-03	ND		
Vanadium	44.3	ug/liter	2.3E-05	0.007	3.2E-03	2.60E-03	2.6E-06	0.00021	1.2E-02	**1.6E-02**
				SUMMARY HAZARD INDEX	3E-03				1E-02	2E-02

[1] This chemical-specific value has been calculated in a separate spreadsheet
[2] Calculated from Oral RfDs.
ND = No data available

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD TRANSIENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-23
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specifi	ug/liter	
INGESTION RATE	IR	0.13	liters/day	USEPA, 1989
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	40	kg	USEPA, 1989
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
DOSE ABSORBED PER EVENT	DAevent	chemical specifi	mg/cm2-event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	11	years	Assumption
AGE-SPECIFIC EXPSOURE DURATION	ED	age-specific	years	USEPA, 1989
AGE-WEIGHTED SURFACE AREA [1]	SAsw/adj	1136	cm2-yr/kg	Calculated per USEPA, 1992
DIFFUSION DEPTH PER EVENT	PCevent	chemical specifi	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	11	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm3	

[1] Age weighted, body weight normalized surface area
PCevent calculated per Dermal Exposure Assessment Appendix of this document.
Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml
Surface Area assumes lower legs, hands, feet are exposed.
USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B and
Dermal Exposure Appendix of this document

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day) -1

'HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DAevent \times EV \times EF \times SAsw/adj}{AT \times 365\ \text{days/yr}}$$

Where:

SAsw/adj = Sum (SA x ED / BW)
DAevent = PCevent x CW x CF1 x CF2

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD TRANSIENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-23
CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	PCEVENT [2] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
			SUMMARY CANCER RISK		0E+00				0E+00	0E+00

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] This chemical-specific value has been calculated in a separate spreadsheet.
[3] Calculated from Oral CSFs.
ND = No data available

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD TRANSIENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-23
NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT [1] (ml/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)*-1	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Calcium	20400	ug/liter	8.2E-03	ND		2.60E-03	6.8E-04	ND		
Iron	3610	ug/liter	1.4E-03	ND		2.60E-03	1.2E-04	ND		
Magnesium	2490	ug/liter	1.0E-03	ND		2.60E-03	8.2E-05	ND		
Manganese	41.6	ug/liter	1.7E-05	0.14	1.2E-04	2.60E-03	1.4E-06	0.0056	2.5E-04	**3.6E-04**
Potassium	3790	ug/liter	1.5E-03	ND		2.60E-03	1.3E-04	ND		
Sodium	26500	ug/liter	1.1E-02	ND		2.60E-03	8.8E-04	ND		
Vanadium	44.3	ug/liter	1.8E-05	0.007	2.5E-03	2.60E-03	1.5E-06	0.00021	7.0E-03	**9.5E-03**
SUMMARY HAZARD INDEX					**3E-03**				**7E-03**	**1E-02**

[1] This chemical-specific value has been calculated in a separate spreadsheet.
[2] calculated from Oral RfDs.
ND = No data available

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT TRANSIENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-24
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specifi	ug/liter	
INGESTION RATE	IR	0.13	liters/day	USEPA, 1989
SURFACE AREA	SA	5,750	cm2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	70	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DAevent	chemical specifi	mg/cm2-event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	19	years	Assumption
DIFFUSION DEPTH PER EVENT	PCevent	chemical-specifi	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	19	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm3	

PCevent calculated per Dermal Exposure Assessment Appendix of this document.
Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml
Surface Area assumes lower legs, hands, feet are exposed.
USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991b. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B and
Dermal Exposure Appendix of this document

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DAevent \times EV \times EF \times ED \times SA}{AT \times BW \times 365\ \text{days/yr}}$$

Where:
DAevent = PCevent x CW x CF1 x CF2

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT TRANSIENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-24
CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	FCEVENT[2] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
SUMMARY CANCER RISK					0E+00				0E+00	0E+00

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] This chemical-specific value has been calculated in a separate spreadsheet
[3] Calculated from Oral CSFs.
ND = No data available

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT TRANSIENT - WADING
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-24
NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION (mg/l)	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PC(EVENT)[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day) -1	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Calcium	20400	ug/liter	4.7E-03	ND		2.60E-03	5.4E-04	ND		
Iron	3610	ug/liter	8.3E-04	ND		2.60E-03	9.5E-05	ND		
Magnesium	2490	ug/liter	5.7E-04	ND		2.60E-03	6.6E-05	ND		
Manganese	41.6	ug/liter	9.5E-06	0.14	6.8E-05	2.60E-03	1.1E-06	0.0056	2.0E-04	**2.6E-04**
Potassium	3790	ug/liter	8.7E-04	ND		2.60E-03	1.0E-04	ND		
Sodium	26500	ug/liter	6.1E-03	ND		2.60E-03	7.0E-04	ND		
Vanadium	44.3	ug/liter	1.0E-05	0.007	1.4E-03	2.60E-03	1.2E-06	0.00021	5.6E-03	**7.0E-03**
				SUMMARY HAZARD INDEX	2E-03				6E-03	7E-03

[1] This chemical-specific value has been calculated in a separate spreadsheet
[2] Calculated from Oral RfDs.
ND = No data available

INGESTION OF GROUNDWATER AS DRINKING WATER FROM SURFICIAL AQUIFER(UNFILTERED SAMPLES)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-25

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	30	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

INGESTION OF GROUNDWATER AS DRINKING WATER FROM SURFICIAL AQUIFER(UNFILTERED SAMPLES)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-25
CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (1) (mg/kg-day)$^{-1}$	CANCER RISK INGESTION
Benzene	16	ug/liter	1.9E-04	0.029	5.4E-06
Trichloroethene	16.6	ug/liter	1.9E-04	0.011	2.1E-06
bis(2-Ethylhexyl) phthalate	66.7	ug/liter	7.8E-04	0.014	1.1E-05
alpha-Chlordane	0.15	ug/liter	1.8E-06	1.3	2.3E-06
beta-HCH	4.5	ug/liter	5.3E-05	1.8	9.5E-05
Beryllium	3.2	ug/liter	3.8E-05	4.3	1.6E-04
Lead	108	ug/liter	1.3E-03	NA	
Chromium	187	ug/liter	2.2E-03	NA	
				TOTAL CANCER RISK	3E-04

INGESTION OF GROUNDWATER AS DRINKING WATER FROM SURFICIAL AQUIFER(UNFILTERED SAMPLES)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-25
NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Acetone	8500	ug/liter	2.3E-01	0.1	2.3E+00
Benzene	16	ug/liter	4.4E-04	0.0003	1.5E+00
2-Hexanone	60	ug/liter	1.6E-03	ND	
Toluene	180	ug/liter	4.9E-03	0.2	2.5E-02
Trichloroethene	16.6	ug/liter	4.5E-04	0.007	6.5E-02
bis(2-Ethylhexyl) phthalate	66.7	ug/liter	1.8E-03	0.02	9.1E-02
2,4-Dimethylphenol	38.5	ug/liter	1.1E-03	0.02	5.3E-02
2-Methylnaphthalene	116	ug/liter	3.2E-03	0.04	7.9E-02
4-Methylphenol	508	ug/liter	1.4E-02	0.005	2.8E+00
Naphthalene	226	ug/liter	6.2E-03	0.04	1.5E-01
alpha-Chlordane	0.15	ug/liter	4.1E-06	0.00006	6.8E-02
beta-HCH	4.5	ug/liter	1.2E-04	ND	
Aluminum	503833	ug/liter	1.4E+01	1	1.4E+01
Antimony	29.4	ug/liter	8.1E-04	0.0004	2.0E+00
Barium	187	ug/liter	5.1E-03	0.07	7.3E-02
Beryllium	3.2	ug/liter	8.8E-05	0.005	1.8E-02
Cadmium	3	ug/liter	8.2E-05	0.0005	1.6E-01
Calcium	25336	ug/liter	6.9E-01	ND	
Chromium	187	ug/liter	5.1E-03	0.005	1.0E+00
Iron	35596	ug/liter	9.8E-01	ND	
Lead	108	ug/liter	3.0E-03	ND	
Magnesium	4230	ug/liter	1.2E-01	ND	
Manganese	68	ug/liter	1.9E-03	0.005	3.7E-01
Mercury	0.31	ug/liter	8.5E-06	0.0003	2.8E-02
Potassium	3262	ug/liter	8.9E-02	ND	
Selenium	6.8	ug/liter	1.9E-04	0.005	3.7E-02
Sodium	9897	ug/liter	2.7E-01	ND	
Vanadium	314	ug/liter	8.6E-03	0.007	1.2E+00
TRPH	9500	ug/liter	2.6E-01	ND	
			TOTAL HAZARD INDEX		3E+01

ND = No data available

INHALATION EXPOSURE TO VOCs DURING SHOWERING FROM SURFICIAL AQUIFER (UNFILTERED GROUNDWATER)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-26

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SHOWER AIR	CA [1]	chemical-specific	ug/m3	Modeled
CONVERSION FACTOR 1	CF1	24	hours/day	
EXPOSURE TIME SHOWER	ET	0.2	hours/day	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
CONVERSION FACTOR 2	CF2	365	days/year	
AVERAGING TIME CANCER	AT	70	years	USEPA, 1989
AVERAGING TIME NONCANCER	AT	30	years	USEPA, 1989

[1] Calculated via model by Foster and Chrostowski, Air Pollution Control Association Annual Meeting, 1987.
USEPA, 1989. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, (Part A) EPA/540/1-89/002; December 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Assumptions".

EQUATIONS

CANCER RISK = AVG. CONC. (ug/m3) * CANCER UNIT RISK (ug/m3)^-1

HAZARD QUOTIENT = AVG.CONC.(ug/m3)/REF. CONC. (ug/m3)

$$\text{AVG. CONC.} = \frac{CAair * EF * ET * ED}{AT * CF1 * CF2}$$

Note:
*For noncarcinogenic effects: AT = ED

INHALATION EXPOSURE TO VOCs DURING SHOWERING FROM SURFICIAL AQUIFER (UNFILTERED GROUNDWATER)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-26
CARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE? V/NV	SHOWER AIR CONCENTRATION (ug/m³)	AVERAGE AIR CONCENTRATION LIFETIME (ug/m3)	INHALATION CANCER UNIT RISK (ug/m3)^-1	CANCER RISK
Benzene	V	8.6E+01	2.9E-01	8.30E-06	2.4E-06
Trichloroethene	V	72	2.5E-01	1.70E-06	4.2E-07
bis(2-Ethylhexyl) phthalate	NV		NA		NA
alpha-Chlordane	NV		NA		NA
beta-HCH	NV		NA		NA
Beryllium	NV		NA		NA
Lead	NV		NA		NA
Chromium	NV		NA		NA
				SUMMARY CANCER RISK	3E-06

ND = No Data Available
NA - Not Applicable - The analyte is not volatile and has therefore not been evaluated via this volatilization model.

INHALATION EXPOSURE TO VOCs DURING SHOWERING FROM SURFICIAL AQUIFER (UNFILTERED GROUNDWATER)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 5
TABLE F-26
NONCARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE? V/NV	SHOWER AIR CONCENTRATION (ug/m³)	AVERAGE AIR CONCENTRATION FOR TIME PERIOD (mg/m3)	CHRONIC INHALATION RfC [1] (mg/m3)	HAZARD QUOTIENT
Acetone	V	5.0E+03	4.0E+01	ND	NA
Benzene	V	8.6E+01	6.8E-01	ND	NA
2-Hexanone	V	NA	0.0E+00	ND	NA
Toluene	V	9.0E+02	7.2E+00	4.00E+02	1.8E-02
Trichloroethene	V	7.2E+01	5.8E-01	ND	NA
bis(2-Ethylhexyl) phthalate	NV		NA	ND	NA
2,4-Dimethylphenol	NV		NA	ND	NA
2-Methylnaphthalene	NV		NA	ND	NA
4-Methylphenol	NV		NA	ND	NA
Naphthalene	NV		NA	ND	NA
alpha-Chlordane	NV		NA	ND	NA
beta-HCH	NV		NA	ND	NA
Aluminum	NV		NA	ND	NA
Antimony	NV		NA	ND	NA
Barium	NV		NA	ND	NA
Beryllium	NV		NA	ND	NA
Cadmium	NV		NA	ND	NA
Calcium	NV		NA	ND	NA
Chromium	NV		NA	ND	NA
Iron	NV		NA	ND	NA
Lead	NV		NA	ND	NA
Magnesium	NV		NA	ND	NA
Manganese	NV		NA	0.05	NA
Mercury	NV		NA	ND	NA
Potassium	NV		NA	ND	NA
Selenium	NV		NA	ND	NA
Sodium	NV		NA	ND	NA
Vanadium	NV		NA	ND	NA
TRPH	V			ND	NA
			SUMMARY HAZARD INDEX		2E-02

[1] RfC is the Reference Concentration published by USEPA
ND - No Data Available
NA - Not Applicable - The analyte is not volatile and has therefore not been evaluated via this volatilization model.

TABF-26.WK1
5/2/95

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-27
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm2-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year *	Assumption
EXPOSURE DURATION	ED	0.5	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	0.5	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

INTAKE-DERMAL = (DAevent x EF / AT x 365 days/year) x SAsoil/adj

Where:
DAevent = CS x AF x ABS x CF

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-27
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Chromium	I	6	mg/kg	2.4E-08	ND		0.001	2.9E-10	ND		
SUMMARY CANCER RISK						0E+00				0E+00	0E+00

[1] A relative potency factor (RPF) has been applied to oral cancer slope factor of carcinogenic PAH compounds in accordance with USEPA "Provisional Guidance for Quantitive Risk Assessment of Polycyclic Aromatic Hydrocarbons" (July, 1993).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-27
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Methylnaphthalene	O	6003	ug/kg	3.4E-06	0.04	8.5E-05	0.01	4.1E-07	0.04	1.0E-05	9.5E-05
Dibenzofuran	O	1900	ug/kg	1.1E-06	ND		0.01	1.3E-07	ND		
Fluorene	O	1400	ug/kg	7.9E-07	0.4	2.0E-06	0.01	9.5E-08	0.364	2.6E-07	2.2E-06
Fluoranthene	O	1285	ug/kg	7.2E-07	0.4	1.8E-06	0.01	8.7E-08	0.364	2.4E-07	2.0E-06
Naphthalene	O	3569	ug/kg	2.0E-06	0.04	5.0E-05	0.01	2.4E-07	0.04	6.0E-06	5.6E-05
Pyrene	O	31	ug/kg	1.7E-08	0.3	5.8E-08	0.01	2.1E-09	0.273	7.7E-09	6.6E-08
Calcium	I	5324	mg/kg	3.0E-03	ND		0.001	3.6E-05	ND		
Chromium	I	6	mg/kg	3.4E-06	0.02	1.7E-04	0.001	4.1E-08	0.0022	1.8E-05	1.9E-04
Manganese	I	13.6	mg/kg	7.7E-06	0.14	5.5E-05	0.001	9.2E-08	0.0056	1.6E-05	7.1E-05
Magnesium	I	1437	mg/kg	8.1E-04	ND		0.001	9.7E-06	ND		
TRPH	O	25000000	ug/kg	1.4E-02	ND		0.01	1.7E-03	ND		
SUMMARY HAZARD INDEX						4E-04				5E-05	4E-04

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

INHALATION OF PARTICULATE DUST - SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-28

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical specific	chemical specific	
PART. EMISSION FACTOR	PEF	4.97E+07	m^3/kg	Appendix
CONCENTRATION AIR	CA	chemical specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	0.5	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	0.5	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
PEF has been derived in the Appendix to this report, Derivation of Particulate Emissions Factor

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day) -1

'HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

INHALATION OF PARTICULATE DUST - SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-28
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION HI	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)⁻¹	CANCER RISK
Chromium	I	6.00	mg/kg	1.21E-07	6.7E-12	41	2.8E-10
					SUMMARY CANCER RISK		3E-10

ND = No data available

INHALATION OF PARTICULATE DUST - SUBSURFACE SOIL
EXCAVATION WORKER
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-28
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Methylnaphthalene	O	6003	ug/kg	1.21E-07	9.5E-10	ND	
Dibenzofuran	O	1900	ug/kg	3.82E-08	3.0E-10	ND	
Fluorene	O	1400	ug/kg	2.82E-08	2.2E-10	ND	
Fluoranthene	O	1285	ug/kg	2.59E-08	2.0E-10	ND	
Naphthalene	O	3569	ug/kg	7.18E-08	5.6E-10	ND	
Pyrene	O	31	ug/kg	6.24E-10	4.9E-12	ND	
Calcium	I	5324	mg/kg	1.07E-04	8.4E-07	ND	
Chromium	I	6	mg/kg	1.21E-07	9.4E-10	ND	
Magnesium	I	1437	mg/kg	2.89E-05	2.3E-07	ND	
Manganese	I	13.6	mg/kg	2.74E-07	2.1E-09	0.0000143	**1.5E-04**
TRPH	O	25000000	ug/kg	5.03E-04	3.9E-06	ND	
						SUMMARY HAZARD INDEX	**1E-04**

ND = No data available

INGESTION OF GROUNDWATER AS DRINKING WATER FROM SURFICIAL AQUIFER(UNFILTERED SAMPLES)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-29

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	30	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

INGESTION OF GROUNDWATER AS DRINKING WATER FROM SURFICIAL AQUIFER(UNFILTERED SAMPLES)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-29
CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR [1] (mg/kg-day)^-1	CANCER RISK INGESTION
Benzene	14.6	ug/liter	1.7E-04	0.029	5.0E-06
Methylene Chloride	24000	ug/liter	2.8E-01	0.0075	2.1E-03
Trichloroethane	14.4	ug/liter	1.7E-04	0.011	1.9E-06
Bis(2-ethylhexyl)phthalate	6	ug/liter	7.0E-05	0.014	9.9E-07
beta-BHC	0.03	ug/liter	3.5E-07	1.8	6.3E-07
Arsenic	6.2	ug/liter	7.3E-05	1.75	1.3E-04
Chromium	104	ug/liter	1.2E-03	ND	
			TOTAL CANCER RISK		2E-03

INGESTION OF GROUNDWATER AS DRINKING WATER FROM SURFICIAL AQUIFER(UNFILTERED SAMPLES)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-29
NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Benzene	14.6	ug/liter	4.0E-04	0.0003	1.3E+00
1,2-Dichloroethane	12	ug/liter	3.3E-04	0.009	3.7E-02
Methylene Chloride	24000	ug/liter	6.6E-01	0.06	1.1E+01
Trichloroethene	14.4	ug/liter	3.9E-04	0.007	5.6E-02
bis(2-Ethylhexyl)phthalate	6	ug/liter	1.6E-04	0.02	8.2E-03
2,4-Dimethylphenol	953	ug/liter	2.6E-02	0.02	1.3E+00
2-Methylphenol	3828	ug/liter	1.0E-01	0.05	2.1E+00
4-Methylphenol	692	ug/liter	1.9E-02	0.005	3.8E+00
Naphthalene	21.1	ug/liter	5.8E-04	0.04	1.4E-02
Phenol	5550	ug/liter	1.5E-01	0.6	2.5E-01
beta-BHC	0.03	ug/liter	8.2E-07	ND	
Aluminum	201000	ug/liter	5.5E+00	1	5.5E+00
Arsenic	6.2	ug/liter	1.7E-04	0.0003	5.7E-01
Calcium	62944	ug/liter	1.7E+00	NA	
Chromium	104	ug/liter	2.8E-03	0.005	5.7E-01
Iron	9045	ug/liter	2.5E-01	NA	
Lead	38.9	ug/liter	1.1E-03	NA	
Magnesium	3328	ug/liter	9.1E-02	NA	
Manganese	221	ug/liter	6.1E-03	0.005	1.2E+00
Potassium	3229	ug/liter	8.8E-02	NA	
Sodium	20537	ug/liter	5.6E-01	NA	
Vanadium	54.6	ug/liter	1.5E-03	0.007	2.1E-01
TRPH	720	ug/liter	2.0E-02	NA	
			TOTAL HAZARD INDEX		3E+01

ND = No data available

INHALATION EXPOSURE TO VOCs DURING SHOWERING FROM SURFICIAL AQUIFER (UNFILTERED GROUNDWATER)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-30

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SHOWER AIR	CA [1]	chemical-specific	ug/m3	Modeled
CONVERSION FACTOR 1	CF1	24	hours/day	
EXPOSURE TIME SHOWER	ET	0.2	hours/day	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
CONVERSION FACTOR 2	CF2	365	days/year	
AVERAGING TIME CANCER	AT	70	years	USEPA, 1989
AVERAGING TIME NONCANCER	AT	30	years	USEPA, 1989

[1] Calculated via model by Foster and Chrostowski, Air Pollution Control Association Annual Meeting, 1987.
USEPA, 1989. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, (Part A) EPA/540/1-89/002; December 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Assumptions".

EQUATIONS

CANCER RISK = AVG. CONC. (ug/m3) * CANCER UNIT RISK (ug/m3)^-1

HAZARD QUOTIENT = AVG.CONC.(ug/m3)/REF. CONC. (ug/m3)

$$\text{AVG. CONC.} = \frac{CAair * EF * ET * ED}{AT * CF1 * CF2}$$

Note:
*For noncarcinogenic effects: AT = ED

INHALATION EXPOSURE TO VOCs DURING SHOWERING FROM SURFICIAL AQUIFER (UNFILTERED GROUNDWATER)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-30
CARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE V/NV	SHOWER AIR CONCENTRATION (ug/m³)	AVERAGE AIR CONCENTRATION LIFETIME (ug/m3)	INHALATION CANCER UNIT RISK (ug/m3)^-1	CANCER RISK
Benzene	V	78	2.7E-01	8.30E-06	2.2E-06
Methylene Chloride	V	120000	4.1E+02	4.70E-07	1.9E-04
Trichloroethene	V	63	2.2E-01	1.70E-06	3.7E-07
bis(2-Ethylhexyl)phthalate	NV		NA	ND	NA
beta-BHC	NV		NA	5.30E-04	NA
Arsenic	NV		NA	4.30E-03	NA
Chromium	NV		NA	ND	NA
				SUMMARY CANCER RISK	2E-04

ND = No Data Available
NA - Not Applicable - The analyte is not volatile and has therefore not been evaluated via this volatilization model.

INHALATION EXPOSURE TO VOCs DURING SHOWERING FROM SURFICIAL AQUIFER (UNFILTERED GROUNDWATER)
ADULT RESIDENT
NAS CECIL FIELD
OPERABLE UNIT 2, SITE 17
TABLE F-30
NONCARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE? V/NV	SHOWER AIR CONCENTRATION (ug/m³)	AVERAGE AIR CONCENTRATION FOR TIME PERIOD (ug/m³)	CHRONIC INHALATION RfC [1] (ug/m³)	HAZARD QUOTIENT
Benzene	V	7.8E+01	6.2E-01	ND	NA
1,2-Dichloroethene	V	5.9E+01	4.7E-01	ND	NA
Methylene Chloride	V	1.2E+05	9.6E+02	3.00E+03	3.2E-01
Trichloroethene	V	6.3E+01	5.0E-01	ND	NA
bis(2-Ethylhexyl)phthalate	NV		NA	ND	NA
2,4-Dimethylphenol	NV		NA	ND	NA
2-Methylphenol	NV		NA	ND	NA
4-Methylphenol	NV		NA	ND	NA
Naphthalene	NV		NA	ND	NA
Phenol	NV		NA	ND	NA
beta-BHC	NV		NA	ND	NA
Aluminum	NV		NA	ND	NA
Arsenic	NV		NA	ND	NA
Calcium	NV		NA	ND	NA
Chromium	NV		NA	ND	NA
Iron	NV		NA	ND	NA
Lead	NV		NA	ND	NA
Magnesium	NV		NA	ND	NA
Manganese	NV		NA	5.00E-02	NA
Potassium	NV		NA	ND	NA
Sodium	NV		NA	ND	NA
Vanadium	NV		NA	ND	NA
TRPH	V		ND	ND	
				SUMMARY HAZARD INDEX	3E-01

[1] RfC is the Reference Concentration published by USEPA
ND - No Data Available
NA - Not Applicable - The analyte is not volatile and has therefore not been evaluated via this volatilization model.

APPENDIX G

ANALYSIS OF TOTAL RECOVERABLE PETROLEUM HYDROCARBON (TRPH) CLEANUP LEVELS

FILTERED GROUNDWATER RESULTS

Table G-1
Selection of Human Health Contaminants of Potential Concern
Site 5 Filtered Groundwater

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Screening Background Concentration[3]	Risk-Based Concentration[4]	Analyte CPC? (Yes/No)
Volatile Organic Compounds (µg/ℓ)							
Acetone	14/30	2 to 60	1 to 8,500	984	[11]30	370	YES
Benzene	3/30	1 to 100	8 to 16	11	ND	[15]0.087	YES
2-Butanone	4/30	2 to 200	6 to 150	97	ND	2,200	NO[5]
1,2-Dichloroethene (total)	1/30	1 to 100	14	14	ND	5.5	NO[8]
Ethylbenzene	5/30	1 to 100	11 to 41	28	ND	130	NO[5]
2-Hexanone	2/30	2 to 200	35 to 60	48	ND	NA	YES
4-Methyl-2-pentanone	6/30	2 to 200	7 to 190	98	[11]4	[15]290	NO[5]
Tetrachloroethene	1/30	1 to 200	2	2	ND	1.1	NO[8]
Toluene	9/30	1 to 17	21 to 180	111	ND	75	YES
Trichloroethene	1/30	1 to 100	19	19	ND	1.6	YES[10]
Xylenes (total)	8/30	1 to 100	56 to 200	117	ND	1,200	NO[5]
Semivolatile Organic Compound (µg/ℓ)							
bis(2-Ethylhexyl) phthalate	9/30	10 to 200	0.5 to 1,400	180	[11]2	4.8	YES
2,4-Dimethylphenol	6/30	10 to 100	64 to 110	86	ND	73	YES
Di-n-butylphthalate	4/30	10 to 200	0.7 to 2	1.7	ND	370	NO[8]
Diethylphthalate	6/30	10 to 200	0.5 to 8	4.6	ND	2,900	NO[5]
2-Methylnaphthalene	9/30	10	59 to 1,000	202	ND	NA	YES
2-Methylphenol	8/30	10 to 200	14 to 90	60	ND	180	NO[5]
4-Methylphenol	9/30	10	9 to 820	425	ND	18	YES
Naphthalene	10/30	10	0.5* to 610	192	ND	150	YES
Phenol	15/30	10 to 200	0.5 to 180	59.2	[11]4	2,200	NO[5]

See notes at end of table.

Table G-1 (Continued)
Selection of Human Health Contaminants of Potential Concern
Site 5 Filtered Groundwater

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Screening Background Concentration[3]	Risk-Based Concentration[4]	Analyte CPC? (Yes/No)
Pesticides/PCBs (µg/ℓ)							
alpha-Chlordane	1/30	0.05 to 10	0.15	0.15	ND	0.052	YES
beta-HCH	2/30	0.03 to 5	0.18 to 4.5	2.34	ND	0.037	YES
Endosulfan II	1/30	0.09 to 2	0.21 to 0.21	0.21	ND	22	NO[8]
Inorganic Compounds (µg/ℓ)							
Aluminum	12/25	200	266 to 3,630	998	3,600	11,000	NO[5]
Arsenic	12/25	10	2.2 to 76.3	16.6	93	[12]0.038	NO[6]
Barium	22/25	200	13.4 to 89.8	26.1	70	260	NO[5]
Calcium	22/25	5,000	288 to 52,600	7,269	8,790	NA	YES
Chromium	25	10	5.45* to 8	6.7	ND	[13]18	NO[5]
Iron	18/25	100	291 to 11,600	2,684	1,902	NA	YES
Lead	25	3	1.3 to 2.2	1.7	ND	[14]15	NO[5]
Magnesium	24/25	5,000	537 to 2,660	1,138	3,266	NA	NO[5]
Manganese	14/25	15	3.6 to 55.4	18.2	ND	18	YES
Potassium	14/25	5,000	255 to 2,470	873	2,456	NA	YES
Silver	2/25	10	2.2 to 7.1	4.7	ND	180	NO[6]
Sodium	25/25	5,000	3,600 to 22,800	7,352	23,926	NA	NO[6]
Vanadium	11/25	50	2.1 to 199	47.9	ND	26	YES
Zinc	4/25	20	15.9 to 114	44.4	25	1,100	NO[6]
Total Recoverable Petroleum Hydrocarbon (mg/ℓ)							
TRPH	9/30	0.06 - 2.5	0.62 to 160	23.5	ND	NA	YES

See notes at end of table.

Table G-1 (Continued)
Selection of Human Health Contaminants of Potential Concern
Site 5 Filtered Groundwater

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Screening Background Concentration[3]	Risk-Based Concentration[4]	Analyte CPC? (Yes/No)

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] The mean of detected concentration is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples in which the analyte was not detected.
[3] The background screening value is twice the average of detected concentration for inorganic analytes in background samples.
[4] USEPA Region III Risk Based Concentration for tap water per January 1993 guidance (Selecting Exposure routes and Contaminants of Concern by Risk-Based Screening, EPA/903/R-93-001) unless otherwise noted. Actual values are taken from the COC Screening Table dated 18 March 1994 and are based on a Cancer Risk of 10^{-6} or a Hazard Quotient of 0.1.
[5] The maximum detected concentration did not exceed USEPA Region III Risk Based Concentration and, therefore, will not be evaluated in the HHRA.
[6] The maximum detected concentration did not exceed twice the arithmetic mean of detected concentrations at background locations.
[7] The analyte was detected at a concentration above twice the arithmetic mean of detected concentrations at background location but is an essential nutrient and professional judgement was used before the analyte was removed from the CPC list.
[8] The frequency of detection was less than 5% and professional judgement was used before the analyte was removed from the CPC list.
[9] The analyte is a member of a chemical class which contains other CPCs (i.e.,carcinogenic PAHs).
[10] The analyte was detected at less than 5%, but will be retained because it was detected in more than one media.
[11] An organic background value is the maximum concentration detected. Organic background values are not used to eliminate CPCs.
[12] The value is based on arsenic as a carcinogen.
[13] The value is based on chromium hexavalent form.
[14] Treatment technology action limit for drinking water distribution systems per "National Primary Drinking Water Regulations" 40 CFR 141 as amended in 57 FR 41345, Aug. 3, 1993.
[15] The value reflects updated information from the April 20, 1994 USEPA Region III RBC tables.

Notes: For consistency and ease of use, all CPC table footnotes are the same, although all footnotes may not be used on all tables.
Sample locations include: CEF5-3; CEF5-4; CEF5-5; CEF5-6; CEF5-7S; CEF5-10S; CEF5-11I; CEF5-12D; CEF5-24S; CEF5-25I; CEF5-26D; CEF5-27S; CEF5-8S; CEF5-9I; CFMW3S;CFMW 4S; CFMW5S; CFMW6S; CFMW7S; CFMW16S; CFMW17I; CFMW18D; CFMW19S, CFMW20S; CFMW21I; CFMW22D; CFMW23S; CFMW29S and CFMW30S.
Duplicate samples include: CEF29SDUP; CEF18SDUP.
Background sample locations include: CEF5MW13; CEF5MW14 and CEF5MW15.

The average of a sample and its duplicate is used for all table calculations.

CPC = contaminant of potential concern.
NA = not available
ND = not detected in any background samples
HCH = hexachlorocyclohexane.

* = Value is the average of a sample and its duplicate.
$\mu g/\ell$ = micrograms per liter
mg/ℓ = milligrams per liter

Table G-2
Exposure Point Concentrations for Human Health Contaminants of Potential Concern
Site 5 Filtered Groundwater

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration	95% UCL[2]	Exposure Point Concentration[3]
Volatile Organic Compounds (µg/ℓ)				
Acetone	14/30	8,500	19,930	8,500
Benzene	3/30	16	16	16
2-Hexanone	2/30	60	NC	60
Toluene	9/30	180	441	180
Trichloroethene	1/30	19	16.6	16.6
Semivolatiles Organic Compounds (µg/ℓ)				
bis(2-Ethylhexyl) phthalate	9/30	1,400	66.7	66.7
2,4-Dimethylphenol	6/30	110	38.5	38.5
2-Methylnaphthalene	9/30	1,000	116	116
4-Methylphenol	9/30	820	508	508
Naphthalene	10/30	610	226	226
Pesticides/PCBs (µg/ℓ)				
alpha-Chlordane	1/30	0.15	NC	0.15
beta-HCH	2/30	4.5	NC	4.5
Inorganic Compounds (µg/ℓ)				
Calcium	22/25	52,600	12,965	12,965
Iron	18/25	11,600	9,897	9,897
Manganese	14/25	55.4	17	17
Potassium	14/25	2,470	2,441	2,441
Vanadium	11/25	199	73	73
Total Recoverable Petroleum Hydrocarbons (mg/ℓ)				
TRPH	9/30	160	9.5	9.5

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the number of samples analyzed.
[2] 95% UCL calculated on the arithmetic mean of all samples using one-half the contract required quantitation limit or contract required detection limit (CRQL/CRDL) for non-detected concentrations.
[3] The exposure point concentration is the lesser of the maximum concentration detected onsite or the 95% UCL. In cases where the analyte is detected in 2 or less samples, the maximum detected concentration is the exposure point concentration.

Notes: % = percent.
mg/ℓ = milligrams per liter.
NC = not calculated.
UCL = upper confidence limit.
µg/ℓ = micrograms per liter.
* = Value is the average of a sample and its duplicate.

Table G-3 (Continued)
Selection of Human Health Contaminants of Potential Concern
Site 17 Filtered Groundwater

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Screening Background Concentration[3]	Risk-Based Concentration[4]	Analyte CPC? (Yes/No)
Volatile Organic Compounds (µg/ℓ)							
Benzene	4/26	1 to 665	5 to 23*	12.3	ND	[15]0.36	YES
1,1-Dichloroethane	2/26	1 to 665	1 to 2*	1.5	ND	81	NO[5]
1,2-Dichloroethene (total)	2/26	1 to 665	10 to 12	11	ND	5.5	YES
Ethylbenzene	4/26	1 to 665	3 to 6.5*	4.9	ND	130	NO[5]
Methylene chloride	2/26	1 to 5	2 to 24,000*	12,001	ND	4.1	YES
1,1,1-Trichloroethane	1/26	1 to 1,010	520*	520	ND	130	NO[8]
Toluene	5/26	1 to 665	4 to 19	11.8	ND	75	NO[5]
Trichloroethene	3/26	1 to 665	6 to 50	22.5	ND	1.6	YES
Xylenes (total)	4/26	1 to 665	14 to 22	19	ND	1,200	NO[5]
Semivolatile Organic Compounds (µg/ℓ)							
bis(2-Ethylhexyl) phthalate	9/26	10 to 5,000	0.5 to 6	2.2	ND	4.8	YES
Di-n-butylphthalate	4/26	10 to 5,000	0.6 to 2	1.3	ND	370	NO[5]
Diethylphthalate	2/26	10 to 5,000	0.8	0.8	ND	2,900	NO[5]
2,4-Dimethylphenol	6/26	10 to 5,000	26 to 3,750*	1,274	ND	73	YES
2-Methylphenol	6/26	10	11 to 22,000*	5,074	ND	180	YES
4-Methyl-2-pentanone	1/26	2 to 1,300	3	3	ND	[15]290	NO[5,9]
4-Methylphenol	5/26	10 to 100	0.7 to 19,000*	4,504	ND	18	YES
Naphthalene	4/26	10 to 410	10 to 385*	107	ND	150	YES
Phenol	2/26	10 to 200	5 to 5,550*	2,850	ND	2,200	YES

See notes at end of table.

Table G-3 (Continued)
Selection of Human Health Contaminants of Potential Concern
Site 17 Filtered Groundwater

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Screening Background Concentration[3]	Risk-Based Concentration[4]	Analyte CPC? (Yes/No)
Pesticides/PCBs (µg/ℓ)							
beta-HCH	3/26	0.03 to 1	0.018 to 0.044	0.03	ND	0.037	YES
Inorganic Compounds (µg/ℓ)							
Aluminum	14/22	200	48.7 to 6,820	815	14,986	11,000	NO[5,6]
Arsenic	10/21	10	2.3 to 20	5.4.7	22.2	[12]0.038	NO[6]
Barium	12/22	200	17 to 97.8	31.6.9	127.8	260	NO[5]
Calcium	16/22	5,000	736 to 75,900	29,180	35,480	NA	YES
Cobalt	1/22	50	15	15	ND	[15]660	NO[5]
Iron	18/22	100	174 to 4,77	1,256	5,054	NA	NO[6]
Magnesium	20/22	5,000	461 to 7,57	2,041	5,020	NA	YES
Manganese	3/22	15	27.9 to 10,950*	3,693	67.2	18	YES
Nickel	2/22	40	13.9 to 22.6	18.3.6	ND	73	NO[5]
Potassium	18/22	5,000	129.5* to 23,400*	2,436	3,296	NA	YES
Sodium	22/22	5,000	4,080 to 96,700*	16,725	22,786	NA	YES
Total Recoverable Petroleum Hydrocarbons (mg/ℓ)							
TRPH	11/26	0.05 to 0.5	0.07 to 1.2	0.61	ND	NA	YES

See notes at end of table.

Table G-3 (Continued)
Selection of Human Health Contaminants of Potential Concern
Site 17 Filtered Groundwater

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Screening Background Concentration[3]	Risk-Based Concentration[4]	Analyte CPC? (Yes/No)

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] The mean of detected concentration is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples in which the analyte was not detected.
[3] The background screening value is twice the average of detected concentration for inorganic analytes in background samples.
[4] USEPA Region III Risk Based Concentration for tap water per January 1993 guidance (Selecting Exposure routes and Contaminants of Concern by Risk-Based Screening, EPA/903/R-93-001) unless otherwise noted. Actual values are taken from the COC Screening Table dated 18 March 1994 and are based on a Cancer Risk of 10^{-6} or a Hazard Quotient of 0.1.
[5] The maximum detected concentration did not exceed USEPA Region III Risk Based Concentration and, therefore, will not be evaluated in the HHRA.
[6] The maximum detected concentration did not exceed twice the arithmetic mean of detected concentrations at background locations.
[7] The analyte was detected at a concentration above twice the arithmetic mean of detected concentrations at background location but is an essential nutrient and professional judgement was used before the analyte was removed from the CPC list.
[8] The frequency of detection was less than 5% and professional judgement was used before the analyte was removed from the CPC list.
[9] The analyte is a member of a chemical class which contains other CPCs (i.e.,carcinogenic PAHs).
[10] The analyte was detected at less than 5%, but will be retained because it was detected in more than one media.
[11] An organic background value is the maximum concentration detected. Organic background values are not used to eliminate CPCs.
[12] The value is based on arsenic as a carcinogen.
[13] The value is based on chromium hexavalent form.
[14] Treatment technology action limit for drinking water distribution systems per "National Primary Drinking Water Regulations" 40 CFR 141 as amended in 57 FR 41345, Aug. 3, 1993.
[15] The value reflects updated information from the April 20, 1994 USEPA Region III RBC tables.

Notes: For consistency and ease of use, all CPC table footnotes are the same, although all footnotes may not be used on all tables.

Sample locations include: CF17MW1, CF17MW4S, CF17MW5S, CF17MW6S, CF17MW6SD, CF17MW7DP, CF17MW8S, CF17MW9S, CF17MW10DP, CF17MW11I, CF17MW12DP, CF17MW13S, CF17MW14I, CF17MW15DP, CF17MW16S, CF17MW17I, CF17MW18DP, CF17MW19S, CF17MW20I, CF17MW20ID, CF17MW21I, CF17MW22DP, CF17MW23S, CF17MW24S

The average of a sample and its duplicate is used for all table calculations.

CPC = contaminant of potential concern.
NA = not available.
ND = not detected in any background samples.
HCH = hexachlorocyclohexane.

* = Value is the average of a sample and its duplicate.
$\mu g/\ell$ = micrograms per liter.
mg/ℓ = milligram per liter.

Table G-4
Exposure Point Concentrations for Human Health Contaminants of Potential Concern
Site 17 Filtered Groundwater

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration	95% UCL[2]	Exposure Point Concentration[3]
Volatile Organic Compounds (µg/ℓ)				
Benzene	4/26	23*	14.6	14.6
1,2-Dichloroethene (total)	2/26	12	NC	12
Methylene chloride	2/26	24,000*	NC	24,000
Trichloroethene	3/26	50	14.4	14.4
Semivolatile Organic Compounds (µg/ℓ)				
bis(2-Ethylhexyl) phthalate	9/26	6	110	6
2,4-Dimethylphenol	6/26	3,750*	953	953
2-Methylphenol	6/26	22,000*	3,828	3,828
4-Methylphenol	5/26	19,000*	692	692
Naphthalene	4/26	385*	21.1	21.1
Phenol	2/26	5,550*	NC	5550
Pesticides/PCBs (µg/ℓ)				
beta-HCH	3/26	0.04	0.03	0.03
Inorganic Compounds (µg/ℓ)				
Calcium	16/22	75,900	92,967	75,900
Magnesium	20/22	7,570	3,165	3,165
Manganese	3/22	10,950*	164	164
Potassium	18/22	23,400*	5,064	5,064
Sodium	22/22	96,700*	23,389	23,389
Total Recoverable Petroleum Hydrocarbons (mg/ℓ)				
TRPH	11/26	1.2	0.72	0.72

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the number of samples analyzed.
[2] 95% UCL calculated on the arithmetic mean of all samples using one-half the contract required quantitation limit or contract required detection limit (CRQL/CRDL) for non-detected concentrations.
[3] The exposure point concentration is the lesser of the maximum concentration detected onsite or the 95% UCL. In cases where the analyte was detected in two or less samples, the maximum detected concentration is used as the exposure point concentration.

Notes: % = percent.
µg/ℓ = microgram per liter.
mg/ℓ = milligram per liter.
UCL = upper confidence limit.
* = Value is the average of a sample and its duplicate

INGESTION OF GROUNDWATER AS DRINKING WATER (FILTERED SAMPLES)
ADULT RESIDENT
Site 5
NAS Cecil Field Operable Unit 2
G-5

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	30	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE ding} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

NOTE:
For noncarcinogenic effects AT = ED

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INGESTION OF GROUNDWATER AS DRINKING WATER (FILTERED SAMPLES)
ADULT RESIDENT
Site 5
NAS Cecil Field Operable Unit 2
G-5
CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)$^{-1}$	CANCER RISK INGESTION
Benzene	16	ug/liter	1.9E-04	0.029	5.4E-06
Trichloroethene	16.6	ug/liter	1.9E-04	0.011	2.1E-06
bis(2-Ethylhexyl) phthalate	66.7	ug/liter	7.8E-04	0.014	1.1E-05
alpha-Chlordane	0.15	ug/liter	1.8E-06	1.3	2.3E-06
beta-HCH	4.5	ug/liter	5.3E-05	1.8	9.5E-05
			TOTAL CANCER RISK		1E-04

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INGESTION OF GROUNDWATER AS DRINKING WATER (FILTERED SAMPLES)
ADULT RESIDENT
Site 5
NAS Cecil Field Operable Unit 2
G-5
NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Acetone	8500	ug/liter	2.3E-01	0.1	2.3E+00
Benzene	16	ug/liter	4.4E-04	NA	
2-Hexanone	60	ug/liter	1.6E-03	NA	
Toluene	180	ug/liter	4.9E-03	0 2	2.5E-02
Trichloroethene	16 6	ug/liter	4.5E-04	0.007	6.5E-02
bis(2-Ethylhexyl) phthalate	66.7	ug/liter	1.8E-03	0.02	9.1E-02
2,4-Dimethylphenol	38 5	ug/liter	1.1E-03	0 02	5.3E-02
2-Methylnaphthalene	116	ug/liter	3.2E-03	NA	
4-Methylphenol	508	ug/liter	1.4E-02	0.005	2 8E+00
Naphthalene	226	ug/liter	6.2E-03	0 04	1.5E-01
alpha-Chlordane	0.15	ug/liter	4.1E-06	0.00006	6 8E-02
beta-HCH	4.5	ug/liter	1.2E-04	NA	
Calcium	12965	ug/liter	3.6E-01	NA	
Iron	9897	ug/liter	2.7E-01	NA	
Manganese	17	ug/liter	4.7E-04	0 005	9 3E-02
Potassium	2441	ug/liter	6.7E-02	NA	
Vanadium	73	ug/liter	2.0E-03	0 007	2.9E-01
TRPH	9500	ug/liter	2.6E-01	NA	
				TOTAL HAZARD INDEX	6E+00

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INHALATION EXPOSURE TO VOCs DURING SHOWERING
ADULT RESIDENT
Site 5
NAS Cecil Field Operable Unit 2
G-6

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SHOWER A	CA [1]	chemical-specifi	ug/m3	Modeled
CONVERSION FACTOR 1	CF1	24	hours/day	
EXPOSURE TIME SHOWER	ET	0.2	hours/day	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
CONVERSION FACTOR 2	CF2	365	days/year	
AVERAGING TIME CANCER	AT	70	years	USEPA, 1989
AVERAGING TIME NONCANC	AT	30	years	USEPA, 1989

[1] Calculated via model by Foster and Chrostowski, Air Pollution Control Association Annual Meeting, 1987.
USEPA, 1989. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, (Part A) EPA/540/1-89/002; December 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Assumptions".

EQUATIONS

CANCER RISK = AVG. CONC. (ug/m3) * CANCER UNIT RISK (ug/m3)^-1

HAZARD QUOTIENT = AVG.CONC.(ug/m3)/REF. CONC. (ug/m3)

$$\text{AVG. CONC.} = \frac{CAair * EF * ET * ED}{AT * CF1 * CF2}$$

Note:
*For noncarcinogenic effects: AT = ED

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INHALATION EXPOSURE TO VOCs DURING SHOWERING
ADULT RESIDENT
Site 5
NAS Cecil Field Operable Unit 2
G-6
CARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE V/NV	SHOWER AIR CONCENTRATIO (ug/m³)	AVERAGE AIR CONCENTRATION LIFETIME (ug/m3)	INHALATION CANCER UNIT RISK (ug/m3)^-1	CANCER RISK
Benzene	V	8.6E+01	2.9E-01	8.30E-06	2.4E-06
Trichloroethene	V	72	2.5E-01	1.70E-06	4.2E-07
				SUMMARY CANCER RISK	3E-06

NA - Not Applicable - The analyte is not volatile and has therefore not been evaluated via this volatilization model.

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INHALATION EXPOSURE TO VOCs DURING SHOWERING
ADULT RESIDENT
Site 5
NAS Cecil Field Operable Unit 2
G-6
NONCARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE? V/NV	SHOWER AIR CONCENTRATIO (ug/m³)	AVERAGE AIR CONCENTRATION FOR TIME PERIO (ug/m3)	CHRONIC INHALATION RfC [1] (ug/m3)	HAZARD QUOTIENT
Acetone	V	5.0E+03	4.0E+01	NA	NA
Benzene	V	8.6E+01	6.8E-01	NA	NA
2-Hexanone	V	NA	0.0E+00	NA	NA
Toluene	V	9.0E+02	7.2E+00	4.00E+02	1.8E-02
Trichloroethene	V	7.2E+01	5.8E-01	NA	NA
			0.0E+00		NA
				SUMMARY HAZARD INDEX	1.8E-02

[1] RfC is the Reference Concentration published by USEPA
NA - Not Applicable - The analyte is not volatile and has therefore not been evaluated via this volatilization model.

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INGESTION OF GROUNDWATER AS DRINKING WATER (FILTERED SAMPLES)
ADULT RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
G-7

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1991
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	30	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE dlng} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

NOTE:
For noncarcinogenic effects AT = ED

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INGESTION OF GROUNDWATER AS DRINKING WATER (FILTERED SAMPLES)
ADULT RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
G-7
CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
Benzene	14.6	ug/liter	1.7E-04	0.029	5.0E-06
Methylene Chloride	24000	ug/liter	2.8E-01	0.0075	2.1E-03
Trichloroethene	14.4	ug/liter	1.7E-04	0.011	1.9E-06
Bis(2-ethylhexyl)phthalate	6	ug/liter	7.0E-05	0.014	9.9E-07
beta-BHC	0.03	ug/liter	3.5E-07	1.8	6.3E-07
			TOTAL CANCER RISK		2E-03

DRAFT

INGESTION OF GROUNDWATER AS DRINKING WATER (FILTERED SAMPLES)
ADULT RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
G-7
NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Benzene	14.6	ug/liter	4.0E-04	NA	NA
1,2-Dichloroethene	12	ug/liter	3.3E-04	0.009	3.7E-02
Methylene Chloride	24000	ug/liter	6.6E-01	0.06	1.1E+01
Trichloroethene	14.4	ug/liter	3.9E-04	0.007	5.6E-02
bis(2-Ethylhexyl)phthalate	6	ug/liter	1.6E-04	0.02	8.2E-03
2,4-Dimethylphenol	953	ug/liter	2.6E-02	0.02	1.3E+00
2-Methylphenol	3828	ug/liter	1.0E-01	0.05	2.1E+00
4-Methylphenol	692	ug/liter	1.9E-02	0.005	3.8E+00
Naphthalene	21.1	ug/liter	5.8E-04	0.04	1.4E-02
Phenol	5550	ug/liter	1.5E-01	0.6	2.5E-01
beta-BHC	0.03	ug/liter	8.2E-07	NA	NA
Calcium	75900	ug/liter	2.1E+00	NA	NA
Magnesium	3165	ug/liter	8.7E-02	NA	NA
Manganese	164	ug/liter	4.5E-03	0.005	9.0E-01
Potassium	5064	ug/liter	1.4E-01	NA	NA
Sodium	23389	ug/liter	6.4E-01	NA	NA
TRPH	720	ug/liter	2.0E-02	NA	
			TOTAL HAZARD INDEX		2E+01

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INHALATION EXPOSURE TO VOCs DURING SHOWERING
ADULT RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
G-8

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SHOWER A	CA [1]	chemical-specifi	ug/m3	Modeled
CONVERSION FACTOR 1	CF1	24	hours/day	
EXPOSURE TIME SHOWER	ET	0.2	hours/day	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	30	years	USEPA, 1991
CONVERSION FACTOR 2	CF2	365	days/year	
AVERAGING TIME CANCER	AT	70	years	USEPA, 1989
AVERAGING TIME NONCANC	AT	30	years	USEPA, 1989

[1] Calculated via model by Foster and Chrostowski, Air Pollution Control Association Annual Meeting, 1987.
USEPA, 1989. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, (Part A) EPA/540/1-89/002; December 1989.
USEPA, 1991 Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Assumptions".

EQUATIONS

CANCER RISK = AVG. CONC. (ug/m3) * CANCER UNIT RISK (ug/m3)^-1

HAZARD QUOTIENT = AVG.CONC.(ug/m3)/REF. CONC. (ug/m3)

$$\text{AVG. CONC.} = \frac{CAair * EF * ET * ED}{AT * CF1 * CF2}$$

Note:
*For noncarcinogenic effects: AT = ED

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INHALATION EXPOSURE TO VOCs DURING SHOWERING
ADULT RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
G-8
CARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE V/NV	SHOWER AIR CONCENTRATIO (ug/m³)	AVERAGE AIR CONCENTRATION LIFETIME (mg/m3)	INHALATION CANCER UNIT RISK (ug/m3)^-1	CANCER RISK
Benzene	V	78	2.7E-01	8.30E-06	2.2E-06
Methylene Chloride	V	120000	4.1E+02	4.70E-07	1.9E-04
Trichloroethene	V	63	2.2E-01	1.70E-06	3.7E-07
bis(2-Ethylhexyl)phthalate	NV		NA	NA	NA
beta-BHC	NV		NA	5.30E-04	NA
				SUMMARY CANCER RISK	2E-04

NA - Not Applicable - The analyte is not volatile and has therefore not been evaluated via this volatilization model.

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INHALATION EXPOSURE TO VOCs DURING SHOWERING
ADULT RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
G-8
NONCARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE? V/NV	SHOWER AIR CONCENTRATIO (ug/m³)	AVERAGE AIR CONCENTRATION FOR TIME PERIO (ug/m3)	CHRONIC INHALATION RfC [1] (ug/m3)	HAZARD QUOTIENT
Benzene	V	7.8E+01	6.2E-01	NA	NA
1,2-Dichloroethene	V	5.9E+01	4.7E-01	NA	NA
Methylene Chloride	V	1.2E+05	9.6E+02	3.00E+03	3.2E-01
Trichloroethene	V	6.3E+01	5.0E-01	NA	NA
bis(2-Ethylhexyl)phthalate	NV		NA	NA	NA
2,4-Dimethylphenol	NV		NA	NA	NA
2-Methylphenol	NV		NA	NA	NA
4-Methylphenol	NV		NA	NA	NA
Naphthalene	NV		NA	NA	NA
Phenol	NV		NA	NA	NA
beta-BHC	NV		NA	NA	NA
Calcium	NV		NA	NA	NA
Magnesium	NV		NA	NA	NA
Manganese	NV		NA	5.00E-02	NA
Potassium	NV		NA	NA	NA
Sodium	NV		NA	NA	NA
TRPH	V	NA	NA	NA	NA
				SUMMARY HAZARD INDEX	3.2E-01

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Table G-9
Summary Of Human Health Risks
Filtered Groundwater at Site 5

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Land Use	Media	Receptor	Exposure Route	Cancer Risk	Hazard Index
Future	**Groundwater**	**Adult Resident**			
			Incidental Ingestion	1E-4	6E+0
			Inhalation of Volatiles	3E-6	2E-2
			Total	1E-4	6E+0

Table G-10
Summary Of Human Health Risks
Filtered Groundwater at Site 17

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Land Use	Media	Receptor	Exposure Route	Cancer Risk	Hazard Index
Future	**Groundwater**	**Adult Resident**			
			Incidental Ingestion	2E-3	2E+1
			Inhalation of Volatiles	2E-4	3E-1
			Total	2E-3	2E+1

During the Feasibility Study at Site 5, a question concerning the "protectiveness" to human health of the FDEP TRPH soil cleanup level of 50 mg/kg was raised. This question presented a problem during the risk assessment both because there are no USEPA toxicity values for TRPH, especially "weathered" TRPH, and because TRPH is often a mixture of more than one type of fuel making it difficult to focus on a single toxic endpoint. The TRPH fingerprint analysis (by USEPA Method 8015) at Site 5 indicated a "weathered" product somewhat similar to either kerosene or jet aviation fuels (JP-8 or Jet Fuel A) but with much of the lighter fractions of these two fuel mixtures missing. While this is a common finding at sites it also makes it scientifically unsound, due to the lack of an acceptable toxicity value for a TRPH mixture of this type, to attempt to quantify human health risks associated with soil exposure to this TRPH in the actual body of the risk assessment. The uncertainties associated with this type of analysis are too great to provide meaningful information about the actual health risks at a site.

However, it may be possible to address the issue of the "protectiveness" of the FDEP TRPH cleanup level if two extremely conservative, and basically unrealistic, assumptions are used in a focussed risk analysis. The first assumption is that the TRPH is not "weathered" and contains all of the fractions found in "fresh" fuels. Obviously this is not realistic based upon the results of the fingerprint analysis. The second assumption is that toxicity of the TRPH found at Site 5 is comparable to the most toxic of the aviation or automotive fuels thus far evaluated by the USEPA. Again this is not realistic since many of the toxic effects resulting from fuel exposure are due to inhalation of fuel vapors, which usually contain the lighter fractions of the fuel mixtures, and which are not present in the TRPH mixture at Site 5 (ATSDR, 1992a, 1992b).

The USEPA has provided provisional reference doses for four fuels: gasoline; JP-4 jet fuel; JP-5 jet fuel; and marine diesel fuel (USEPA, 1992). The most toxic of these fuels is marine diesel with a reference dose of $8x10^{-3}$ mg/kg/day. This toxicity value was used in this focussed risk analysis. This risk analysis also examined the risks associated with a child residential exposure since this receptor is the most sensitive for non-carcinogenic toxic effects.

The hazard quotient associated with a residential child exposure to 50 mg/kg of TRPH, assuming that the above described caveats are accurate, is $8x10^{-2}$. This value indicates that even with the highly conservative assumptions used in this risk analysis, that the FDEP TRPH soil cleanup level of 50 mg/kg is adequately protective to human health, even to the most sensitive receptor.

However, it should be noted that this analysis is only for human health and the potential effects to ecological receptors should be examined separately. It should also be noted that this analysis is not indicative that the reference dose for marine diesel fuel is acceptable for use as a surrogate toxicity value for any fuel, "weathered" or not, in a qualitative risk assessment. This determination can only be made on a site-by-site basis and only if the use of any toxicity value as a surrogate is scientifically valid.

Hazard Resulting from an Exposure to TRPH at the FDEP Soil Clean-up Level (50 ppm)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Hazard Index =

$1/RfD \times (SCL \times IR_{soil} \times FI \times CF \times EF \times ED)/(BW \times ATnc \times 365\ dy/yr)$

= 8E-02

Parameter	Symbol	Value (Child 1-6)	Units	Source
Soil Clean-up Level	SCL	50	ppm	[1]
Soil Ingestion Rate	IR_{soil}	200	mg/day	[2]
Fraction Ingested	FI	100%	percent	Assumption
Conversion Factor	CF	1.0E-06	kg/mg	
Exposure Frequency	EF	350	days/year	[2]
Exposure Duration	ED	6	years	[2]
Averaging Time: Noncancer	Atnc	6	years	[2]
Body Weight	BW	15	kg	[2]
Reference Dose	RfD	8E-03	mg/kg/day	[3]

[1] Florida Department of Environmental Protection (FDEP), Florida Administrative Code 17-770, Petroleum Conta

[2] USEPA, 1991, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters.

[3] USEPA, 1992. United States Environmental Protection Agency, Master List of Responses for 2QTR 1992. Superfund Health Risk Technical Support Center Chemical Risk Assessment Issue Papers. Office of Research and Development, ECAO, Cincinnati, OH.

ATSDR, 1992a. Toxicological Profile for Automotive Gasoline - Draft, U.S. Public Health Service.

ATSDR, 1992b. Toxicological Profile for Jet Fuels JP-4 and JP-7 - Draft, U.S. Public Health Service.

References:

ATSDR, 1992a. Toxicological Profile for Automotive Gasoline - Draft, U.S. Public Health Service.

ATSDR, 1992b. Toxicological Profile for Jet Fuels JP-4 and JP-7 - Draft, U.S. Public Health Service.

APPENDIX H

APPENDIX H

ECOLOGICAL RECEPTORS AT NAS CECIL FIELD

Table H-1

Characteristic Flora of Major Vegetative Cover Types [a]

Baseline Risk Assessment

Operable Unit 2

NAS Cecil Field, Jacksonville, Florida

Scientific Name	Common Name	Source [a]
PINE COMMUNITY		
Acer rubrum	Red maple	[b]
Andropogon glomeratus	Broom sedge	[b]
Arisaema triphyllum	Jack-in-the-pulpit	
Aristida stricta	Pineland three-awn	
Aster sp.	Aster	[b]
Bignonia capreolata	Cross vine	
Carya glabra	Pignut hickory	
Cephalanthus occidentalis	Buttonbush	[b]
Crataegus sp.	Hawthorne	
Gelsemium sempervirens	Yellow jessamine	[b]
Ilex glabra	Gallberry	[b]
Ilex vomitoria	Yaupon	
Liquidambar styraciflua	Sweet gum	[b]
Lonicera japonica	Japanese honeysuckle	[b]
Lonicera sp.	Honeysuckle	
Lycopodium alopeuroides	Clubmoss	[b]
Lyonia lucida	Fetterbush	[b]
Lyonia mariana	Staggerbush	
Magnolia grandiflora	Bigleaf magnolia	
Osmunda cinnamonea	Cinnamon fern	[b]
Panicum sp.	Panic grass	
Parthenocissus quinquefolia	Virginia creeper	[b]
Pinus elliottii	Slash pine	[b]
Pinus palustris	Longleaf pine	[b]
Pinus taeda	Loblolly pine	[b]
Polypodium polypoides	Resurrection fern	
Prunus caroliniana	Choke cherry	[b]
Prunus serotina	Black cherry	[b]
Pteridium aquilinum	Bracken fern	[b]
Quercus chapmanni	Chapman oak	
Quercus laevis	Turkey oak	[b]
Quercus laurifolia	Diamond-leaf oak	[b]
Quercus myrtifolia	Myrtle oak	[b]
Quercus nigra	Water oak	[b]
Quercus spp.	Oaks	
Rhus coppalina	Shining sumac	
Rubus trivialis	Dewberry	
Rubus cuneifolius	Bramble	[b]
Serenoa repens	Saw palmetto	[b]
Smilax bona-nox	Catbriar	[b]
Smilax glauca	Greenbriar	
Smilax rotundifolia	Bullbriar	
Smilax sp.	Greenbriar	
Thelypteris kunthii	Fern	
Tillandsia usneoides	Spanish moss	[b]
Toxicodendron radicans	Poison ivy	[b]
Vitis rotundifolia	Muscadine grape	[b]
Woodwardia virginica	Virginia chain fern	

Table H-1

Characteristic Flora of Major Vegetative Cover Types [a]

Baseline Risk Assessment

Operable Unit 2

NAS Cecil Field, Jacksonville, Florida

Scientific Name	Common Name	Source [a]
MESOPHYTIC HARDWOOD COMMUNITY		
Amphicarpa bracteata	Hog peanut	
Aralia spinosa	Devil's Walking stick	
Assimina triloba	Pawpaw	
Asplenium sp.	Spleenwort	
Athyrium filix-femina	Lady fern	
Calopogon tuberosus	Grass Pink [c]	[b]
Carpinus carolinensis	Hornbeam	
Carya glabra	Pignut hickory	
Centrosema virginiana	Butterfly pea	
Cercis canadensis	Redbud	
Cornus florida	Flowering dogwood	
Diospyros virginiana	Persimmon	[b]
Erythrina herbacea	Coral bean	
Gaylussacia frondosa	Dangleberry	
Hamamelis virginiana	Witch-hazel	
Hypericum hypericoides	St. John's-wort	
Ilex glabra	Gallberry	[b]
Ilex opaca	American holly	
Ligustrum lucidum	Wax-leaved ligustrum	
Lonicera japonica	Japanese honeysuckle	[b]
Lycopodium sp.	Club moss	[b]
Lyonia lucida	Fetterbush	[b]
Magnolia grandiflora	Magnolia	
Mitchella repens	Partridgeberry	
Myrica cerifera	Bayberry, Wax myrtle	[b]
Nyssa sylvatica	Black gum	
Parthenocissus quinquefolia	Virginia creeper	[b]
Pinus elliottii	Slash pine	[b]
Pinus palustris	Longleaf pine	[b]
Polypodium polypoides	Resurrection fern	[b]
Polypodium plumula	Comb fern	
Prunus serotina	Black cherry	[b]
Pterocaulon pyenostachyum	Blackroot	
Quercus hemisphaerica	Laurel oak	
Quercus michauxii	Swamp chestnut oak	
Quercus nigra	Water oak	[b]
Quercus virginiana	Live oak	[b]
Serenoa repens	Saw palmetto	[b]
Smilax bona-nox	Catbriar	[b]
Smilax sp.	Greenbriar	
Smilax walterii	Coral greenbriar	
Thelypteris quadrangularis	Fern	
Ulmus alata	Winged elm	
Vaccinium arboreum	Sparkleberry	
Vaccinium sp.	Blueberry	
Vitis rotundifolia	Muscadine grape	

Table H-1

Characteristic Flora of Major Vegetative Cover Types [a]

Baseline Risk Assessment

Operable Unit 2

NAS Cecil Field, Jacksonville, Florida

Scientific Name	Common Name	Source [a]
MESOPHYTIC HARDWOOD COMMUNITY (cont.)		
Woodwardia areolata	Netted chain fern	[b]
WETLAND/FLOODPLAIN COMMUNITY		
Acer negundo	Box elder	
Acer rubrum	Red maple	[b]
Agalinas purpurea	Purple gerardia	[b]
Alnus serrulata	Alder	[b]
Amorpha fruticosa	False indigo	
Ampelopsis arborea	Peppervine	
Aralia spinosa	Devils walking stick	
Arisaema triphyllum	Jack-in-the-pulpit	
Asplenium resiliens	Black-stemmed spleenwort	
Athyrium filix-femina	Lady fern	
Betula nigra	River birch	
Bignonia capreolata	Cross vine	
Botrychium virginianum	Rattlesnake fern	
Carex sp.	Sedge	[b]
Carpinus caroliniana	Hornbeam	
Cephalanthus occidentalis	Buttonbush	[b]
Cicuta mexicana	Water hemlock	
Cladium sp.	Twig rush	
Cnidoscolus stimulosus	Nettle	
Cornus foemina	Swamp dogwood	[b]
Cyperus sp.	Sedge	[b]
Cyrilla racemiflora	Swamp titi	[b]
Dichromena sp.	White top sedge	
Drosera rotundifolia	Sundew	[b]
Ericaulon decangulare	Hat pins	[b]
Fraxinus caroliniana	Water ash	[b]
Fraxinus pennsylvanica	Green ash	
Gallium sp.	Bedstraw	
Gordonia lasianthus	Loblolly bay	[b]
Hydrocotyle umbellata	Water pennywort	[b]
Hypericum fasciculatum	St. John's-wort	[b]
Ilex coriacea	Gallberry	
Ilex glabra	Gallberry	[b]
Ilex myrtifolia	Myrtle-leaved holly	
Iris pseudacoris	Yellow flag	
Juncus effusus	Soft rush	[b]
Juncus sp.	Rush	[b]
Lachnanthes caroliniana	Redroot	[b]
Lachnocaulon anceps	Bogbutton	[b]
Liquidambar styraciflua	Sweet gum	[b]
Ludwigia peruviana	Primrose willow	[b]
Lycopus virginicus	Bugleweed	[b]
Lyonia lucida	Fetterbush	[b]
Lyonia mariana	Staggerbush	

Table H-1

Characteristic Flora of Major Vegetative Cover Types [a]

Baseline Risk Assessment

Operable Unit 2

NAS Cecil Field, Jacksonville, Florida

Scientific Name	Common Name	Source [a]
WETLAND/FLOODPLAIN COMMUNITY (cont.)		
Magnolia virginiana	Sweet bay magnolia	[b]
Myrica cerifera	Wax myrtle	[b]
Nuphar luteum	Spatterdock	[b]
Nyssa sylvatica	Black gum	
Onoclea sensibilis	Sensitive fern	[b]
Osmunda cinnamonea	Cinnamon fern	[b]
Osmunda regalis	Royal fern	[b]
Orontium aquaticum	Golden club	
Peltandra virginica	Green arum	
Persea borbonia	Red bay	[b]
Persea palustris	Swamp red bay	[b]
Pinus elliottii	Slash pine	[b]
Pinus taedea	Loblolly pine	[b]
Pinus serotina	Pond pine	[b]
Polygonum punctatum	Dotted smartweed	[b]
Polygonum spp.	Smartweeds	
Polypodium polypoides	Resurrection fern	
Quercus nigra	Water oak	[b]
Quercus phellos	Willow oak	[b]
Quercus spp.	Oaks	
Quercus virginiana	Live oak	
Rhexia virginica	Meadowbeauty	[b]
Rubus spp.	Blackberry	[b]
Sagitaria latifolia	Arrowhead	[b]
Salix nigra	Black Willow	[b]
Sambucus canadensis	Elderberry	
Sarracenia minor	Hooded pitcherplant [c]	[b]
Sarracenia repens	Trumpet pitcherplant	[b]
Sassafras albidum	Sassafras	
Scirpus sp.	Bulrush	[b]
Smilax sp.	Greenbriar	
Sphagnum spp.	Sphagnum moss	[b]
Taxodium distichum	Bald cypress	[b]
Thelypteris kunthii	Fern	
Toxicodendron radicans	Poison ivy	[b]
Toxicodendron vernix	Poison sumac	[b]
Typha latifolia	Cattail	[b]
Ulmus americana	American elm	
Urtica dioica	Stinging nettle	[b]
Utricularia inflata	Bladderwort	
Vaccinium arboreum	Sparkleberry	
Vaccinium sp.	Blueberry	
Vitis rotundifolia	Muscadine grape	[b]
Woodwardia areolata	Netted chain fern	[b]
Woodwardia virginica	Virginia chain fern	[b]

Table H-1

Characteristic Flora of Major Vegetative Cover Types [a]

Baseline Risk Assessment

Operable Unit 2

NAS Cecil Field, Jacksonville, Florida

Scientific Name	Common Name	Source [a]
DISTURBED UPLAND COMMUNITY		
Albizia julibrissin	Mimosa	
Allium canadense	Wild onion	
Ambrosia artemissifolia	Ragweed	[b]
Ampelopsis arborea	Peppervine	
Anagallis arvensis	Scarlet pimpernel	[b]
Andropogon glomeratus	Broom grass	[b]
Asplenium resiliens	Black-stemmed spleenwort	
Aster sp.	Aster	[b]
Baccharis halmifolia	Groundsel-tree	[b]
Bidens pilosa	Spanish needles	[b]
Callicarpa americana	Beauty berry	[b]
Campsis radicans	Trumpet creeper	[b]
Carex sp.	Sedge	
Centrosema virginianum	Butterfly pea	
Circium sp.	Thistle	[b]
Cladium sp.	Twig rush	
Clematis crispa	Leather flower	
Cnidoscolus stimulosus	Nettle	
Commelina erecta	Dayflower	[b]
Crotalaria rotundifolia	Rattlebox	[b]
Cuscuta gronovii	Dodder	
Daucus carota	Queen Anne's lace	
Dichromena sp.	White-bracted sedge	
Digitaria sp.	Crab grass	
Dioscorea bulbifera	Air yam	[b]
Erigeron quercifolius	Fleabane	
Eupatorium capillifolium	Dog fennel	[b]
Euthamia minor	Flat-topped goldenrod	[b]
Geranium carolinianum	Wild geranium	
Hedyotis procumbens	Innocence	
Helianthus angustifolia	Sunflower	[b]
Hydrocotyle umbellata	Water pennywort	
Hypericum gentianoides	St. Johns wort	
Hypochoeris radicata	Cat's ear	
Ipomoea sp.	Bindweed	
Juniperus virginiana	Southern red cedar	
Juncus canadensis	Canada rush	
Juncus sp.	Rush	
Lactuca sp.	Wild lettuce	[b]
Lepidium virginicum	Field peppergrass	
Liatris sp.	Blazing star	[b]
Lygodium japonicum	Japanese climbing fern	[b]
Melia azedarach	Chinaberry	
Meliota alba	Tall white clover	
Mikania scandens	Climbing hempweed	[b]
Morus alba	White mulberry	

Table H-1

Characteristic Flora of Major Vegetative Cover Types [a]

Baseline Risk Assessment

Operable Unit 2

NAS Cecil Field, Jacksonville, Florida

Scientific Name	Common Name	Source [a]
DISTURBED UPLAND COMMUNITY (cont.)		
Oenothera laciniata	Primrose	
Oxalis sp.	Sorrel	
Panicum sp.	Panic grass	[b]
Passiflora incarnata	Passion flower	
Phorodendron serotinum	Mistletoe	
Phyla nodiflora	Capeweed	
Phytolacca americana	Pokeweed	[b]
Pluchea odorata	Camphorweed	[b]
Prunus caroliniana	Carolina laurel cherry	
Pteridium aquilinum	Bracken fern	[b]
Quercus myrtifolia	Myrtle oak	
Robinia hispidus	Bristly locust	
Rhus typhina	Staghorn sumac	
Rubus trivialis	Southern dewberry	
Rubus spp.	Blackberry	[b]
Rudbeckia sp.	Black-eyed suzie	[b]
Rumex crispus	Dock	
Sabal minor	Dwarf palmetto	[b]
Sabal palmetto	Sabal palm	
Salvia lyrata	Lyre-leaved mint	
Sambucus canadensis	Elderberry	
Sapium sebiferum	Chinese tallow tree	
Senecio aureus	Hawkweed	[b]
Sesbania sp.	Rattlebox	
Solanum carolinense	Horse nettle	
Solidago fistulosa	Goldenrod	[b]
Solidago sp.	Goldenrod	[b]
Sonchas asper	Sow thistle	
Spiranthes sp.	Orchid	
Stachys floridana	Hedge nettle	
Tradescantia virginiana	Spiderwort	
Trifolium spp.	Clovers	
Ulmus alata	Winged Elm	
Verbena brasiliensis	Vervain	
Vitis rotundifolia	Muscadine grape	[b]
Xyris fimbriata	Yellow-eyed grass	[b]
Yucca aloifolia	Spanish bayonnet	
Zanthoxylum clava-herculis	Southern prickly ash	

Note:

[a] Sources: Godfrey and Wooten (1981); Dressler et al. (1991); Mickel, 1979

[b] Identified at Operable Unit 2 by ABB or CDM.

[c] Sarracenia minor and Calopogon tuberosus are state-threatened species according to the Florida Department of Agriculture and Consumer Services (list published in Preservation of Native Flora of Florida Act, Section 581.185-187, Florida Statutes).

Table H–2
Amphibians Expected to Occur in the Vicinity of NAS Cecil Field

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Family	Scientific Name	Common Name
Ambystomidae	*Ambystoma talpoideum*	Mole salamander
Bufonidae	*Bufo quercicus*	Oak toad
	Bufo terrestris	Southern toad
Hylidae	*Acris gryllus dorsalis*	Florida cricket frog
	Hyla chrysoscelis	Gray treefrog
	Hyla avivoca	Bird–voiced treefrog
	Hyla cinerea	Green treefrog
	Hyla crucifer bartramiana	Southern peeper
	Hyla femoralis	Pine woods treefrog
	Hyla gratiosa	Barking treefrog
	Hyla squirella	Squirrel treefrog
	Limnaeodus ocularis	Little grass frog
	Pseudacris nigrita nigrita	Southern chorus frog
	Pseudacris ornata	Ornate chorus frog
Microhylidae	*Gastrophryne carolinensis*	Eastern narrowmouth toad
Pelobatidae	*Scaphiopus holbrooki*	Eastern spadefoot
Plethodontidae	*Desmognathus auriculatus*	Southern dusky salamander
	Eurycea quadridigitata	Dwarf salamander
	Plethodon glutinosus	Slimy salamander
	Pseudotriton montanus floridanus	Rusty mud salamander
Ranidae	*Rana areolata aesopus*	Florida gopher frog
	Rana catesbeiana	Bullfrog
	Rana clamitans clamitans	Green frog
	Rana grylio	Pig frog
	Rana heckscheri	River frog
	Rana sphenocephala	Southern leopard frog
Salamandridae	*Notophthalmus perstriatus*	Striped newt
	Notopthalmus viridescens louisianensis	Central newt
Sirenidae	*Pseudobranchus striatus*	Narrow–striped dwarf siren
	Siren intermedia	Lesser siren

Source:
Specimen records for Duval County, Florida (Ashton and Ashton, 1988).

Table H–3
Reptiles Expected to Occur in the Vicinity of NAS Cecil Field

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Family	Scientific Name	Common Name
Alligatoridae	*Alligator mississippiensis*	American alligator
Chelydridae	*Chelydra serpentina*	Snapping turtle
Colubridae	*Cemophora coccinea copei*	Scarlet snake
	Coluber constrictor priapur	Southern black racer
	Diadophis punctatus punctatur	Southern ringneck snake
	Drymarchon corais	Indigo snake
	Elaphe guttata	Corn snake
	Elaphe obsoleta quadrivattata	Yellow rat snake
	Farancia abacura abacura	Mud snake
	Farancia erytrogramma	Rainbow snake
	Heterodon platyrhinos	Eastern hognose snake
	Heterodon simus	Southern hognose snake
	Lampropeltis getulus	Common kingsnake
	Lampropeltis triangulum	Eastern milk snake
	Lampropeltis triangulum elapsoides	Scarlet kingsnake
	Masticophis flagellum flagellum	Coachwhip
	Nerodia fasciata	Southern water snake
	Nerodia rhombifera	Diamondback water snake
	Opheodrys aestivus	Rough green snake
	Pituophis melanoleucus mugitur	Florida pine snake
	Regina alleni	Striped crayfish snake
	Regina rigida rigida	Glossy crayfish snake
	Rhadinaea flavilata	Pine woods snake
	Seminatrix pygaea pygaea	North Florida swamp snake
	Storeria dekayi victa	Florida brown snake
	Storeria occipitomaculata obscura	Southern redbelly snake
	Tantilla relicta	Southeastern crowned snake
	Thamnophis sauritus sackeni	Southern ribbon snake
	Thamnophis sirtalis sirtalis	Eastern garter snake
Elapidae	*Micrurus fulvius fulvius*	Eastern Coral snake
Emydidae	*Clemmys guttata*	Spotted turtle
	Deirochelys reticularia chrysea	Chicken turtle
	Pseudemys nelsoni	
	Pseudemys floridana peninsylaris	Cooter
	Terrapene carolina	Eastern box turtle
Iguanidae	*Anolis carolinensis*	Green anole
	Sceloporus undulatus undulatus	Southern fence lizard
Kinosternidae	*Kinosternon subrubrum steindachneri*	Eastern mud turtle
	Sternotherus minor minor	Loggerhead musk turtle
Scincidae	*Eumeces egregius*	Peninsula mole skink
	Eumeces inexpectatus	Southeastern five–lined skink
	Eumeces laticeps	Broadhead skink
	Scincella lateralis	Ground skink
Testudinidae	*Gopherus polyphemus*	Gopher tortoise

Table H–3
Reptiles Expected to Occur in the Vicinity of NAS Cecil Field

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Family	Scientific Name	Common Name
Tetidae	*Cnemidophorus sexlineatus*	Six–lined racerunner
Viperidae	*Agkistrodon piscivorus caramto*	Florida cottonmouth
	Crotalus adamanteus	Eastern diamondback
	Sistrurus miliarus barbouri	Pigmy rattlesnake

Source:
Specimen records for Duval County, Florida (Ashton and Ashton, 1988b and 1991).

Table H–4
Birds Expected to Occur in the Vicinity of NAS Cecil Field

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Family	Scientific Name	Common Name
Accipitridae	*Accipiter cooperii*	Cooper's hawk
	Accipiter striatus	Sharp–shinned hawk
	Buteo jamaicensis	Red–tailed hawk
	Buteo lineatus	Red–shouldered hawk
	Buteo platypterus	Broad–winged hawk
	Circus cyaneus	Northern harrier
	Elandides forficatus	American swallow–tailed kite
	Haliaeetus leucocephalus	Bald eagle
	Pandion haliaetus	Osprey
Alcedinidae	*Megaceryle alcyon*	Belted kingfisher
Anatidae	*Aix sponsa*	Wood duck
	Anas americana	American wigeon
	Anas clypeata	Northern shoveler
	Anas crecca	Green–winged teal
	Anas discors	Blue–winged teal
	Anas platyrhynchos	Mallard
	Anas rubripes	American black duck
	Anas strepera	Gadwall
	Aythya affinis	Lesser scaup
	Aythya americana	Redhead
	Aythya collaris	Ring–necked duck
	Aythya marila	Greater scaup
	Bucephala albeola	Bufflehead
	Bucephala clangula	Common goldeneye
	Lophodytes cucullatus	Hooded merganser
	Mergus serrator	Red–breasted merganser
	Oxyura jamaicensis	Ruddy duck
Anhingidae	*Anhinga anhinga*	Anhinga
Apodidae	*Chaetura pelagica*	Chimney swift
Ardeidae	*Ardea herodias*	Great blue heron
	Bubulcus ibis	Cattle egret
	Butorides striatus	Green–backed heron
	Casmerodius albus	Great egret
	Egretta thula	Snowy egret
	Egretta tricolor	Tricolored heron
	Egretta caerulea	Little blue heron
	Nycticorax nycticorax	Black–crowned night heron
	Nycticorax violaceus	Yellow–crowned night heron
Bombycillidae	*Bombycilla cedrorum*	Cedar waxwing
Caprimulgidae	*Caprimulgus carolinensis*	Chuck–will's–widow
	Caprimulgus vociferus	Whip–poor–will
	Chordeiles minor	Common nighthawk
Cathartidae	*Cathartes aura*	Turkey vulture
	Coragyps atratus	Black vulture
Certhiidae	*Certhia americana*	Brown creeper
Charadriidae	*Charadrius semipalmatus*	Semipalmated plover
	Charadrius vociferus	Killdeer
	Pluvialis squatarola	Black–bellied plover
Columbidae	*Columba livia*	Rock dove
	Columbina passerina	Common ground–dove
	Zenaida macroura	Mourning dove

Table H–4
Birds Expected to Occur in the Vicinity of NAS Cecil Field

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Family	Scientific Name	Common Name
Corvidae	*Corvus brachyrhynchos*	Common crow
	Corvus ossifragus	Fish crow
	Cyanocitta cristata	Blue jay
Cuculidae	*Coccyzus americanus*	Yellow–billed cuckoo
Emberizidae	*Ammodramus henslowii*	Henslow's sparrow
	Ammodramus leconteii	Le Conte's sparrow
	Ammodramus savannarum	Grasshopper sparrow
	Cardinalis cardinalis	Northern cardinal
	Carduelis tristis	American goldfinch
	Carpodacus purpureus	Purple finch
	Guiraca caerulea	Blue grosbeak
	Junco hyemalis	Dark–eyed junco
	Melospiza georgiana	Swamp sparrow
	Melospiza melodia	Song sparrow
	Passerculus sandwichensis	Savannah sparrow
	Passerina ciris	Painted bunting
	Pipilo erythrophthalmus	Rufous–sided towhee
	Pooecetes gramineus	Vesper sparrow
	Spizella passerina	Chipping sparrow
	Spizella pusilla	Field sparrow
	Zonotrichia albicollis	White–throated sparrow
Falconidae	*Falco columbarius*	Merlin
	Falco peregrinus	Peregrine falcon
	Falco sparverius	American kestrel
Gaviidae	*Gavia immer*	Common loon
	Gavia stellata	Red–throated loon
Hirundinidae	*Hirundo rustica*	Barn swallow
	Iridoprocne bicolor	Tree swallow
	Progne subis	Purple martin
	Stelgidopteryx seripennis	Northern rough–winged swallow
Icteridae	*Agelaius phoeniceus*	Red–winged blackbird
	Euphagus carolinus	Rusty blackbird
	Euphagus cyanocephalus	Brewer's blackbird
	Icterus galbula	Northern oriole
	Icterus spurius	Orchard oriole
	Molothrus ater	Brown–headed cowbird
	Quiscalus major	Boat–tailed grackle
	Quiscalus quiscula	Common grackle
	Sturnella magna	Eastern meadowlark
Laniidae	*Lanius ludovicianus*	Loggerhead shrike
Laridae	*Larus argentatus*	Herring gull
	Larus atricilla	Laughing gull
	Larus delawarensis	Ring–billed gull
	Larus marinus	Great black–backed gull
	Larus philadelphia	Bonaparte's gull
	Sterna caspia	Caspian tern
	Sterna forsteri	Forster's tern
	Sterna hirundo	Common tern
	Sterna maxima	Royal tern
Mimidae	*Dumatella carolinensis*	Gray catbird
	Mimus polyglottus	Northern mockingbird
	Toxostoma rufum	Brown thrasher

Table H–4
Birds Expected to Occur in the Vicinity of NAS Cecil Field

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Family	Scientific Name	Common Name
Paridae	*Parus bicolor*	Tufted titmouse
	Parus carolinensis	Carolina chickadee
Parulidae	*Dendroica coronata*	Yellow–rumped warbler
	Dendroica discolor	Prairie warbler
	Dendroica dominica	Yellow–throated warbler
	Dendroica palmarum	Palm warbler
	Dendroica pinus	Pine warbler
	Geothylpis trichas	Common yellowthroat
	Limnothlypis swainsonii	Swainson's warbler
	Mniotilta varia	Black–and–white warbler
	Parula americana	Northern parula
	Protondtaria citrea	Prothonotary warbler
	Seiuris aurocapillus	Ovenbird
	Vermivora celata	Orange–crowned warbler
Phalacrocoracidae	*Phalacrocorax auritus*	Double–crested cormorant
Phasianidae	*Colinus virginianus*	Common bobwhite
	Meleagris gallopavo	Wild turkey
Picidae	*Colaptes auratus*	Yellow–shafted flicker
	Dryocopus pileatus	Pileated woodpecker
	Melanerpes carolinus	Red–bellied woodpecker
	Melanerpes erythrocephalus	Red–headed woodpecker
	Picoides pubescens	Downy woodpecker
	Picoides villosus	Hairy woodpecker
	Sphyrapicus varius	Yellow–bellied sapsucker
Ploceidae	*Passer domesticus*	House sparrow
Podicipedidae	*Podiceps auritus*	Horned grebe
	Podilymbus podiceps	Pied–billed grebe
Rallidae	*Fulica americana*	American coot
	Gallinula chloropus	Common gallinule
	Porphyrula martinica	Purple gallinule
	Porzana carolina	Sora rail
	Rallus elegans	King rail
	Rallus limicola	Virginia rail
	Rallus longrostris	Clapper rail
Scolopacidae	*Actitis macularis*	Spotted sandpiper
	Arenaria interpres	Ruddy turnstone
	Calidris alpina	Dunlin
	Calidris canutus	Red knot
	Calidris melanotos	Pectoral sandpiper
	Calidris minutilla	Least sandpiper
	Calidris pusilla	Semipalmated sandpiper
	Capella gallinago	Common snipe
	Catoptrophorus semipalmatus	Willet
	Crocethia alba	Sanderling
	Limnodromus griseus	Short–billed dowitcher
	Limnodromus scolopaceus	Long–billed dowitcher
	Limosa fedoa	Marbled godwit
	Numenius phaeopus	Whimbrel
	Scolopax minor	American woodcock
	Tringa flavipes	Lesser yellowlegs
	Tringa melanoleuca	Greater yellowlegs
	Tringa solitaria	Solitary sandpiper

Table H–4
Birds Expected to Occur in the Vicinity of NAS Cecil Field

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Family	Scientific Name	Common Name
Sittidae	*Sitta canadensis*	Red–breasted nuthatch
	Sitta carolinensis	White–breasted nuthatch
	Sitta pusilla	Brown–headed nuthatch
Strigidae	*Asio flammeus*	Short–eared owl
	Bubo virginianus	Great horned owl
	Otus asio	Eastern screech owl
	Strix varia	Barred owl
Sturnidae	*Sturnus vulgaris*	European starling
Sylviidae	*Polioptila caerulea*	Blue–gray gnatcatcher
	Regulus calendula	Ruby–crowned kinglet
	Regulus satrapa	Golden–crowned kinglet
Thraupidae	*Piranga rubra*	Summer tanager
Threskiornithidae	*Eudocimus albus*	White ibis
	Plegadis falcinellus	Glossy ibis
Trochilidae	*Archilochus colubris*	Ruby–throated hummingbird
Troglodytidae	*Cistothorus palustris*	Marsh wren
	Cistothorus platensis	Sedge wren
	Thryothorus ludovicianus	Carolina wren
	Troglodytes aedon	House wren
	Troglodytes troglodytes	Winter wren
Turdidae	*Catharus guttata*	Hermit thrush
	Sialia sialis	Eastern bluebird
	Turdus migratorius	American robin
Tyrannidae	*Contopus virene*	Eastern wood pewee
	Empidonax sp.	Flycatcher
	Empidonax virescens	Acadian flycatcher
	Myiarchus crinitus	Great crested flycatcher
	Sayornis phoebe	Eastern phoebe
	Tyrannus tyrannus	Eastern kingbird
Tytonidae	*Tyto alba*	Common barn owl
Vireonidae	*Vireo flavifrons*	Yellow–throated vireo
	Vireo griseus	White–eyed vireo
	Vireo olivaceus	Red–eyed vireo
	Vireo solitarius	Solitary vireo

Source:
Regional distribution for northeastern Florida (Peterson, 1980). Many of these birds are regular or occasional visitors during springs and/or fall migration, and are not resident species.

Table H–5
Mammals Expected to Occur in the Vicinity of NAS Cecil Field

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Family	Scientific Name	Common Name
Canidae	*Urocyon cinereoargenteus*	Gray fox
Cervidae	*Odocoileus virginianus*	White–tailed deer
Cricetidae	*Neotoma floridana*	Eastern wood rat
	Oryzomys palustris	Marsh rice rat
	Peromyscus gossypinus	Cotton mouse
	Peromyscus nuttalli	Golden mouse
	Peromyscus polionotus	Old field mouse
	Reithrodontomys humulis	Eastern harvest mouse
	Sigmodon hispidus	Hispid cotton rat
Dasypodidae	*Dasypus novemcinctus*	Nine–banded armadillo
Didelphidae	*Didelphis virginiana*	Virginia oppossum
Felidae	*Lynx rufus*	Bobcat
Geomyidae	*Geomys pinetis*	Southeastern pocket gopher
Leporidae	*Sylvilagus floridanus*	Eastern cottontail
	Sylvilagus palustris	Marsh rabbit
Muridae	*Mus musculus*	House mouse
	Rattus norvegicus	Norway rat
Mustelidae	*Lutra canadensis*	River otter
	Mephitis mephitis	Striped skunk
	Mustela vison	Mink
	Spilogale putorius	Eastern spotted skunk
Procyonidae	*Procyon lotor*	Raccoon
Sciuridae	*Glaucomys volans*	Southern flying squirrel
	Sciurus carolinensis	Gray squirrel
	Sciurus niger shermani	Sherman's fox squirrel
Soricidae	*Blarina brevicauda*	Short–tailed shrew
	Cryptotis parva	Least shrew
	Sorex longirostirs	Southeastern shrew
Talpidae	*Scalopus aquaticus*	Eastern mole
Vespertillionidae	*Eptesicus fuscus*	Big brown bat
	Lasiurus borealis	Red bat
	Lasiurus cinereus	Hoary bat
	Lasiurus intermedius	Northern yellow bat
	Lasiurus seminolus	Semiole bat
	Myotis austroriparius	Southeastern bat
	Pipistrellus subflavus	Eastern pipistrelle
	Plecotus rafinesquii	Eastern big–eared bat

Source:
Specimen records for Duval County, Florida (Ashton and Ashton, 1988b and 1991).

APPENDIX I

APPENDIX I

RESULTS OF AQUATIC SAMPLING AT OPERABLE UNIT 2

ADDENDUM
TO
AQUATIC BIOLOGICAL SAMPLING SERVICES CONDUCTED AT NAVAL AIR STATION CECIL FIELD

Prepared for:

ABB Environmental Services, Inc.
2120 Washington Boulevard
Arlington, Virginia 22204

Prepared by:

EA Mid-Atlantic Regional Operations
EA Engineering, Science, and Technology
15 Loveton Circle
Sparks, Maryland 21152

June 1994

EA Project 60695.01

ADDENDUM
TO
AQUATIC BIOLOGICAL SAMPLING SERVICES CONDUCTED AT NAVAL AIR STATION CECIL FIELD

Prepared for:

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1. INTRODUCTION

In support of ABB Environmental Services, Inc. (ABB-ES) work at Naval Air Station (NAS) Cecil Field, Jacksonville, Florida, EA Engineering, Science and Technology provided aquatic biological sampling services. The aquatic sampling was conducted near hazardous waste sites in streams and lakes at NAS Cecil Field. The results of these studies will be used by ABB-ES to support both the assessment of ecological risks at these sites and remedial decision making. The objectives of the ecological assessment of these sites was to characterize aquatic habitats and to collect macroinvertebrates and fish. This report is an addendum to Aquatic Biological Sampling Services Conducted at NAS Cecil Field which was submitted in January 1994. The field and lab methods and data analyses for this report are the same as those described in the January 1994 report. The results of the macroinvertebrate sample analyses for all of the remaining stations not covered in the first report are presented here.

2. STUDY AREA

The study area consisted of Rowell Creek, Sal Taylor Creek, Yellow Water Creek, Lake Fretwell, and tributaries to these water bodies at NAS Cecil Field. Reference sites were also established on the streams upstream from identified or potential hazardous waste influence. In addition, all stream stations were compared to Five Mile Creek, a State of Florida regional reference site. Most station locations were previously established by ABB-ES personnel as part of other sampling programs and during Hester-Dendy sampler placement. An ABB-ES ecologist was onsite during the biological sampling and was responsible for determining the exact sampling locations.

This report will include data from Rowell Creek (Station R1, 1-3), Rowell Creek Golf Course (Station R1, 1-3), Golf Course (Stations 1 and 2), Lake Fretwell (Stations 1-8), Yellow Water Creek (Station R1, 1 and 2), Site 5 (Stations 2-5), Site 6 (Station 1), Sal Taylor Creek (Station R1, 1-8), Site 8 (Stations 1 and 2), and Site 9 (Station 1). Site 18 (Station 1) was visited, but due to lack of water, no biological collections were made; however, a physical/chemical characterization was conducted.

3. RESULTS

3.1 PHYSICAL/CHEMICAL CHARACTERIZATIONS

A summary of the physical/chemical characterizations and habitat assessment scores for each station sampled is included in Tables 3-1 and 3-2 and Tables 3-3 and 3-4, respectively. The data are presented in two groupings, the stream stations and the lake stations, for comparisons by major habitat type.

Riparian Zone/Instream Features

The riparian zone at most stations was predominantly forest with the exceptions of GC-BIO-1, RC-BIO-3, and STC-BIO-1 through 4, which were all located in open areas (Table 3-1). Local watershed erosion was classified as slight to moderate at many stations, but was classified as heavy at only one station, RC-GC-BIO-3. Non-point source pollution was obvious at 5-BIO-3 through 5, 9-BIO-1, 18-BIO-1, GC-BIO-1 and 2, RC-BIO-1 through 3, and RC-GC-BIO-1 through 3. Channelization was evident at GC-BIO-2 and STC-BIO-1 through 4. Canopy cover varied between moderate to heavy shade in the forested areas.

The lake stations were either near forests, roads, or in the center of the lake (Table 3-2). Erosion and non-point source pollution were slight where they occurred.

Sediment/Substrate

Petroleum sediment odor was evident at 5-BIO-3 and 4, 8-BIO-2, and STC-BIO-1 through 3. Anaerobic sediment odor was noted at 9-BIO-1, RC-GC-BIO-1, RC-GC-BIO-3, and STC-BIO-4.

Sand was a major substrate type at many stream stations. [illegible] pack was a major component at 5-BIO-2 through 5, and aquatic vegetation was common at GC-BIO-1 and STC-BIO-1 through 4.

Sediment odor was normal at all lake stations. Mud/muck/silt and detritus were the predominant substrate types at most stations. Sand was a major substrate type at LF-BIO-5 and 8, and aquatic vegetation was common at LF-BIO-7.

TABLE 3-1 PHYSICAL/CHEMICAL CHARACTERIZATION INFORMATION FROM STREAM STATIONS SAMPLED AT NAS-CECIL FIELD, JUNE 1993

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basis?

RIPARIAN ZONE/INSTREAM FEATURES

STATION	PERCENT FOREST	PERCENT FIELD/ PASTURE	PERCENT RESIDENTIAL	PERCENT OTHER	LOCAL WATERSHED EROSION	NPS POLLUTION	STREAM WIDTH (M)	HIGH WATER MARK (M)
FIVE MILE CREEK	100	0	0	0	NONE	NONE	3-7	3
5-BIO-2	75	0	0	25	MODERATE	OBVIOUS	0.5-1.0	1.0
5-BIO-3	80	0	0	20	SLIGHT	OBVIOUS	0.2-1.0	1.0
5-BIO-4	100	0	0	0	MODERATE	OBVIOUS	1.00	2.0
5-BIO-5	95	0	0	5	SLIGHT	OBVIOUS	1.00	2.0
8-BIO-1	90	10	0	0	NONE	SOME	0.50	0.5
8-BIO-2	95	5	0	0	NONE	SOME	1.00	0.5
9-BIO-1	100	0	0	0	MODERATE	OBVIOUS	1.00	2.0
18-BIO-1	100	0	0	0	MODERATE	OBVIOUS	5.00	3.0
GC-BIO-1	0	0	0	100	SLIGHT	OBVIOUS	5.0-6.0	2.0
GC-BIO-2	80	0	0	20	MODERATE	OBVIOUS	5.00	4.0
RC-BIO-1	100	0	0	0	MODERATE	OBVIOUS	8.00	2.5
RC-BIO-2	100	0	0	0	MODERATE	OBVIOUS	10.00	2.9
RC-BIO-3	25	0	0	75	MODERATE	OBVIOUS	3.00	2.0
RC-GC-BIO-1	100	0	0	0	MODERATE	OBVIOUS	4.00	4.0
RC-GC-BIO-2	100	0	0	0	MODERATE	OBVIOUS	4.00	4.0
RC-GC-BIO-3	80	0	0	20	HEAVY	OBVIOUS	3.0-4.0	6.0
STC-BIO-1	0	100	0	0	MODERATE	SOME	2.00	1.5
STC-BIO-2	0	100	0	0	MODERATE	SOME	3.00	1.5
STC-BIO-3	0	100	0	0	MODERATE	SOME	5.0	1.5
STC-BIO-4	5	95	0	0	NONE	SOME	1.0-3.0	2.0
STC-BIO-5	100	0	0	0	MODERATE	NONE	5.0-6.0	4.0
STC-BIO-6	100	0	0	0	MODERATE	NONE	6.0-8.0	4.0
STC-BIO-7	100	0	0	0	MODERATE	NONE	4.00	3.0
STC-BIO-R1	100	0	0	0	SLIGHT	SOME	2.00	2.0
YWC-BIO-1	90	0	10	0	SLIGHT	SOME	3.0-10.0	0.5
YWC-BIO-2	95	0	5	0	MODERATE	SOME	4.00	3.0
YWC-BIO-R1	100	0	0	0	SLIGHT	NONE	1.00	2.0

TABLE 3-1 (Cont.)

RIPARIAN ZONE/INSTREAM FEATURES						SEDIMENT/SUBSTRATE	
STATION	STREAM DEPTH (M)	VELOCITY	IMPOUNDED	CHANNELIZED	CANOPY COVER	SEDIMENT ODOR	SEDIMENT OILS
FIVE MILE CREEK	0.1-1	0.1	NO	NO	MOD. SHADE	NORMAL	ABSENT
5-BIO-2	0.1-0.5	0.00	NO	NO	MOD. SHADE	NORMAL	ABSENT
5-BIO-3	0.1-0.2	0.00	NO	NO	HEAVY SHADE	PETROLEUM	ABSENT
5-BIO-4	0.20	0.00	NO	NO	HEAVY SHADE	PETROLEUM	ABSENT
5-BIO-5	0.50	0.00	NO	NO	MOD. SHADE	NORMAL	ABSENT
8-BIO-1	0.20	0.00	NO	NO	LIGHT SHADE	NORMAL	SLIGHT
8-BIO-2	0.30	0.00	NO	NO	LIGHT SHADE	PETROLEUM	MODERATE
9-BIO-1	0.20	<0.1	NO	NO	HEAVY SHADE	ANAEROBIC	ABSENT
18-BIO-1	0.00	0.00	NO	NO	HEAVY SHADE	--	--
GC-BIO-1	0.2-1.0	<0.5	NO	NO	OPEN	NORMAL	ABSENT
GC-BIO-2	2.00	<0.1	NO	YES	HEAVY SHADE	NORMAL	ABSENT
RC-BIO-1	1.50	<0.5	NO	NO	MOD. SHADE	NORMAL	ABSENT
RC-BIO-2	1.90	<0.5	NO	NO	MOD. SHADE	NORMAL	ABSENT
RC-BIO-3	0.2-0.5	0.20	NO	NO	LIGHT SHADE	CHLORINE	ABSENT
RC-GC-BIO-1	1.00	<0.5	NO	NO	MOD. SHADE	ANAEROBIC	ABSENT
RC-GC-BIO-2	1.00	<0.5	NO	NO	MOD. SHADE	NORMAL	ABSENT
RC-GC-BIO-3	0.50	<0.5	NO	NO	MOD. SHADE	ANAEROBIC	ABSENT
STC-BIO-1	1.00	0.00	NO	YES	OPEN	PETROLEUM	MODERATE
STC-BIO-2	0.50	<0.5	NO	YES	OPEN	PETROLEUM	MODERATE
STC-BIO-3	0.30	<0.5	NO	YES	OPEN	PETROLEUM	MODERATE
STC-BIO-4	1.00	<0.5	NO	YES	OPEN	ANAEROBIC	ABSENT
STC-BIO-5	0.5-1.5	<0.5	NO	NO	MOD. SHADE	NORMAL	ABSENT
STC-BIO-6	0.2-1.0	0.10	NO	NO	MOD. SHADE	NORMAL	ABSENT
STC-BIO-7	0.30	<0.3	NO	NO	MOD. SHADE	NORMAL	ABSENT
STC-BIO-R1	0.2-0.5	<0.5	NO	NO	HEAVY SHADE	NORMAL	ABSENT
YWC-BIO-1	0.2-0.5	0.20	NO	NO	HEAVY SHADE	NORMAL	ABSENT
YWC-BIO-2	0.2-1.0	<0.1	NO	NO	HEAVY SHADE	NORMAL	ABSENT
YWC-BIO-R1	0.20	0.30	NO	NO	HEAVY SHADE	NORMAL	ABSENT

TABLE 3-1 (Cont.)

SEDIMENT/SUBSTRATE

STATION	PERCENT WOODY DEBRIS (SNAGS)	PERCENT LEAF PACKS	PERCENT AQUATIC VEGETATION	PERCENT BANKS/ ROOTS	PERCENT RIFFLES	PERCENT SAND	PERCENT MUD/MUCK/ SILT	PERCENT LEAF MATS	PERCENT OTHER (DETRITUS)	PERCENT OTHER (CLAY)	TOTAL
FIVE MILE CREEK	5	0	35	0	0	50	0	10	0	0	100
5-BIO-2	0	50	10	0	0	10	30	0	0	0	100
5-BIO-3	5	80	0	5	0	10	0	0	0	0	100
5-BIO-4	25	50	0	0	0	15	5	5	0	0	100
5-BIO-5	0	75	0	5	0	15	0	0	5	0	100
8-BIO-1	5	0	0	0	0	60	0	0	35	0	100
8-BIO-2	5	0	0	10	0	40	0	0	45	0	100
9-BIO-1	20	30	0	0	0	40	10	0	0	0	100
18-BIO-1	--	--	--	--	--	--	--	--	--	--	--
GC-BIO-1	0	10	80	0	0	5	5	0	0	0	100
GC-BIO-2	25	20	0	10	0	30	5	10	0	0	100
RC-BIO-1	15	0	0	15	0	60	0	10	0	0	100
RC-BIO-2	10	0	0	10	0	60	0	20	0	0	100
RC-BIO-3	10	5	5	0	0	80	0	0	0	0	100
RC-GC-BIO-1	20	25	0	10	0	45	0	0	0	0	100
RC-GC-BIO-2	20	25	0	10	0	45	0	0	0	0	100
RC-GC-BIO-3	10	15	0	15	0	40	10	10	0	0	100
STC-BIO-1	0	0	50	20	0	15	0	0	15	0	100
STC-BIO-2	0	0	50	20	0	15	0	0	15	0	100
STC-BIO-3	0	0	75	0	0	10	0	0	15	0	100
STC-BIO-4	0	0	50	0	0	10	0	0	30	10	100
STC-BIO-5	15	15	0	20	0	0	50	0	0	0	100
STC-BIO-6	10	10	0	15	0	65	0	0	0	0	100
STC-BIO-7	10	0	10	10	0	70	0	0	0	0	100
STC-BIO-R1	20	25	0	0	0	45	10	0	0	0	100
YWC-BIO-1	20	20	5	5	0	50	0	0	0	0	100
YWC-BIO-2	10	15	10	20	0	45	0	0	0	0	100
YWC-BIO-R1	40	15	0	20	0	25	0	0	0	0	100

TABLE 3-1 (Cont.)

WATER QUALITY

STATION	DEPTH (M)	TEMP (C)	PH (SU)	DO (MG/L)	COND (UMHOS/CM)	SECCHI
FIVE MILE CREEK	1	23	4.4	5.8	62	0.3
5-BIO-2	0.3	26.1	5.6	3.4	99	0.30
5-BIO-3	0.2	24.5	6.8	1.0	120	0.20
5-BIO-4	0.2	23.6	6.9	0.4	177	0.20
5-BIO-5	0.5	24.1	6.0	0.8	91	0.50
8-BIO-1	0.2	26.6	6.3	5.3	67	0.20
8-BIO-2	0.2	26.0	6.4	2.8	76	0.20
9-BIO-1	0.2	22.4	5.8	4.3	62	0.20
10-BIO-1	0.2	22.6	5.6	3.5	88	--
GC-BIO-1	0.2	25.1	6.4	4.2	144	0.20
GC-BIO-2	0.5	27.5	7.0	5.6	186	0.90
RC-BIO-1	0.5	28.0	7.3	5.7	187	1.50
RC-BIO-2	0.5	27.9	7.8	5.9	187	1.70
RC-BIO-3	0.2	27.1	6.7	5.2	437	0.20
RC-GC-BIO-1	0.2	21.8	5.4	0.9	173	1.00
RC-GC-BIO-2	1.0	23.4	6.2	1.4	168	1.00
RC-GC-BIO-3	0.4	23.2	6.6	2.3	195	0.40
STC-BIO-1	0.5	25.7	5.8	4.3	92	1.00
STC-BIO-2	0.3	26.5	6.2	7.4	148	0.30
STC-BIO-3	0.3	26.5	6.2	4.9	146	0.30
STC-BIO-4	1.0	24.3	5.9	3.4	125	1.00
STC-BIO-5	0.2	24.9	6.5	5.0	79	1.2
STC-BIO-6	0.2	25.6	6.7	6.8	143	0.20
STC-BIO-7	0.2	25.6	6.7	6.8	143	0.20
STC-BIO-R1	0.2	25.1	6.3	3.7	169	0.20
YWC-BIO-1	0.2	25.2	6.4	4.4	99	0.20
YWC-BIO-2	0.2	24.4	6.5	4.4	114	1.00
YWC-BIO-R1	0.2	23.9	6.5	4.1	105	0.20

TABLE 3-1 (Cont.)

WATER QUALITY (Cont.)

STATION	STREAM TYPE	WATER ODOR	WATER SURFACE OILS	CLARITY	COLOR	PERIPHYTON	FISH	AQUATIC MACROPHYTES	IRON SULFUR BACTERIA
FIVE MILE CREEK	SWAMP & BOG	NORMAL	NONE	CLEAR	TANNIC	COMMON	COMMON	COMMON	ABSENT
5-BIO-2	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	RARE	ABSENT
5-BIO-3	SWAMP & BOG	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	RARE	ABSENT
5-BIO-4	SWAMP & BOG	NORMAL	NONE	CLEAR	TANNIC	RARE	ABUNDANT	ABSENT	ABSENT
5-BIO-5	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	COMMON	ABSENT
8-BIO-1	SAND-BOTTOM	NORMAL	NONE	TURBID	OTHER	RARE	COMMON	ABSENT	ABSENT
8-BIO-2	SAND-BOTTOM	NORMAL	NONE	CLEAR	CLEAR	RARE	COMMON	ABSENT	ABSENT
9-BIO-1	SWAMP & BOG	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	ABSENT	ABSENT
18-BIO-1	--	NORMAL	NONE	TURBID	MUDDY	ABSENT	COMMON	ABSENT	ABSENT
GC-BIO-1	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	COMMON	ABUNDANT	ABSENT
GC-BIO-2	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	ABSENT	ABSENT	ABSENT
RC-BIO-1	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	ABSENT	ABSENT
RC-BIO-2	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	RARE	ABSENT
RC-BIO-3	SAND-BOTTOM	CHLORINE	NONE	CLEAR	CLEAR	ABSENT	ABSENT	ABSENT	ABSENT
RC-GC-BIO-1	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	ABSENT	ABSENT
RC-GC-BIO-2	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	ABSENT	ABSENT
RC-GC-BIO-3	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	COMMON	ABSENT	ABSENT
STC-BIO-1	SAND-BOTTOM	NORMAL	SHEEN	CLEAR	CLEAR	COMMON	COMMON	COMMON	ABSENT
STC-BIO-2	SAND-BOTTOM	NORMAL	SHEEN	CLEAR	CLEAR	COMMON	COMMON	COMMON	ABSENT
STC-BIO-3	SAND-BOTTOM	NORMAL	NONE	CLEAR	CLEAR	RARE	RARE	ABSENT	ABSENT
STC-BIO-4	SAND-BOTTOM	NORMAL	NONE	CLEAR	GREEN	ABUNDANT	--	ABUNDANT	ABSENT
STC-BIO-5	SAND-BOTTOM	NORMAL	NONE	TURBID	TANNIC	RARE	RARE	RARE	ABSENT
STC-BIO-6	SAND-BOTTOM	NORMAL	NONE	CLEAR	CLEAR	COMMON	COMMON	RARE	ABSENT
STC-BIO-7	SAND-BOTTOM	NORMAL	NONE	CLEAR	CLEAR	COMMON	COMMON	RARE	ABSENT
STC-BIO-R1	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	ABSENT	ABSENT
YWC-BIO-1	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	RARE	RARE	ABSENT
YWC-BIO-2	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	COMMOMN	COMMON	ABSENT
YWC-BIO-R1	SAND-BOTTOM	NORMAL	NONE	CLEAR	TANNIC	RARE	COMMOMN	ABSENT	ABSENT

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TABLE 3-2 PHYSICAL/CHEMICAL CHARACTERIZATION INFORMATION FROM LAKE STATIONS SAMPLED AT NAS-CECIL FIELD, JUNE 1993

RIPARIAN ZONE/INSTREAM FEATURES

STATION	PERCENT FOREST	PERCENT RESIDENTIAL	PERCENT OTHER (LAKE)	PERCENT OTHER (ROADS)	LOCAL WATERSHED EROSION	NPS POLLUTION	SYSTEM WIDTH (M)	HIGH WATER MARK (M)	SYSTEM DEPTH (M)	IMPOUNDED	CANOPY COVER
LF-BIO-1	40	10	50	0	SLIGHT	SOME	--	2.3	1.30	YES	OPEN
LF-BIO-2	0	0	100	0	NONE	NONE	--	2.0	1.00	YES	OPEN
LF-BIO-3	50	0	50	0	NONE	NONE	--	2.2	1.20	YES	OPEN
LF-BIO-4	100	0	0	0	NONE	NONE	--	2.5	1.50	YES	OPEN
LF-BIO-5	50	0	0	50	SLIGHT	SOME	--	2.7	1.70	YES	OPEN
LF-BIO-6	75	0	0	25	SLIGHT	SOME	--	4.5	3.50	YES	OPEN
LF-BIO-7	50	0	0	50	SLIGHT	SOME	6.0-7.0	3.2	2.20	YES	OPEN
LF-BIO-8	60	0	40	0	NONE	NONE	5.0-10.0	2.4	1.40	YES	OPEN
6-BIO-1	60	0	40	0	SLIGHT	NONE	3.0-5.0	3.0	0.2-0.5	YES	OPEN

TABLE 3-2 (Cont.)

SEDIMENT/SUBSTRATE

STATION	SEDIMENT ODOR	SEDIMENT OILS	PERCENT WOODY DEBRIS (SNAGS)	PERCENT LEAF PACKS	PERCENT AQUATIC VEGETATION	PERCENT BANKS/ ROOTS	PERCENT RIFFLES	PERCENT SAND	PERCENT MUD/MUCK/ SILT	PERCENT LEAF MATS	PERCENT OTHER (DETRITUS)	PERCENT OTHER (CLAY)	TOTAL
LF-BIO-1	NORMAL	ABSENT	0	0	0	0	0	0	30	0	50	20	100
LF-BIO-2	NORMAL	ABSENT	0	0	0	0	0	10	50	0	40	0	100
LF-BIO-3	NORMAL	ABSENT	0	0	0	0	0	10	50	0	40	0	100
LF-BIO-4	NORMAL	ABSENT	0	0	0	0	0	0	25	0	75	0	100
LF-BIO-5	NORMAL	ABSENT	0	0	0	0	0	50	30	0	20	0	100
LF-BIO-6	NORMAL	ABSENT	0	0	0	0	0	0	75	15	10	0	100
LF-BIO-7	NORMAL	ABSENT	0	0	50	0	0	0	25	25	0	0	100
LF-BIO-8	NORMAL	ABSENT	0	0	0	0	0	50	25	0	25	0	100
6-BIO-1	NORMAL	ABSENT	10	15	25	0	0	0	30	0	20	0	100

TABLE 3-2 (Cont.)

WATER QUALITY

STATION	DEPTH TOP (M)	TEMP TOP (C)	PH TOP (SU)	DO TOP (MG/L)	COND TOP (UMHOS/CM)	DEPTH BOTTOM (M)	TEMP BOTTOM (C)	PH BOTTOM (SU)	DO BOTTOM (MG/L)	COND BOTTOM (UMHOS/CM)	SECCHI (M)
LF-BIO-1	0.2	31.9	7.9	7.6	178	1.3	31.0	7.7	7.1	178	1.30
LF-BIO-2	0.2	31.4	7.7	7.7	179	1.0	30.8	7.6	8.3	180	1.00
LF-BIO-3	0.2	30.1	7.2	6.5	177	1.2	29.3	7.1	6.5	179	1.20
LF-BIO-4	0.2	28.9	6.9	5.6	178	1.5	27.8	6.8	4.8	178	1.50
LF-BIO-5	0.2	29.0	7.6	5.9	180	1.7	27.7	7.1	4.0	180	1.70
LF-BIO-6	0.2	27.8	8.1	5.6	181	3.5	25.1	6.2	0.1	194	1.30
LF-BIO-7	0.2	27.3	6.8	4.0	183	2.2	27.0	6.7	3.0	183	2.20
LF-BIO-8	0.2	30.7	7.4	6.9	169	1.4	28.0	7.1	2.7	159	1.40
6-BIO-1	--	--	--	--	--	0.5	26	6.5	1.7	175	0.5

TABLE 3-2 (Cont.)

WATER QUALITY (Cont.)

STATION	SYSTEM TYPE	WATER ODOR	WATER SURFACE OILS	CLARITY	COLOR	PERIPHYTON	FISH	AQUATIC MACROPHYTES	IRON SULFUR BACTERIA
LF-BIO-1	LAKE	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	ABSENT	RARE	ABSENT
LF-BIO-2	LAKE	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	ABSENT	ABUNDANT	ABSENT
LF-BIO-3	LAKE	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	ABSENT	COMMON	ABSENT
LF-BIO-4	LAKE	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	ABSENT	COMMON	ABSENT
LF-BIO-5	LAKE	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	ABSENT	ABSENT	ABSENT
LF-BIO-6	LAKE	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	ABSENT	ABSENT	ABSENT
LF-BIO-7	LAKE	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	ABUNDANT	ABUNDANT	ABSENT
LF-BIO-8	LAKE	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	COMMON	ABUNDANT	ABSENT
6-BIO-1	POND	NORMAL	NONE	CLEAR	TANNIC	ABUNDANT	COMMON	COMMON	ABSENT

TABLE 3-3 HABITAT ASSESSMENT SCORES FOR STREAM STATIONS SAMPLED AT NAS-CECIL FIELD, JUNE 1993

STATION	BOTTOM SUBSTRATE	WATER VELOCITY	ARTIFICIAL CHANNEL	BANK STABILITY	RIPARIAN ZONE VEGETATION	FLOW ADJUSTMENT	TOTAL SCORE	PERCENT COMPARISON TO REFERENCE
FIVE MILE CREEK	24	8	15	10	10	5	67 72	100
5-BIO-2	5	0	12	8	5	--	30	44.8 (41.7)
5-BIO-3	7	0	12	5	4	--	28	41.8 38.9
5-BIO-4	15	2	12	3	5	--	37	55.2 51.4
5-BIO-5	5	0	12	8	3	--	28	41.8 38.9
8-BIO-1	3	0	13	9	4	--	29	43.3
8-BIO-2	5	1	13	9	6	--	34	50.7
9-BIO-1	16	7	13	5	8	--	49	73.1
GC-BIO-1	16	5	3	9	2	--	35	52.2
GC-BIO-2	20	3	12	6	8	--	49	73.1
RC-BIO-1	20	6	14	7	7	--	54	80.6
RC-BIO-2	20	6	14	8	7	--	55	82.1
RC-BIO-3	12	20	12	7	3	--	54	80.6
RC-GC-BIO-1	23	3	14	5	7	--	52	77.6
RC-GC-BIO-2	23	3	14	3	7	--	50	74.6
RC-GC-BIO-3	20	3	14	2	4	--	43	64.2
STC-BIO-1	5	0	2	2	2	--	11	16.4
STC-BIO-2	5	2	2	2	2	--	13	19.4
STC-BIO-3	5	3	2	2	2	--	14	20.9
STC-BIO-4	5	5	3	8	2	--	23	34.3
STC-BIO-5	18	18	14	5	8	--	63	94
STC-BIO-6	12	16	13	7	6	--	54	80.6
STC-BIO-7	21	21	13	6	5	--	66	98.5
STC-BIO-R1	18	10	14	8	6	--	56	83.6
YWC-BIO-1	24	7	14	9	8	--	62	92.5
YWC-BIO-2	25	10	14	6	5	--	60	89.6
YWC-BIO-R1	24	22	14	8	7	--	75	100

TABLE 3-4 HABITAT ASSESSMENT SCORES FOR LAKE STATIONS SAMPLED AT NAS-CECIL FIELD, JUNE 1993

STATION	BOTTOM SUBSTRATE	WATER VELOCITY	ARTIFICIAL CHANNEL	BANK STABILITY	RIPARIAN ZONE VEGETATION	FLOW ADJUSTMENT	TOTAL SCORE
LF-BIO-1	4	0	14	6	2	--	26
LF-BIO-2	10	0	14	9	2	--	35
LF-BIO-3	10	0	14	9	4	--	37
LF-BIO-4	10	0	14	9	4	--	37
LF-BIO-5	7	0	14	9	0	--	30
LF-BIO-6	7	0	14	9	0	--	30
LF-BIO-7	18	0	14	8	6	--	46
LF-BIO-8	10	0	14	9	5	--	38
6-BIO-1	24	0	14	9	5	--	52

Water Quality

Water quality measurements were made at or near the bottom of the stream stations. Water depth was 1 meter or less at all stations. Water temperature ranged from 21.8 to 28.0°C and pH ranged from 5.4 to 7.8, with pH at most stations less than 7.0. The dissolved oxygen (DO) values ranged from a very low value of 0.4 mg/L at 5-BIO-4 to 7.4 mg/L at STC-BIO-2. Other very low values were recorded at 5-BIO-3 (1.0 mg/L), 5-BIO-5 (0.8 mg/L) RC-GC-BIO-2 (0.9 mg/L), and RC-GC-BIO-2 (1.4 mg/L). In general, DO levels were low, ranging from 2.3 to 6.8 mg/L. Conductivity ranged from 62 to 437 μmhos/cm, with most measurements less than 200 μmhos/cm.

Water odor was normal at all stream stations except RC-BIO-3, which is located below the wastewater treatment plant and smelled like chlorine. Water surface oils were present as a sheen only at STC-BIO-1 and 2. Water clarity was classified as clear at most stations, except 8-BIO-1, 18-BIO-1, and STC-BIO-5, which were turbid. Water color was tannic at many stations, with some classified as clear, muddy (18-BIO-1), and green (STC-BIO-4). Periphyton was rare or absent at most stations and abundant at GC-BIO-1 and STC-BIO-4. Aquatic macrophytes were absent or rare at most stations and abundant at GC-BIO-1 and STC-BIO-4.

Water quality measurements were made both near the bottom and at the surface at the lake stations. Both temperature and pH were slightly higher at the surface. The combined surface and bottom temperature values ranged from 25.1 to 31.9°C, and pH ranged from 6.2 to 8.1. Conductivity did not vary appreciably from surface to bottom, ranging from 177 to 194 μmhos/cm overall. DO was substantially different from surface to bottom at some stations. At LF-BIO-6, the deepest station (3.5 m), the bottom DO was 0.1 mg/L compared to 5.6 mg/L at the surface. The surface/bottom combined range was 0.1 to 8.3 mg/L. Bottom DO was low (1.7 mg/L) at the small pond station, 6-BIO-1.

No unusual water odors or surface oils were noted at the lake stations. All stations had clear, tannic colored water with abundant periphyton. Aquatic macrophytes were abundant at LF-BIO-2, 7, and 8, and absent to common at the other stations.

Habitat Assessment

Habitat quality scores at the stream stations were lowest at STC-BIO-1 through 4 (habitat scores of 11 to 23) and ranged as high as 75 at the reference station at Yellow Water Creek, YWC-BIO-R1 (Table 3-3). The reference station at Sal Taylor Creek, STC-BIO-R1 (56),

had a moderately high score. Five Mile Creek, the regional reference that will be compared with all the macroinvertebrate data, had a score of 67. Most scores ranged between 43 and 66. Moderately low scores also occurred at 5-BIO-2 through 5 (28-37), 8 BIO-1 and 2 (29 and 34), and GC-BIO-1 (35).

Although the habitat assessment procedure is designed for stream habitat, information that was applicable to the lake stations was tabulated and scores were assigned (Table 3-4). These scores were only comparable to each other and did show some variability. The scores at Lake Fretwell ranged from 26 at LF-BIO-1 to 46 at LF-BIO-7. At the pond station, 6-BIO-1, the score was 52.

3.2 BENTHIC MACROINVERTEBRATE COMMUNITY

A taxonomic list of the benthic macroinvertebrates collected in the study is presented in Table 3-5. It includes all taxa that were collected from the stream and lake stations using the combination of the dip net, Hester-Dendy, and Ponar samplers. A macroinvertebrate data listing including all the information on identification and enumeration of the organisms collected at the stations sampled is listed in Appendix A. The metrics were calculated, based on the information in Appendix A, for each station location from the three separate sample types and are presented in Tables 3-6 through 3-8. Since significant chemical contamination was not detected in sediment samples from STC-BIO-6 and 7, and RC-GC-BIO-2 and 3, the Hester-Dendy and Ponar samples were not processed. Dip net samples were processed and the data were reported for informational purposes.

Metrics are measurements of various components of the structure and function of the community. Independently, they provide information on the status of the portion of the community they represent. Together the metrics contribute to an integrated assessment of the biological condition of the community. The data are presented in three major station groupings according to watershed as follows:

1. Lake Fretwell and pond station (Ponar data only)
2. Rowell Creek, Golf Course, Site 5, and reference stations
3. Sal Taylor Creek, Yellow Water Creek, and reference stations

Dip Net Samples

The metric values selected for analyses of the dip net data are presented in Table 3-9. These values were assigned bioassessment ranking scores and the total scores to be compared to the

TABLE 3-5 MACROINVERTEBRATE TAXA LIST FOR NAS—CECIL FIELD, JUNE 1993

Tricladida
Nemertea
Nematoda
Oligochaeta
- Lumbriculidae
- Enchytraeidae
- Tubificidae
- Tubificidae imm. w
- Tubificidae imm. w/o
- *Limnodrilus hoffmeisteri*
- *Ilyodrilus templetoni*
- *Aulodrilus pigueti*
- *Bothrioneurum vejdovskyanum*
- Naididae
- *Slavina appendiculata*
- *Dero*
- *Dero digitata*
- *Dero flabelliger*
- *Dero (Aulophorus)*
- *Dero furcata*
- *Dero (Dero)*
- *Nais*
- *Nais communis*
- *Pristina osborni*
- *Pristina aequiseta*
- *Pristina leidyi*

Hirudinea
- *Helobdella*
- *Helobdella elongata*
- *Helobdella triserialis*
- *Helobdella fusca*
- Glossiphoniidae
- *Placobdella papillifera*
- Hirudinidae
- Erpobdellidae
- *Mooreobdella microstoma*

Gastropoda
- Pleuroceridae
- Hydrobiidae
- Lymnaeidae
- Ancylidae
- Planorbidae
- *Physella*

Pelecypoda
- *Corbicula fluminea*
- Sphaeriidae
- Unionidae

Arachnoidea
- Acarina

TABLE 3-5 (Cont.)

Malacostraca
- *Asellus*
- Gammaridae
- *Gammarus*
- *Hyalella azteca*
- *Crangonyx*
- *Palaemonetes paludosus*
- Astacidae

Collembola

Ephemeroptera
- *Stenonema*
- *Stenacron*
- Baetidae
- Baetis
- *Callibaetis*
- *Centroptilum*
- Ephemerellidae
- *Caenis*
- *Paraleptophlebia*

Odonata
- Anisoptera
- Aeshnidae
- *Boyeria*
- *Nasiaeschna*
- Gomphidae
- *Dromogomphus*
- *Progomphus*
- Libellulidae
- Corduliidae
- Macromiidae
- Calopterygidae
- *Calopteryx*
- *Hetaerina*
- Coenagrionidae
- *Argia*

Hemiptera
- Belostomatidae
- Corixidae
- Notonectidae

Coleoptera
- *Haliplus*
- *Derovatellus*
- *Laccophilus*
- *Peltodytes*
- Dytiscidae
- *Celina*
- *Gyrinus*
- *Dineutus*

TABLE 3-5 (Cont.)

- Hydrophilidae
  - *Tropisternus*
  - *Berosus*
  - *Helichus*
- Elmidae
  - *Stenelmis*
  - *Dubiraphia*
  - *Microcylloepus*
  - *Ancyronyx*
  - *Ancyronyx variegata*
- Curculionidae

Megaloptera
- Corydalidae
  - *Corydalus cornutus*
  - *Nigronia serricornis*
  - *Sialis*

Trichoptera
- *Chimarra*
- Psychomyiidae
  - *Lype diversa*
  - *Psychomyia flavida*
- Hydropsychidae
  - *Cheumatopsyche*
  - *Hydropsyche*
- Hydroptilidae
  - *Oxyethira*
- Leptoceridae
  - *Oecetis*
  - *Phylocentropus*
- Polycentropodidae
  - *Cyrnellus fraternus*
  - *Polycentropus*

Lepidoptera

Diptera
- *Chaoborus*
- *Tipulidae*
  - *Tipula*
  - *Hexatoma*
  - *Bittacomorpha*
- Ceratopogonidae
- Culicidae
- Simuliidae
- Chironomidae
  - Orthocladiinae
  - Tanypodinae
    - *Clinotanypus*
    - *Coelotanypus*
    - *Procladius*

TABLE 3-5 (Cont.)

Chironomini
Cricotopus bicinctus
Stenochironomus
Cladotanytarsus
Tanytarsini
Tanytarsus
Tanytarsus Epler F
Chironomus
Cryptochironomus
Polypedilum fallax
Polypedilum convictum
Polypedilum illinoense
Polypedilum scalaenum
Ablabesmyia
Dicrotendipes
Nanocladius
Paralauterborniella
Rheotanytarsus
Parachironomus
Pentaneura
Parametriocnemus
Paratanytarsus
Larsia
Labrundinia
Nilotanypus
Rheocricotopus
Thienemanniella
Tribelos
Cryptotendipes
Paracladopelma
Phaenopsectra
Cladopelma
Stelechomyia
Xylotopus
Thienemannimyia
Cladotanytarsus
Mesosmittia
Harnischia
Natarsia
Glyptotendipes
Tanypus
Microtendipes
Pseudochironomus
Omisus
Endochironomus
Stictochironomus
Zavreliella
Empididae

TABLE 3-5 (Cont.)

Hemerodromia
Psychodidae
Stratiomyidae
Tabanidae

TABLE 3-6 SUMMARY OF METRICS CALCULATED FOR EACH STATION SAMPLED WITH A DIP NET AT NAS-CECIL FIELD, JUNE 1993

Location	Total Taxa	Number individuals per sq. M	Dominant Taxon	Percent Dominant Taxon	Florida Index	Shannon-Weaver Index (base 2)	Percent Diptera	Percent Chironomid	Percent EPT	Percent Collector-filterers	Percent Shredders	Percent Calcium Dependent	Hilsenhoff Biotic Index
5 Mile Creek	32	824	LUMBRICULIDAE	10.7	12	4.500	21.4	20.4	9.7	9.7	15.5	17.5	6.9
5-BIO-2	19	36	CORDULIIDAE	32.4	8	3.230	31.5	22.2	2.8	13.0	6.5	11.1	7.1
5-BIO-3	19	36	ANCYLIDAE	26.2	7	3.286	45.8	42.1	0.0	2.8	10.3	34.6	7.7
5-BIO-4	16	320	CHIRONOMUS	36.9	7	2.983	71.8	69.9	0.0	1.0	18.4	15.5	8.9
5-BIO-5	10	30	ANCYLIDAE	58.2	4	1.969	7.7	5.5	0.0	2.2	5.5	62.6	6.7
6-BIO-1	25	938	DERO FLABELLIGER	43.3	5	3.168	25.9	20.4	1.0	6.0	6.0	4.0	8.7
8-BIO-1	12	21	ASTACIDAE	27.0	4	2.741	17.5	15.9	0.0	0.0	30.2	27.0	6.8
8-BIO-2	8	13	COENAGRIONIDAE	23.7	2	2.483	5.3	5.3	0.0	0.0	21.1	21.1	7.2
9-BIO-1	21	68	AULODRILUS PIGUETI	18.7	4	3.725	42.4	40.4	0.0	8.9	17.7	30.5	6.7
GC-BIO-1	24	1353	CAENIS	25.5	4	3.592	13.8	13.1	39.3	3.4	8.3	11.0	6.5
GC-BIO-2	24	296	DERO FLABELLIGER	27.4	7	3.768	36.8	33.7	3.2	10.5	7.4	21.1	7.4
RC-BIO-1	20	453	PHYSELLA	21.6	7	3.628	51.5	48.5	0.0	17.5	12.4	33.0	7.1
RC-BIO-2	30	1017	PLANORBIDAE	18.3	8	4.097	29.4	29.4	4.6	11.9	16.5	43.1	7.3
RC-BIO-3	12	197	P. ILLINOENSE	59.6	3	2.189	62.0	62.0	0.0	4.7	60.2	9.5	6.4
RC-BIO-R1	20	368	DERO (DERO)	17.4	3	3.755	62.0	58.7	1.1	6.5	6.5	7.6	7.7
RC-GC-BIO-1	19	333	DUBIRAPHIA	20.6	5	3.587	19.6	19.6	8.4	1.9	4.7	5.6	7.4
RC-GC-BIO-2	21	448	DERO (DERO)	16.7	6	3.888	25.0	25.0	12.5	2.1	2.1	15.6	7.6
RC-GC-BIO-3	23	117	DICROTENDIPES	21.6	5	3.927	46.6	45.5	0.0	12.5	8.0	18.2	7.0
RC-GC-BIO-R1	21	1307	DICROTENDIPES	39.3	8	2.898	76.4	74.3	5.7	25.0	10.7	5.7	6.9
STC-BIO-1	7	420	DERO (DERO)	64.4	2	1.626	2.2	2.2	0.0	0.0	0.0	0.0	9.9
STC-BIO-2	16	190	DICROTENDIPES	45.1	3	2.924	69.6	65.7	0.0	0.0	13.7	4.9	7.6
STC-BIO-3	18	155	P. ILLINOENSE	33.1	6	2.802	77.3	77.3	0.0	1.0	36.8	1.6	7.3
STC-BIO-4	20	42	LARSIA	19.8	4	3.282	87.3	85.7	0.0	0.0	11.9	1.6	7.7
STC-BIO-5	22	1391	HYDROBIIDAE	51.7	3	2.587	16.8	16.8	2.7	22.1	1.3	71.1	7.4
STC-BIO-6	32	376	P. PALUDOSUS	16.5	11	4.195	24.8	24.8	18.2	16.5	20.7	32.2	5.7
STC-BIO-7	33	289	P. ILLINOENSE	12.9	12	4.540	44.1	41.9	23.7	17.2	19.4	10.8	6.1
STC-BIO-8	52	179	STENELMIS	15.6	23	4.615	19.7	13.0	12.3	16.5	8.6	26.8	6.2
STC-BIO-R1	14	14	CORDULIIDAE	40.5	4	2.988	11.9	9.5	0.0	0.0	16.7	26.2	6.2
YWC-BIO-1	25	299	ASELLUS	24.0	5	3.884	26.0	24.0	7.3	4.2	28.1	39.6	6.8
YWC-BIO-2	35	352	COENAGRIONIDAE	14.2	15	4.524	16.8	16.8	10.6	8.8	14.2	27.4	6.4
YWC-BIO-R1	20	376	STENELMIS	31.4	7	3.071	6.6	5.0	10.7	10.7	0.8	28.1	5.5

TABLE 3-7 SUMMARY OF METRICS CALCULATED FOR EACH STATION SAMPLED WITH A HESTER-DENDY ARTIFICIAL SUBSTRATE SAMPLER AT NAS-CECIL FIELD, JUNE 1993

Location	Total Taxa	Number individuals per sq. M	Dominant Taxon	Percent Dominant Taxon	Florida Index	Shannon-Weaver Index (base 2)	Percent Diptera	Percent Chironomid	Percent EPT	Percent Collector-filterers	Percent Shredders	Percent Calcium Dependent	Hilsenhoff Biotic Index
5 MILE CREEK	30	326	TANYTARSUS SP. A	15.3	15	4.612	60.5	60.5	5.6	29.8	9.7	0.8	6.4
5-MIO-2	14	498	CHIRONOMUS	81.0	5	1.332	92.6	90.5	0.0	1.1	4.2	3.7	9.4
GC-BIO-1	21	777	DERO (DERO)	66.4	4	2.001	6.8	6.1	12.5	1.4	0.3	8.5	9.0
GC-BIO-2	15	195	PLANORBIDAE	54.1	3	2.386	10.8	9.5	0.0	0.0	6.8	74.3	6.5
RC-BIO-3	22	26686	P. ILLINOENSE	97.0	12	0.279	99.5	99.5	0.0	0.0	98.6	0.0	6.0
RC-BIO-R1	22	687	CHIRONOMUS	50.2	3	2.529	89.3	88.5	0.8	0.8	4.2	0.8	8.7
RC-GC-BIO-1	25	1156	CHIRONOMUS	22.2	8	3.198	81.3	81.3	1.1	1.7	10.7	1.4	7.9
RC-GC-BIO-R1	23	953	ABLABESMYIA	18.5	6	2.887	81.5	80.9	1.4	3.9	3.3	10.2	7.4
STC-BIO-1	2	95	TUBIFICIDAE IMM. W	63.9	0	0.944	0.0	0.0	0.0	0.0	0.0	0.0	10.0
STC-BIO-2	7	313	DICROTENDIPES	68.1	0	1.419	76.5	76.5	0.0	0.0	0.0	1.7	8.4
STC-BIO-4	7	74	DICROTENDIPES	46.4	1	1.991	96.4	96.4	0.0	0.0	28.6	0.0	7.4
STC-BIO-5	26	885	ABLABESMYIA	20.8	8	3.527	66.1	66.1	0.9	6.3	16.5	24.4	7.0
STC-BIO-8	41	3860	LYPE DIVERSA	24.1	14	3.509	34.1	22.2	34.1	7.4	1.4	12.5	4.7
YWC-BIO-1	35	1835	DICROTENDIPES	62.3	12	2.484	78.2	76.5	5.0	3.2	4.0	3.6	7.8
YWC-BIO-2	28	1338	DICROTENDIPES	49.7	9	2.804	88.6	88.4	4.5	13.9	5.1	0.4	7.1
YWC-BIO-R1	36	1475	ANCYLIDAE	27.9	8	3.900	35.5	20.9	17.5	12.1	3.2	30.0	5.6

TABLE 3-8 SUMMARY OF METRICS CALCULATED FOR EACH STATION SAMPLED WITH A PONAR GRAB SAMPLER AT NAS-CECIL FIELD, JUNE 1993

Location	Total Taxa	Number individuals per sq. M	Dominant Taxon	Percent Dominant Taxon	Florida Index	Shannon-Weaver Index (base 2)	Percent Diptera	Percent Chironomid	Percent EPT	Percent Collector-filterers	Percent Shredders	Percent Calcium Dependent	Hilsenhoff Biotic Index
5-BIO-2	13	702	CHIRONOMUS	30.6	3	2.807	77.6	75.5	0.0	2.0	0.0	8.2	8.7
5-BIO-3	24	1691	TUBIFICIDAE IMM. W/O	32.2	5	3.116	44.9	43.2	0.0	3.4	4.2	10.2	8.9
5-BIO-4	10	1247	TUBIFICIDAE IMM. W/O	60.9	2	1.973	32.2	28.7	0.0	1.1	5.7	3.4	9.4
5-BIO-5	5	143	CULICIDAE	30.0	2	2.246	50.0	20.0	0.0	30.0	0.0	20.0	7.3
6-BIO-1	25	831	PELECYPODA	12.1	5	4.303	60.3	39.7	5.2	13.8	15.5	17.2	7.2
8-BIO-1	13	459	PROCLADIUS	18.8	3	3.368	46.9	46.9	0.0	6.3	9.4	12.5	7.0
8-BIO-2	8	459	TUBIFICIDAE IMM. W/O	37.5	1	2.394	37.5	37.5	0.0	0.0	3.1	3.1	9.1
9-BIO-1	17	2924	TRIBELOS	38.2	4	2.814	61.8	61.3	0.0	2.5	2.5	11.8	6.4
GC-BIO-1	34	6034	CERATOPOGONIDAE	16.6	5	4.151	55.6	39.0	5.9	9.7	6.7	3.3	7.3
GC-BIO-2	26	1663	TRIBELOS	22.4	6	3.696	46.6	43.1	0.9	22.4	6.0	24.1	6.8
LF-BIO-1	20	3268	TANTARSUS	40.8	5	2.882	76.3	75.9	0.9	40.8	0.4	3.1	7.8
LF-BIO-2	26	5475	TANTARSUS	43.3	5	3.082	78.3	78.0	5.5	44.1	9.9	1.8	7.6
LF-BIO-3	20	4773	TANTARSUS	46.2	5	2.687	72.1	72.1	3.0	46.2	0.6	1.8	7.6
LF-BIO-4	20	5862	TANTARSUS	43.8	4	2.767	78.0	78.0	2.4	43.8	0.7	3.2	7.6
LF-BIO-5	10	1648	TUBIFICIDAE IMM. W/O	53.0	1	1.978	43.5	41.7	0.0	0.0	0.0	0.0	9.7
LF-BIO-6	8	1663	CHAOBORUS	63.8	0	1.332	66.4	2.6	0.0	0.9	0.0	0.0	8.6
LF-BIO-7	25	1433	TANYTARSINI	26.0	4	3.657	77.0	75.0	1.0	36.0	2.0	10.0	7.4
LF-BIO-8	22	2709	TANYTARSUS	41.3	1	2.983	60.3	58.7	0.0	41.3	0.5	3.2	7.8
RC-BIO-1	16	4085	TUBIFICIDAE IMM. W/O	53.7	3	2.404	18.9	11.6	0.0	10.9	0.7	6.0	9.3
RC-BIO-2	24	4042	DERO (DERO)	25.2	2	3.218	30.1	29.8	1.1	12.8	9.2	19.5	8.2
RC-BIO-3	14	10,736	P. ILLINOENSE	42.2	3	2.434	77.2	77.2	0.0	1.5	53.5	1.5	7.7
RC-BIO-R1	23	2480	PHAENOPSECTRA	43.4	2	2.844	69.4	68.2	9.8	11.6	0.6	2.3	7.6
RC-GC-BIO-1	28	7167	TRIBELOS	23.8	6	3.356	65.0	64.8	0.6	1.4	1.9	2.8	7.9
RC-GC-BIO-R1	42	11,624	DICROTENDIPES	32.2	12	3.627	68.9	66.9	1.5	15.8	5.3	9.6	7.4
STC-BIO-1	4	143	TUBIFICIDAE IMM. W/O	70.0	1	1.357	10.0	10.0	0.0	0.0	10.0	0.0	9.5
STC-BIO-2	19	1261	DICROTENDIPES	61.4	4	2.306	72.7	72.7	0.0	0.0	3.4	1.1	8.3
STC-BIO-3	17	731	TUBIFICIDAE IMM. W/O	27.5	2	3.453	41.2	39.2	0.0	7.8	2.0	13.7	8.7
STC-BIO-4	10	530	PROCLADIUS	40.5	2	2.645	86.5	81.1	0.0	0.0	10.8	0.0	8.3
STC-BIO-5	32	5862	SPHAERIIDAE	36.9	5	3.204	29.1	29.1	0.0	39.1	6.4	40.8	8.2
STC-BIO-8	23	2981	SPHAERIIDAE	45.7	8	2.687	14.4	12.5	1.0	47.6	2.4	47.1	8.1
STC-BIO-R1	24	2609	TUBIFICIDAE IMM. W/O	39.6	5	3.003	4.4	4.4	0.5	7.1	0.5	12.1	8.9
YWC-BIO-1	29	3268	PELECYPODA	31.6	1	3.339	25.0	19.7	1.3	35.5	16.7	39.9	7.1
YWC-BIO-2	46	4974	TUBIFICIDAE IMM. W/O	19.9	9	4.417	35.2	28.2	2.9	18.4	10.1	23.9	7.2
YWC-BIO-R1	33	6479	STENELMIS	29.9	6	3.531	29.2	25.9	4.9	21.7	16.6	16.2	6.3

TABLE 3-9 SELECTED METRICS FOR BIOASSESSMENT SCORING FOR MACROINVERTEBRATES COLLECTED WITH A DIP NET FROM CECIL FIELD STATIONS, JUNE 1993

	STATIONS							
METRIC	5 MILE CREEK	5-BIO-2	5-BIO-3	5-BIO-4	5-BIO-5	8-BIO-1	8-BIO-2	9-BIO-1
TAXA RICHNESS	32	19	19	16	10	12	8	21
FLORIDA INDEX	12	8	4	4	4	4	2	4
HBI	6.9	7.1	7.7	8.9	6.7	6.8	7.2	6.7
EPT INDEX	4	1	0	0	0	0	0	0
CHIRONOMID TAXA	7	5	6	7	3	4	2	10
% DOMINANT TAXON	10.7	32.4	26.2	36.9	58.2	27.0	23.7	18.7
% SHREDDERS	15.5	6.5	10.3	18.4	5.5	30.2	21.1	17.7
% FILTERER-COLLECTORS	9.7	13.0	2.8	1.0	2.2	0	0	8.9

Note: EPT = Ephemeroptera Plecoptera Trichoptera
HBI = Hilsenhoff Biotic Index

TABLE 3-9 (Cont)

METRIC	GC-BIO-1	GC-BIO-2	RC-BIO-1	RC-BIO-2	RC-BIO-3	RC-BIO-R1	RC-GC-BIO-1	RC-GC-BIO-2	RC-GC-BIO-3	RC-GC-BIO-R1
	STATIONS									
TAXA RICHNESS	24	24	20	30	12	20	19	21	23	21
FLORIDA INDEX	4	7	7	8	3	3	5	6	5	8
HBI	6.5	7.4	7.1	7.3	6.4	7.7	7.4	7.6	7.0	6.9
EPT INDEX	3	1	0	3	0	1	1	2	0	4
CHIRONOMID TAXA	6	7	8	9	3	9	6	6	8	8
% DOMINANT TAXON	25.5	27.4	21.6	18.3	59.6	17.4	20.6	16.7	21.6	39.3
% SHREDDERS	8.3	7.4	12.4	16.5	60.2	6.5	4.7	2.1	8.0	10.7
% FILTERER-COLLECTORS	3.4	10.5	17.5	11.9	4.7	6.5	1.9	2.1	12.5	25.0

TABLE 3-9 (Cont)

METRIC	STC-BIO-1	STC-BIO-2	STC-BIO-3	STC-BIO-4	STC-BIO-5	STC-BIO-6	STC-BIO-7	STC-BIO-8	STC-BIO-R1
	STATIONS								
TAXA RICHNESS	7	16	18	20	22	32	33	52	14
FLORIDA INDEX	2	3	6	4	3	11	12	23	4
HBI	9.9	7.6	7.3	7.7	7.4	5.7	6.1	6.2	6.2
EPT INDEX	0	0	0	0	3	5	8	8	0
CHIRONOMID TAXA	1	5	8	9	6	8	9	15	3
% DOMINANT TAXON	64.4	45.1	33.1	19.8	51.7	16.5	12.9	15.6	40.5
% SHREDDERS	0	13.7	36.8	11.9	1.3	20.7	19.4	8.6	16.7
% FILTERER-COLLECTORS	0	0	1.0	0	22.1	16.5	17.2	16.5	0

TABLE 3-9 (Cont)

METRIC	STATIONS		
	YWC-BIO-1	YWC-BIO-2	YWC-BIO-R1
TAXA RICHNESS	25	35	20
FLORIDA INDEX	5	15	7
HBI	6.8	6.4	5.5
EPT INDEX	2	4	3
CHIRONOMID TAXA	6	8	4
% DOMINANT TAXON	24.0	14.2	31.4
% SHREDDERS	28.1	14.2	0.8
% FILTERER-COLLECTORS	4.2	8.8	10.7

reference stations were calculated for each station (Table 3-10). The State of Florida's regional reference, Five Mile Creek, was used for all station comparisons. The data from the upstream reference stations at NAS Cecil Field, RC-BIO-R1, RC-GC-BIO-RI, STC-BIO-R1, and YWC-BIO-R1, were also plotted on the graphs to compare to the regional reference and all other stations.

The total metric scores ranged from lows of 2 at STC-BIO-1 and 8 at 5-BIO-5 to a high of 40 at STC-BIO-8. Other stations with high scores included STC-BIO-7 (38), STC-BIO-6 (36), and YWC-BIO-2 (30), all of which were higher than the score at Five Mile Creek (28). The Cecil Field reference stations, RC-BIO-R1 (18), RC-GC-BIO-R1 (26), STC-BIO-R1 (16), and YWC-BIO-R1 (24), all scored below Five Mile Creek.

The relationship between habitat quality and biological condition among all stations is illustrated as a line graph (Figures 3-1 and 3-2). Ninety-five percent confidence intervals were calculated for the data around the regression line to obtain the expected range of values for biological condition, given the level of habitat quality. In this manner, outlyers can be readily identified and attributed to causes beyond habitat limitations.

The biological and habitat scores were divided by the reference score for a percent comparability value. Then, the regression analysis was performed and the stations were plotted. Interpretation of these plots depends on the understanding that there are essentially three parts to the curve. Station plots that fall within the 95 percent confidence interval lines indicate a predictable condition of the biological community in response to habitat quality. This relationship can be expected only in the absence of poor water quality; that is, poor water quality would prevent the biological community from reaching its potential even though appropriate habitat conditions exist. Sites that fall in the lower right-hand area indicate the depression of biological condition in habitat, which has the capacity to support a healthy community. This is usually an indication of toxic conditions resulting from poor water quality. Artificial (and usually temporary) elevation of biological condition because of organic enrichment would put sites in the upper left-hand area of this graph.

Two groups of stations were plotted against Five Mile Creek and selected Cecil Field reference stations. In Figure 3-1, the following stations lie within the predictable condition of the biological community in response to the habitat quality: YWC-BIO-R1, 9-BIO-1, GC-BIO-1 and 2, RC-GC-BIO-3, 5-BIO-3, and RC-BIO-R1. Stations RC-GC-BIO-R1 and 5-BIO-2 exhibited a higher benthic quality than might have been expected. This may be representative of a situation indicative of nutrient enrichment, which will artificially sustain a more diverse fauna than dictated by the habitat quality. Stations RC-GC-BIO-1 and 2,

TABLE 3-10 BIOASSESSMENT SCORES FOR MACROINVERTEBRATES COLLECTED WITH A DIP NET FROM CECIL FIELD STATIONS, JUNE 1993

	STATIONS							
METRIC	5 MILE-CREEK	5-BIO-2	5-BIO-3	5-BIO-4	5-BIO-5	8-BIO-1	8-BIO-2	9-BIO-1
TAXA RICHNESS	4	2	2	2	0	0	0	2
FLORIDA INDEX	6	4	4	4	2	2	0	2
HBI	4	4	4	0	4	4	4	4
EPT INDEX	2	0	0	0	0	0	0	0
CHIRONOMID TAXA	2	2	2	2	0	2	0	4
% DOMINANT TAXON	6	6	6	4	2	6	6	6
% SHREDDERS	2	0	0	2	0	4	2	2
% FILTERER-COLLECTORS	2	4	0	0	0	0	0	2
TOTAL SCORE	28	22	18	14	8	18	12	22
% COMPARISON TO REFERENCE	100	78.6	64.3	50.0	28.6	64.3	42.8	78.6

Note: EPT = Ephemeroptera Plecoptera Trichoptera
HBI = Hilsenhoff Biotic Index

TABLE 3-10 (Cont)

METRIC	STATIONS									
	GC-BIO-1	GC-BIO-2	RC-BIO-1	RC-BIO-2	RC-BIO-3	RC-BIO-R1	RC-GC-BIO-1	RC-GC-BIO-2	RC-GC-BIO-3	RC-GC-BIO-R1
TAXA RICHNESS	2	2	2	4	0	2	2	2	2	2
FLORIDA INDEX	2	4	4	4	0	0	2	2	2	4
HBI	6	4	4	4	6	4	4	4	4	4
EPT INDEX	2	0	0	2	0	0	0	0	0	2
CHIRONOMID TAXA	2	2	4	4	0	4	2	2	4	4
% DOMINANT TAXON	6	6	6	6	2	6	6	6	6	4
% SHREDDERS	0	0	0	2	6	0	0	0	0	0
% FILTERER-COLLECTORS	0	2	4	2	0	2	0	0	2	6
TOTAL SCORE	20	20	24	28	14	18	16	16	20	26
% COMPARISON TO REFERENCE	71.4	71.4	85.7	100	50.0	64.3	57.1	57.1	71.4	92.8

TABLE 3-10 (Cont)

STATIONS

METRIC	STC-BIO-1	STC-BIO-2	STC-BIO-3	STC-BIO-4	STC-BIO-5	STC-BIO-6	STC-BIO-7	STC-BIO-8	STC-BIO-R1
TAXA RICHNESS	0	2	2	2	2	4	4	6	2
FLORIDA INDEX	0	0	2	2	0	6	6	6	2
HBI	0	4	4	4	4	6	6	6	6
EPT INDEX	0	0	0	0	2	4	6	6	0
CHIRONOMID TAXA	0	2	4	4	2	4	4	6	0
% DOMINANT TAXON	2	4	4	6	4	6	6	6	4
% SHREDDERS	0	0	4	0	0	2	2	0	2
% FILTERER-COLLECTORS	0	0	0	0	6	4	4	4	0
TOTAL SCORE	2	12	20	18	20	36	38	40	16
% COMPARISON TO REFERENCE	7.1	42.8	71.4	64.3	71.4	100	100	100	57.1

TABLE 3-10 (Cont)

METRIC	STATIONS YWC-BIO-1	YWC-BIO-2	YWC-BIO-R1
TAXA RICHNESS	2	4	2
FLORIDA INDEX	2	6	4
HBI	4	6	6
EPT INDEX	0	2	2
CHIRONOMID TAXA	2	4	2
% DOMINANT TAXON	6	6	6
% SHREDDERS	2	0	0
% FILTERER-COLLECTORS	0	2	2
TOTAL SCORE	18	30	24
% COMPARISON TO REFERENCE	64.3	100	85.7

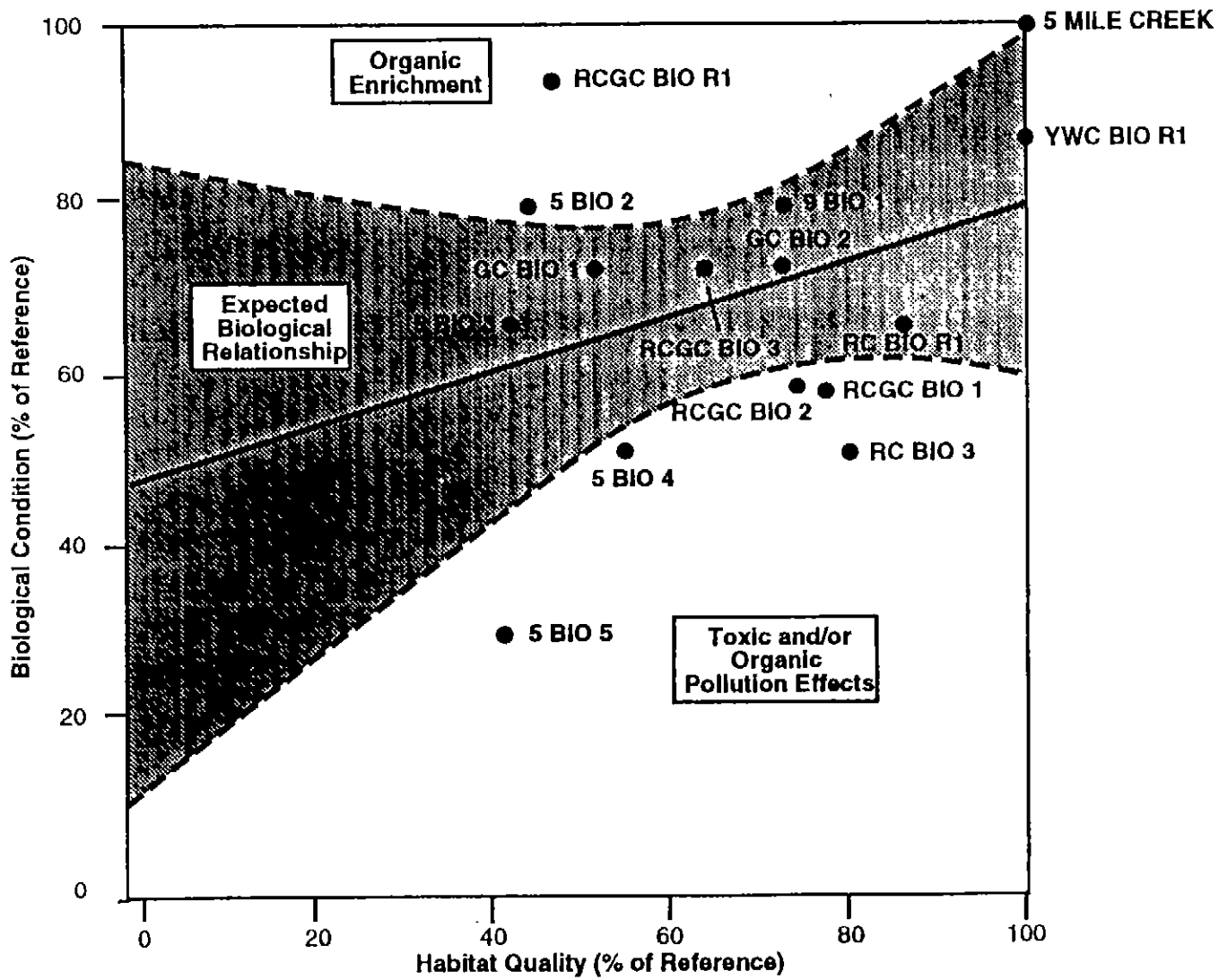

Figure 3-1. Relationship between habitat quality and biological condition from dip net samples taken at stations at Cecil Field.

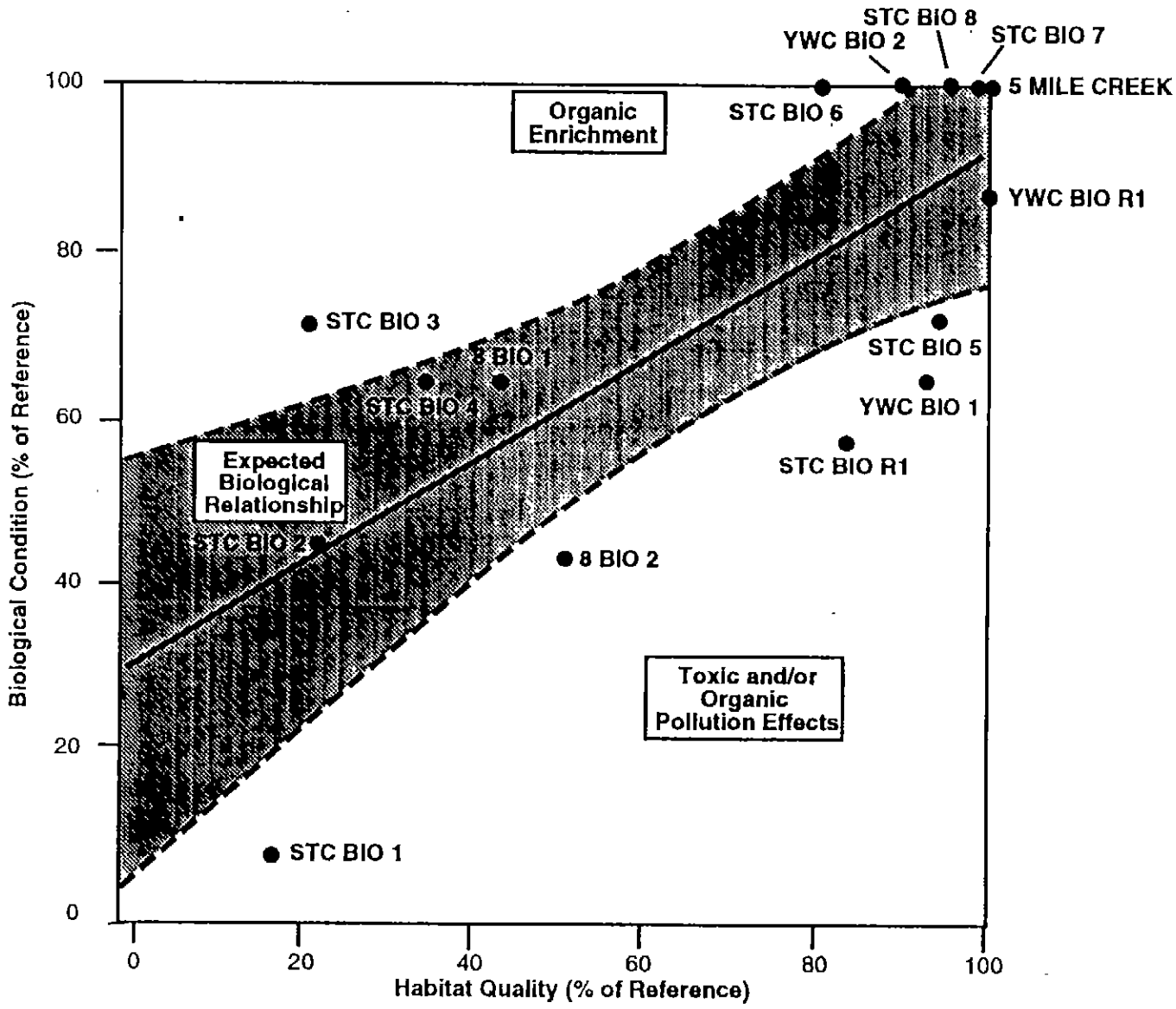

Figure 3-2. Relationship between habitat quality and biological condition from dip net samples taken at stations at Cecil Field.

5-BIO-4, and RC-BIO-3 fell below the 95 percent confidence line and could be classified as slightly impaired. Station 5-BIO-5 was classified as moderately impaired. The stations that fall below the 95 percent confidence internal line represent situations where organic pollution or toxicants could be adversely affecting the biological conditions, regardless of the quality of the habitat, which for 5-BIO-4 and 5 was fairly low. Factors possibly influencing the communities at the impaired stations as noted in this study includes very low DO at 5-BIO-4 and 5, and RC-GC-BIO-1 and 2; petroleum odor in the sediment at 5-BIO-4; chlorine odor in the water and the highest conductivity of any station at RC-BIO-3, which is downstream from the wastewater treatment plant.

In Figure 3-2, the following stations lie within the predictable conditions of the community: STC-BIO-2, 4, 7 and 8; YWC-BIO-R1; and 8-BIO-1. Stations STC-BIO-3 and 6 and YWC-BIO-2 exhibited higher benthic quality than expected. Stations STC-BIO-R1 and 5 and YWC-BIO-1 were classified as slightly impaired. Stations 8-BIO-2 was moderately impaired and STC-BIO-1 was severely impaired. Factors possibly influencing the communities at the impaired stations as noted in this study include petroleum sediment odor and water surface oily sheen at STC-BIO-1, and petroleum sediment odor at 8-BIO-2.

Hester-Dendy Samples

The benthic community that the Hester-Dendy artificial substrate samplers attract primarily consist of pioneer species that colonize the samplers during the sampling period. These organisms originate from recruitment or drift from the benthic populations established in the stream. The artificial substrates are identical in composition and surface area, and the community that colonizes them at each station occurred under the influence of environmental conditions that existed during the sampling period.

A regional reference site established by the State of Florida, Five Mile Creek, will be used to compare to the Cecil Field information in addition to the reference stations, RC-BIO-R1, RC-GC-BIO-R1, YWC-BIO-R1, and STC-BIO-R1.

Some Hester-Dendy samplers were partially exposed as a result of receding water levels. Samplers affected were at 5-BIO-2 and GC-BIO-2. These samples were processed per instructions from ABB-ES and the data are reported here. Because samplers were totally exposed or were not set at some stations, no Hester-Dendy sampler data are available at the following stations: RC-BIO-1 and 2; STC-BIO-R1, 3, and 6; 5-BIO-3, 4, and 5; 6-BIO-1; 8-BIO-1 and 2; 9-BIO-1; RC-GC-BIO-3; and LF-BIO-1 through 8. The period of

colonization and the sampler problems should be considered when evaluating station differences in macroinvertebrate community structure.

In the first station grouping compared in Figure 3-3, the total number of taxa was lowest at 5-BIO-2 (14 taxa) and GC-BIO-2 (15). The number of taxa was highest at the reference stations YWC-BIO-R1 (36) and Five Mile Creek (30). The reference stations RC-BIO-R1 (22) and RC-GC-BIO-R1 (23) were very similar to the remaining stations (21-25).

In the second station grouping in Figure 3-4, the number of taxa at STC-BIO-1 (2), STC-BIO-2 (7) and 4 (7) was much lower than all the others in the comparison. The number of taxa was highest at STC-BIO-8 (41), followed by YWC-BIO-R1 (36). The regional reference station, Five Mile Creek (30) and the remaining stations (26-31) were comparable.

The number of individuals was lowest at GC-BIO-2 (195/m^2) and at Five Mile Creek (326/m^2) in the first station grouping (Figure 3-5). Compared to the other reference stations, the number of individuals at RC-BIO-R1 (687/m^2), RC-GC-BIO-R1 (1,156/m^2), YWC-BIO-R1 (1,835/m^2), and 5-BIO-2 (498/m^2) was also low. The number of individuals at other stations was as high or higher than the reference stations, with the highest number at RC-BIO-3 (26,686/m^2).

In the second group, the number of individuals at STC-BIO-4 (74/m^2) and STC-BIO-1 (95/m^2) was much lower than all other stations (Figure 3-6). Compared to Five Mile Creek (326/m^2), the remaining stations had similar or higher numbers. Compared to YWC-BIO-R1 (1,475/m^2), the number of individuals at STC-BIO-2 (313/m^2) and STC-BIO-5 (885/m^2) was lower, but the numbers at the remaining stations were comparable.

The Florida index values were lowest at reference stations RC-BIO-R1 (3) and GC-BIO-2 (3) (Figure 3-7). Compared to Five Mile Creek (15), which had the highest value, values at all other stations were lower. The next highest value was measured at RC-BIO-3 (12). The other reference stations, RC-GC-BIO-R1 (6) and YWC-BIO-R1 (8), had slightly higher or lower values than the remaining stations.

In the second group, STC-BIO-1 and 2 both had a Florida index value of 0, followed by STC-BIO-4 with an index value of 1 (Figure 3-8). Values at all other stations were the same or higher than the value at YWC-BIO-R1 (8), and were lower than the Five Mile Creek value.

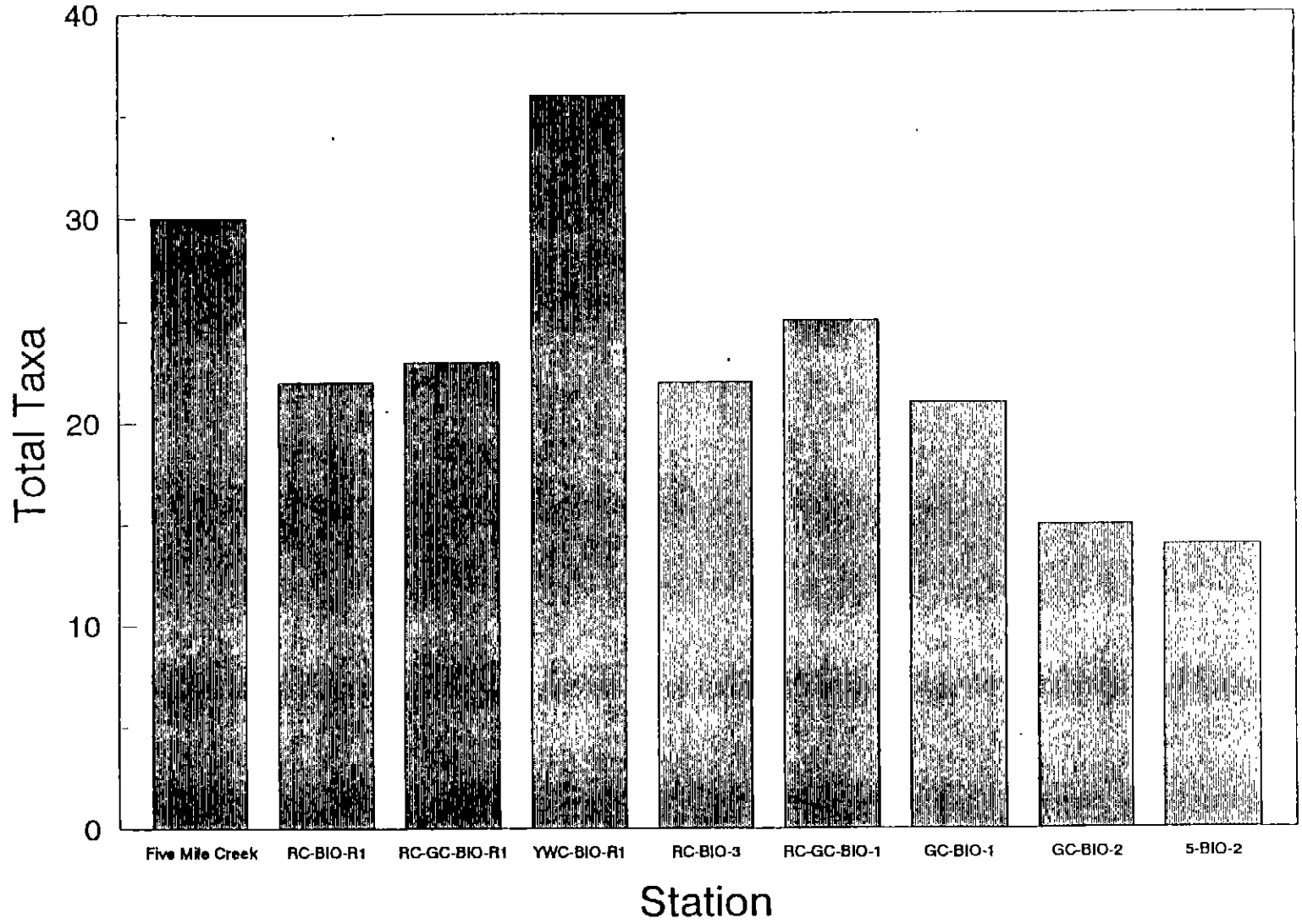

Figure 3-3. Total number of taxa collected from Hester-Dendy samples at Cecil Field.

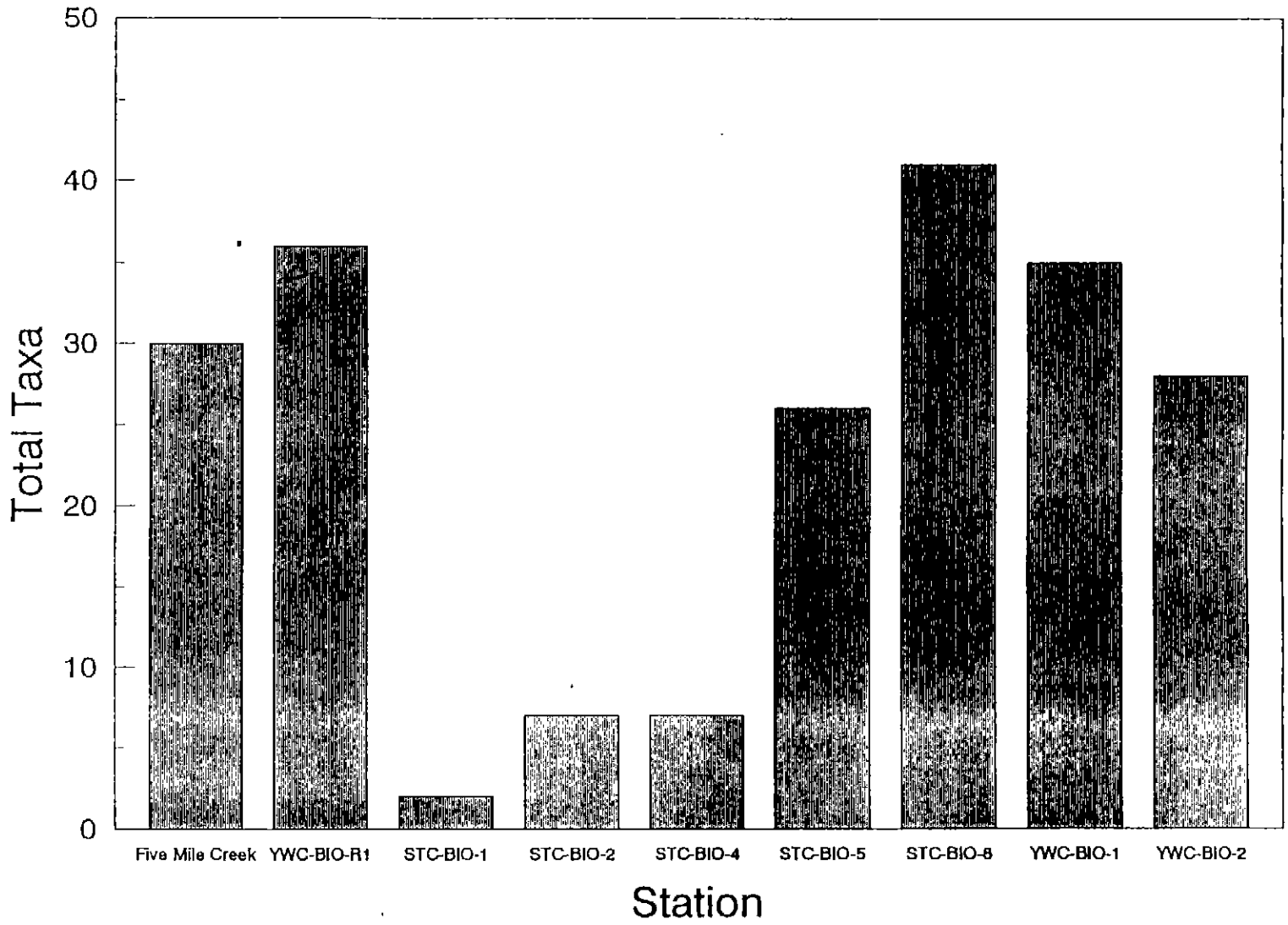

Figure 3-4. Total number of taxa collected from Hester Dendy samples at Cecil Field.

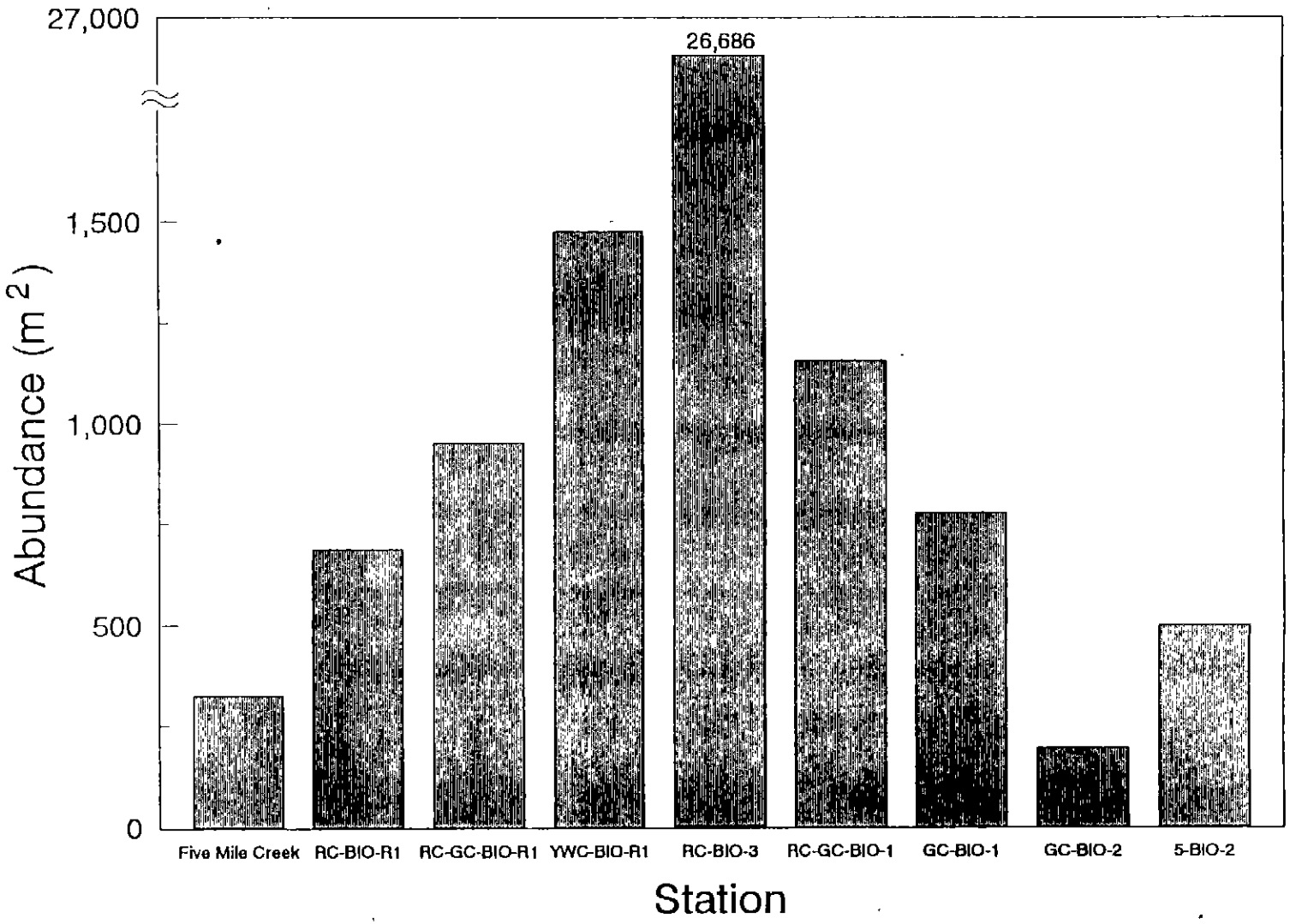

Figure 3-5. Abundance of organisms collected from Hester-Dendy samples at Cecil Field.

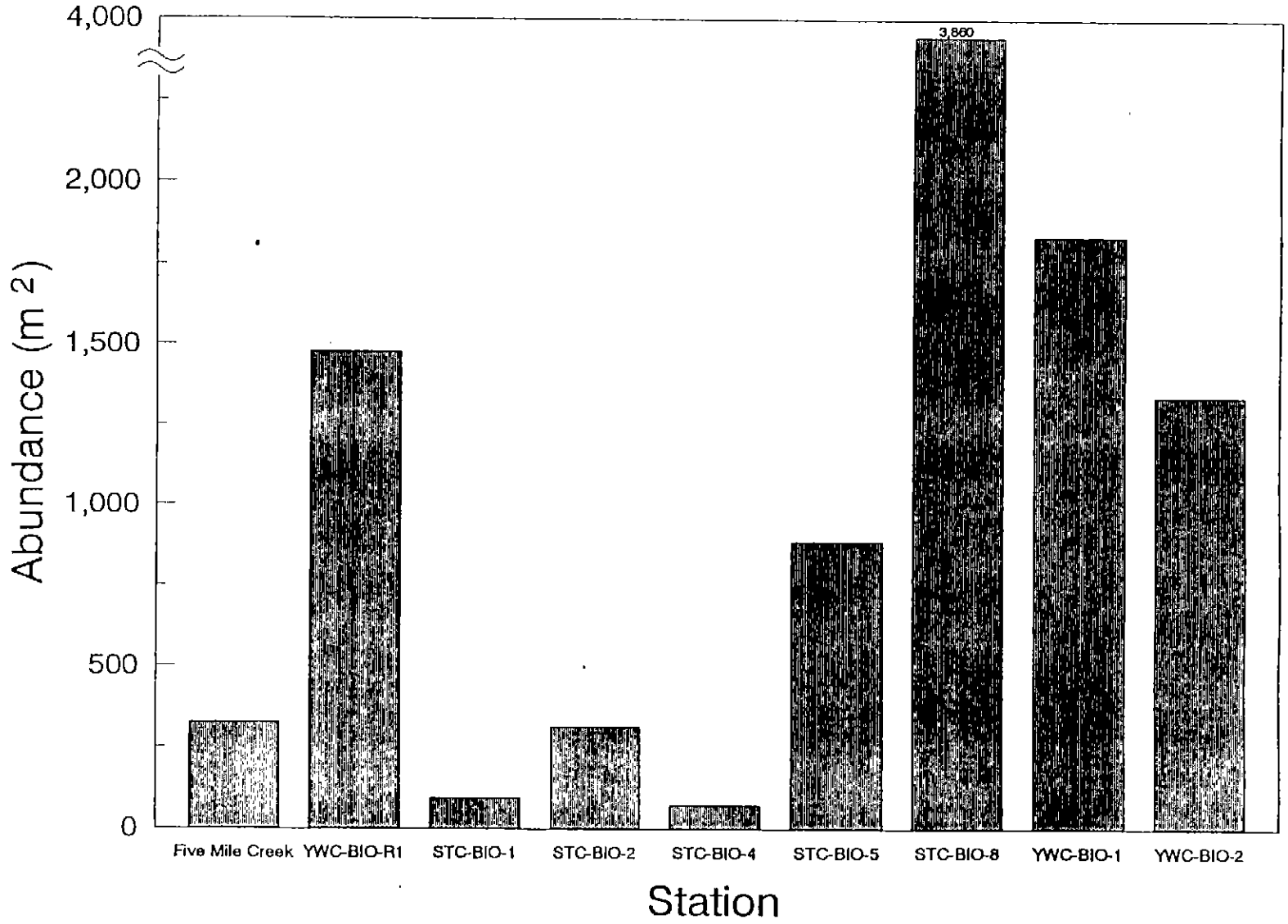

Figure 3-6. Abundance of organisms collected from Hester-Dendy samples at Cecil Field.

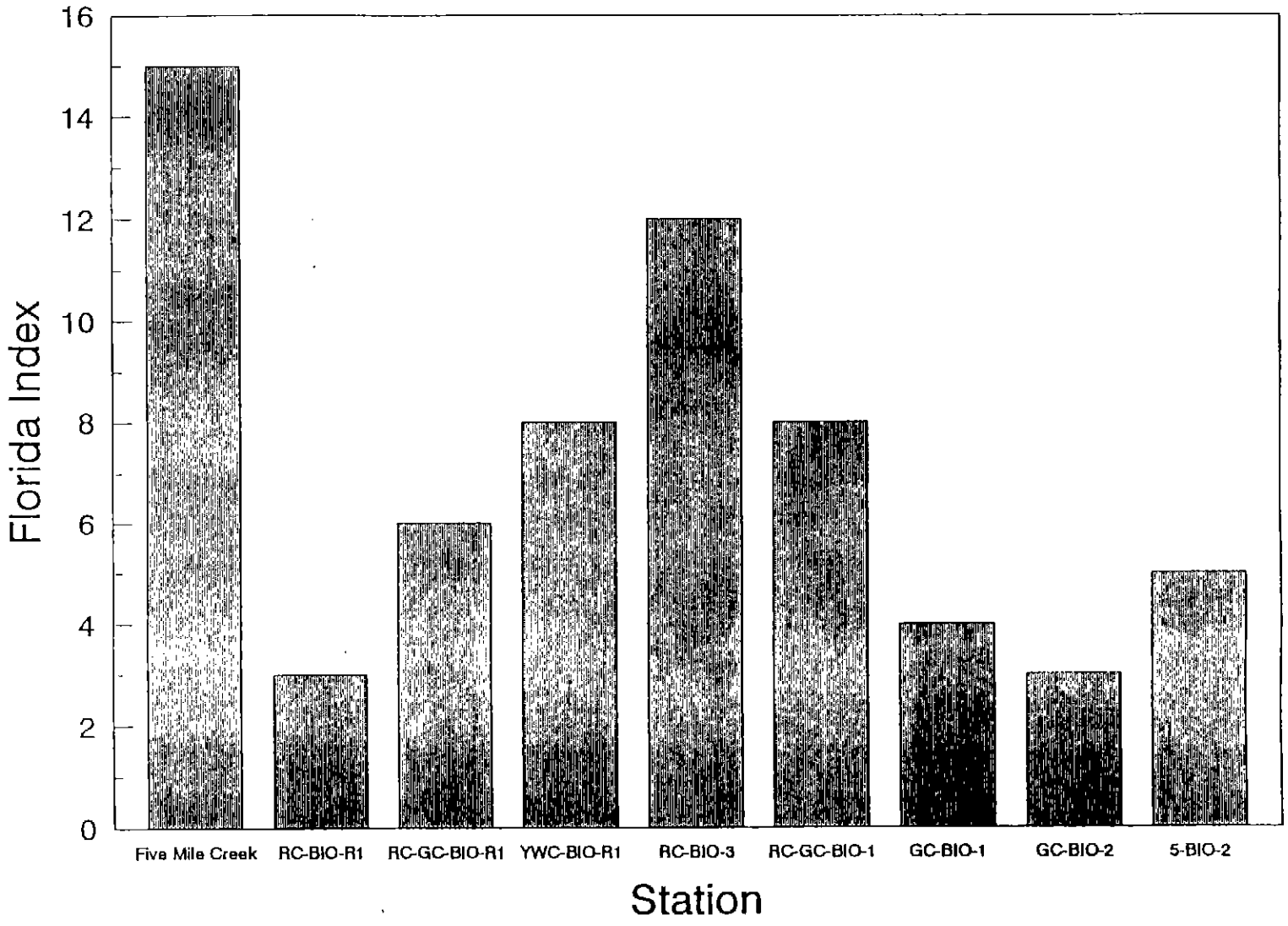

Figure 3-7. Florida Index for Hester-Dendy samples collected at Cecil Field.

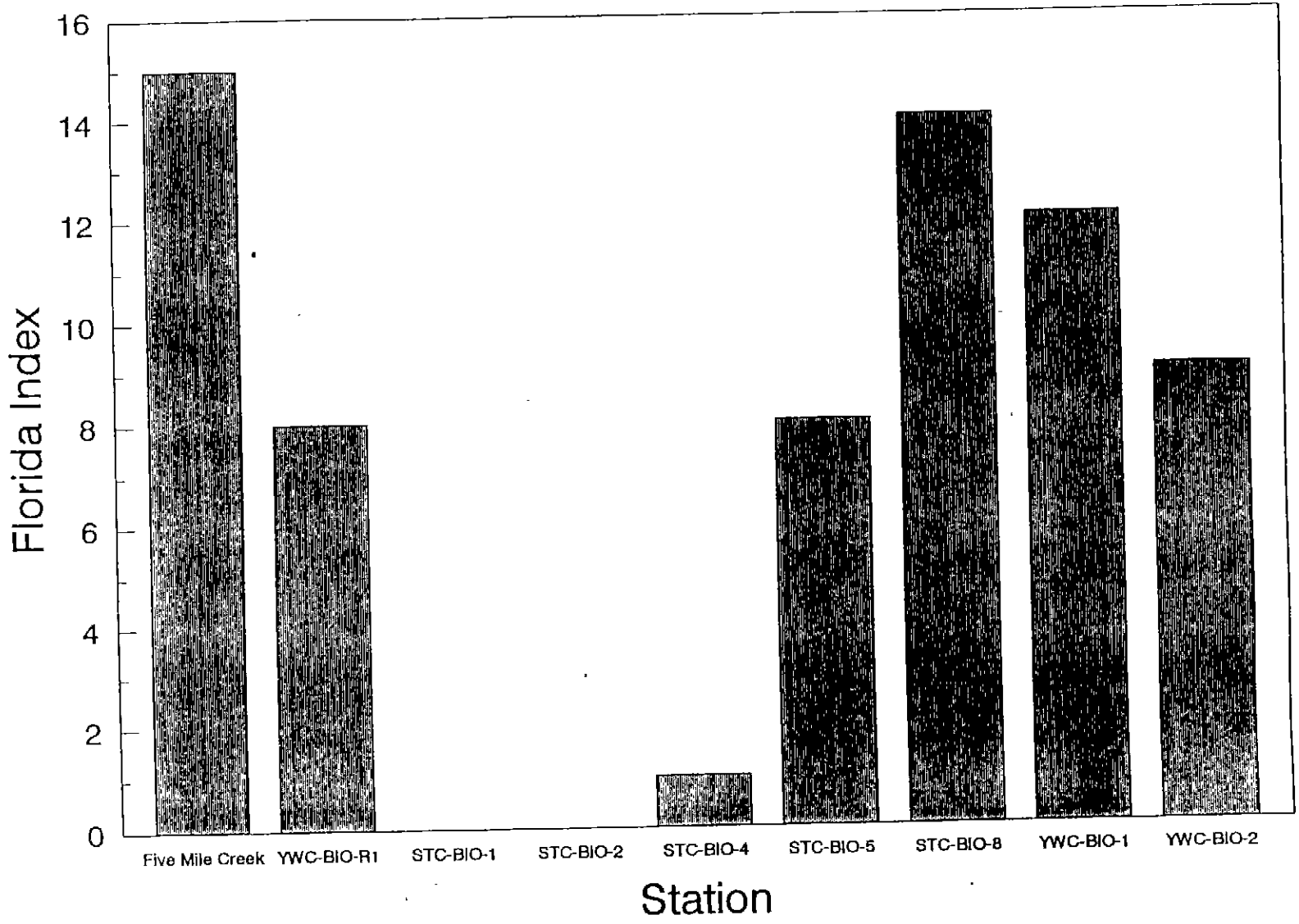

Figure 3-8. Florida Index for Hester-Dendy samples collected at Cecil Field.

The Shannon-Weaver index values were lowest at RC-BIO-3 (0.279), followed by 5-BIO-2 (1.332) (Figure 3-9). Values at all other stations were lower than Five Mile Creek (4.612), but were comparable to RC-BIO-R1 (2.529), RC-GC-BIO-R1 (2.887), and YWC-BIO-R1 (3.900).

In the second group, STC-BIO-1 (0.944) had the lowest value, followed by STC-BIO-2 (1.419) (Figure 3-10). Both reference stations, Five Mile Creek (4.612) and YWC-BIO-R1 (3.900), had higher values than all other stations.

The percent of EPT individuals, which consists of the most pollution-sensitive benthic taxa, was 0.0 at 5-BIO-2, GC-BIO-2, RC-BIO-3, and STC-BIO-1, 2, and 4 (Table 3-7). Percentages at the reference stations, Five Mile Creek (5.6 percent), RC-BIO-R1 (0.8 percent), and RC-GC-BIO-R1 (1.4 percent), were also low. The percent of EPT was highest at STC-BIO-8 (3.4.1 percent), the reference station YWC-BIO-R1 (17.5 percent), and GC-BIO-2 (12.5 percent).

The Hilsenhoff Biotic index rates the community on a scale of 1 (high quality) to 10 (low quality) (Table 3-7). The index scores ranged from a good quality score of 4.7 at STC-BIO-8 to a low score of 10 at STC-BIO-1. Many of the stations had lower quality scores (>7.0) than the reference stations, Five Mile Creek (6.4) and YWC-BIO-R1 (5.6), including the other reference stations, RC-BIO-R1 (8.7) and RC-GC-BIO-R1 (7.4).

The trends in the metric values indicate that STC-BIO-1, 2, and 4 consistently ranked lower than the reference stations and all other stations. The reference stations Five Mile Creek and YWC-BIO-R1 were among the higher ranking stations and were more suitable as reference stations than RC-BIO-R1 and RC-GC-BIO-R1, which had similar metric values to the potentially influenced stations.

Ponar Samples

The results from the Ponar samples are primarily indicative of the infaunal benthic community with some epifaunal components represented. Station-to-station differences in the community may be due to differences in substrate composition, where they exist, in addition to or instead of man-induced alteration on the population.

Since no State of Florida regional reference data exist for this gear type, all stream station data comparisons will be made to the reference stations RC-BIO-R1, RC-GC-BIO-R1, YWC-BIO-R1, and STC-BIO-R1. Since no lake reference stations were established as part

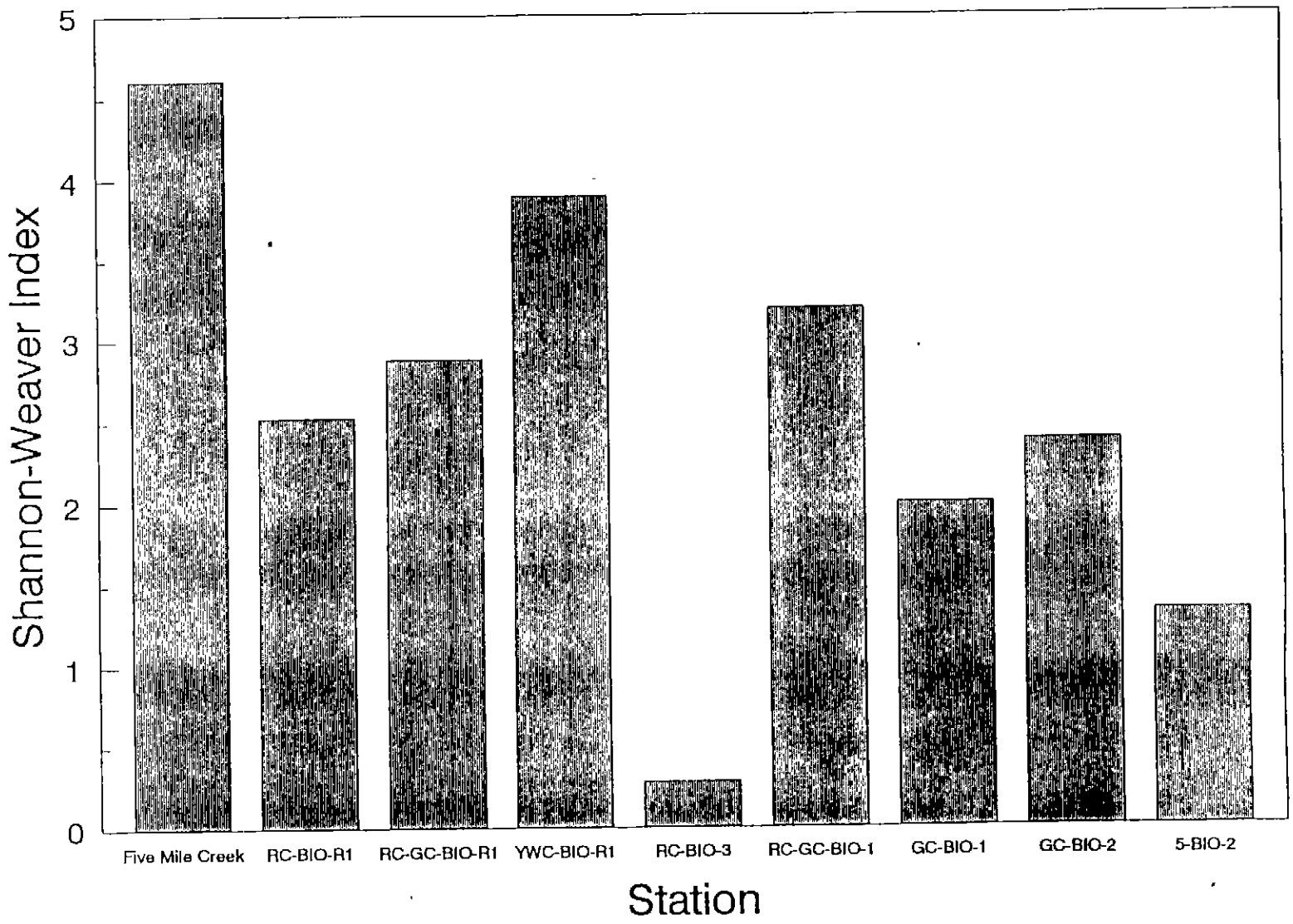

Figure 3-9. Shannon-Weaver Index for Hester-Dendy samples collected at Cecil Field.

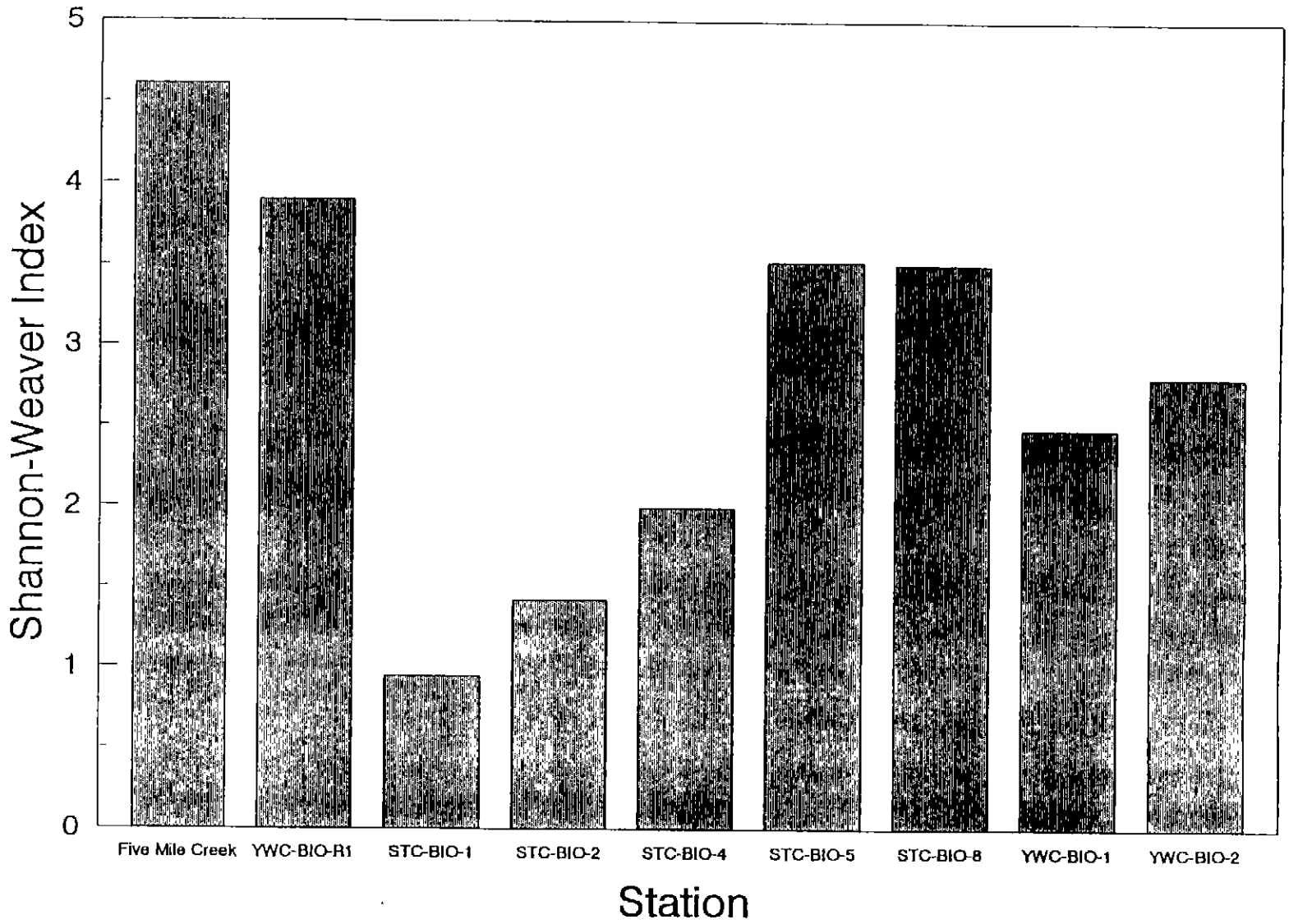

Figure 3-10. Shannon-Weaver Index for Hester-Dendy samples collected at Cecil Field.

of this study, the only suitable stations for comparisons were RC-BIO-1 and 2, located just upstream from Lake Fretwell. These stations were located in the deep, slow moving part of Rowell Creek that entered the lake and were chosen for comparisons because they were more similar to the lake than the shallow small stream stations. Three station groupings were graphed for station comparisons, including two stream station groups and the lake/pond station group.

The total number of taxa in Figure 3-11 was lowest at 5-BIO-5 (5 taxa), followed by 5-BIO-4 (10). Other stations with a number of taxa that was lower than the reference stations were 5-BIO-2 (13) and RC-BIO-3 (14). Compared to reference station RC-BIO-R1 (23), all other stations had a slightly lower or higher number of taxa. Reference stations RC-GC-BIO-R1 (42) and YWC-BIO-R1 (33) ranked higher than most stations.

In Figure 3-12, the number of taxa was lowest at STC-BIO-1 (4), followed by 8-BIO-2 (8). The number of taxa at stations STC-BIO-4 (10) and 8-BIO-1 (13) was also somewhat low. Compared to the reference stations STC-BIO-R1 (24) and YWC-BIO-R1 (33), most other stations were comparable.

The lowest number of taxa in the lake stations (Figure 3-13) was at LF-BIO-6 (8), followed by LF-BIO-5 (10). All other stations were comparable to the reference stations RC-BIO-1 (16) and RC-BIO-2 (24).

The number of individuals in Figure 3-14 was lowest at 5-BIO-5 (143/m^2) and 5-BIO-2 (702/m^2). Compared to RC-BIO-R1 (2,480/m^2), the other stations were comparable, but compared to RC-GC-BIO-R1 (11,624/m^2) and YWC-BIO-R1 (6,479/m^2), more of the stations had lower abundance.

In Figure 3-15, abundance was low at STC-BIO-1 (143/m^2), 8-BIO-1 (459/m^2), 8-BIO-2 (459/m^2), STC-BIO-4 (530/m^2), STC-BIO-3 (731/m^2), and STC-BIO-2 (1,261/m^2). Abundance at all other stations was comparable to STC-BIO-R1 (2,609/m^2), but was lower than YWC-BIO-R1 (6,479/m^2).

The lowest number of individuals in the lake stations (Figure 3-16) was at 6-BIO-1 (831/m^2), followed by LF-BIO-7 (1,433/m^2), LF-BIO-5 (1,648/m^2), and LF-BIO-6 (1,663/m^2). The other stations were comparable to the reference stations RC-BIO-1 (4,085/m^2) and RC-BIO-2 (4,042/m^2).

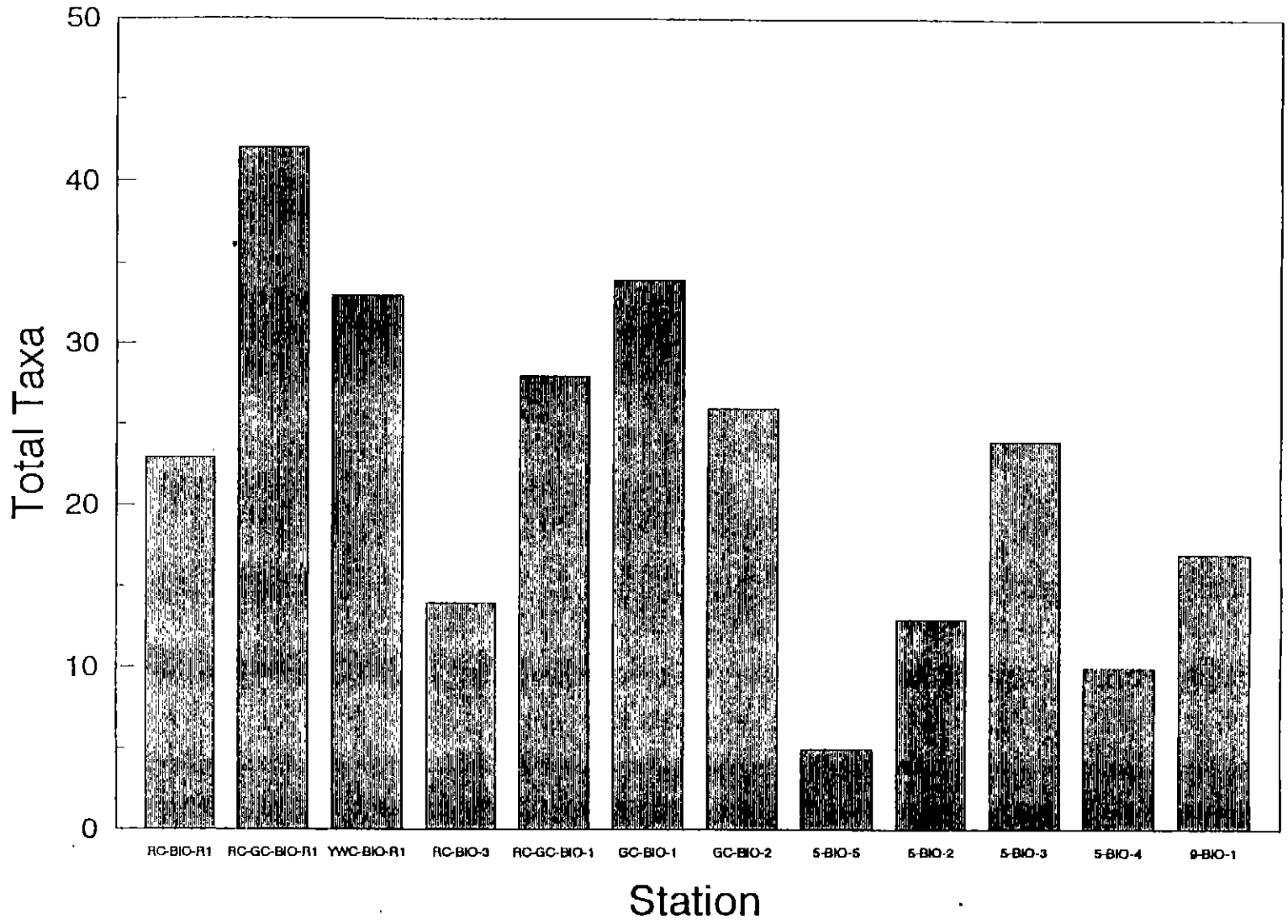

Figure 3-11. Total number of taxa collected from Ponar samples at Cecil Field.

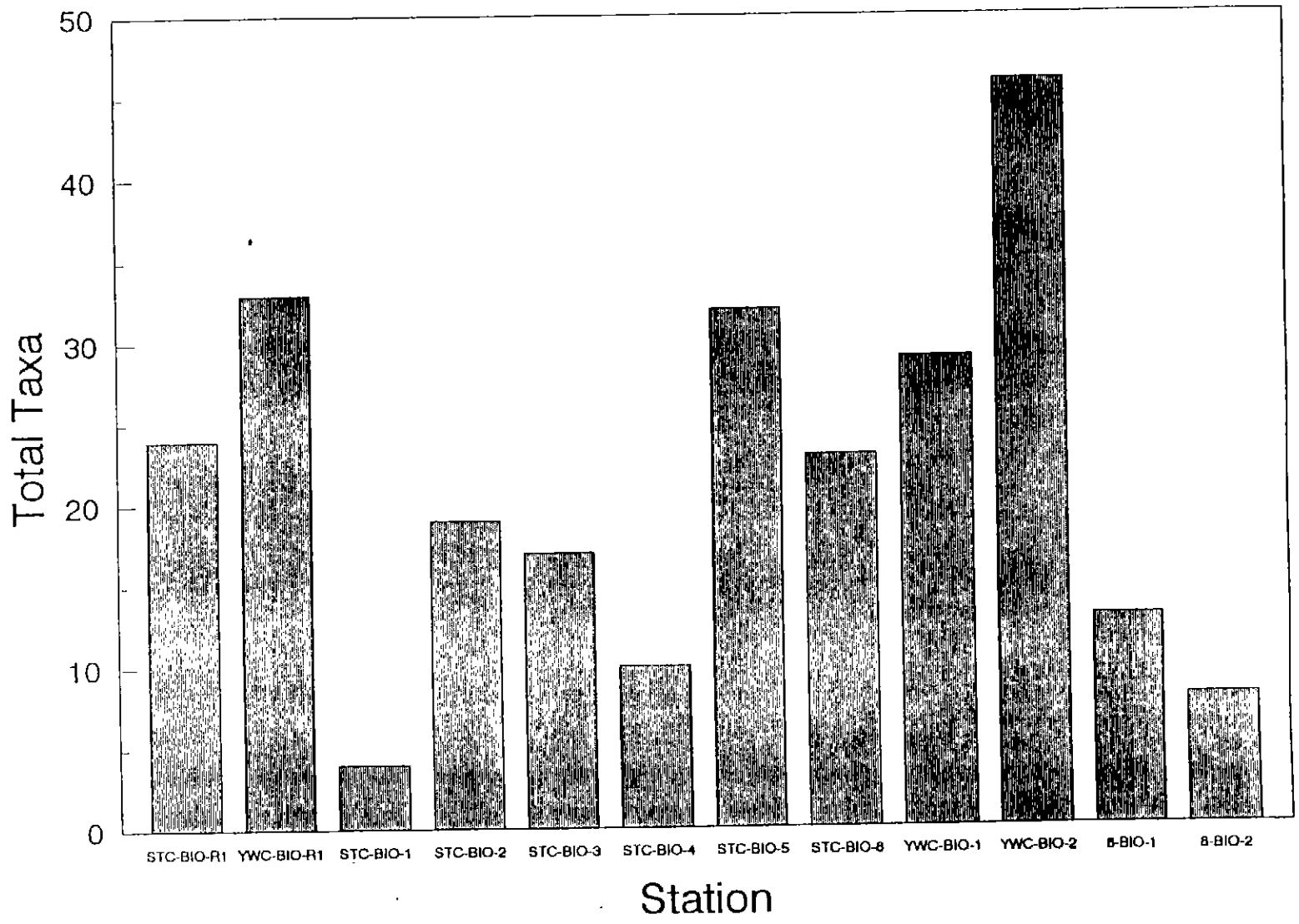

Figure 3-12. Total number of taxa collected from Ponar samples at Cecil Field.

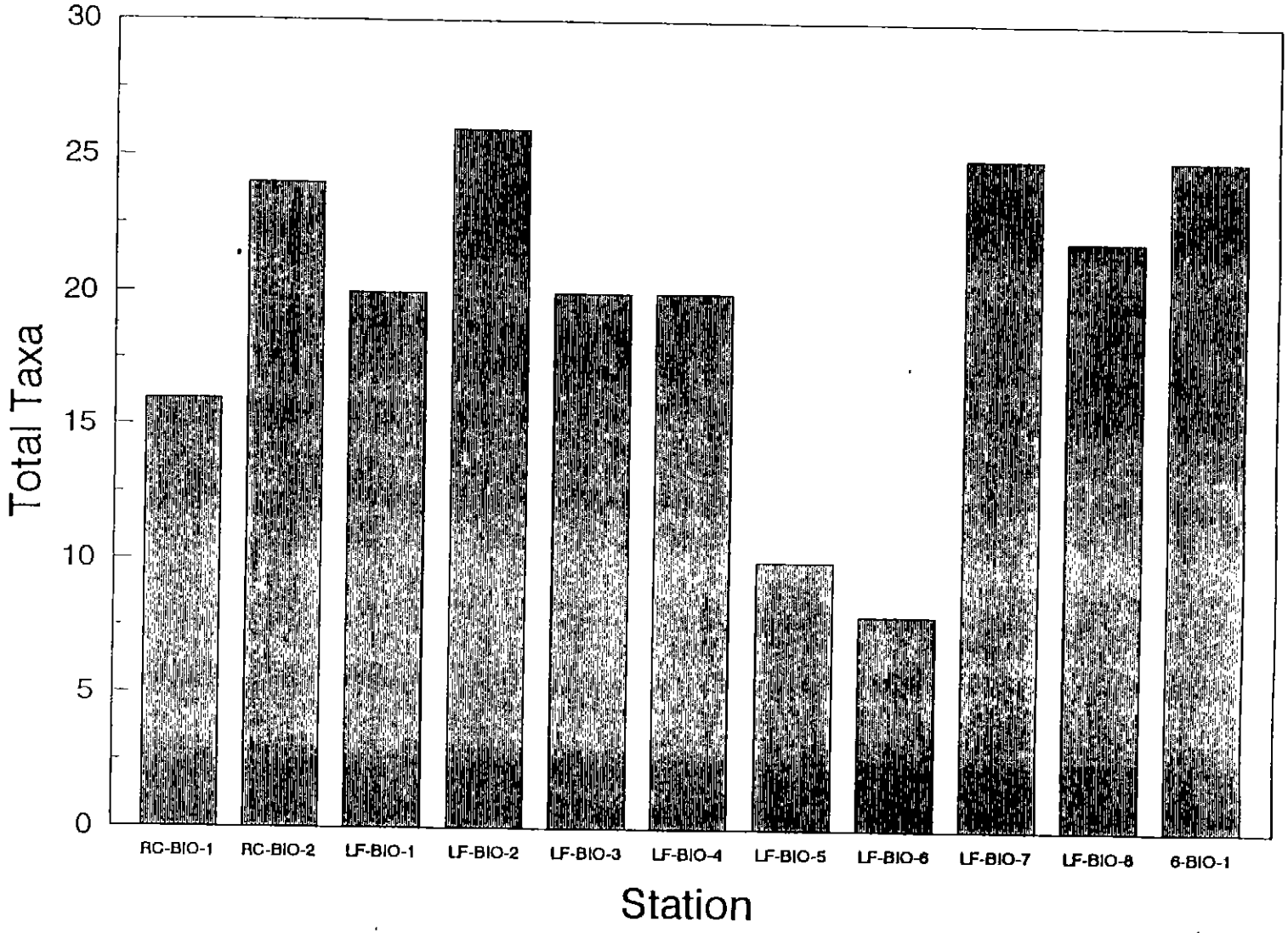

Figure 3-13. Total number of taxa collected from Ponar samples at Cecil Field.

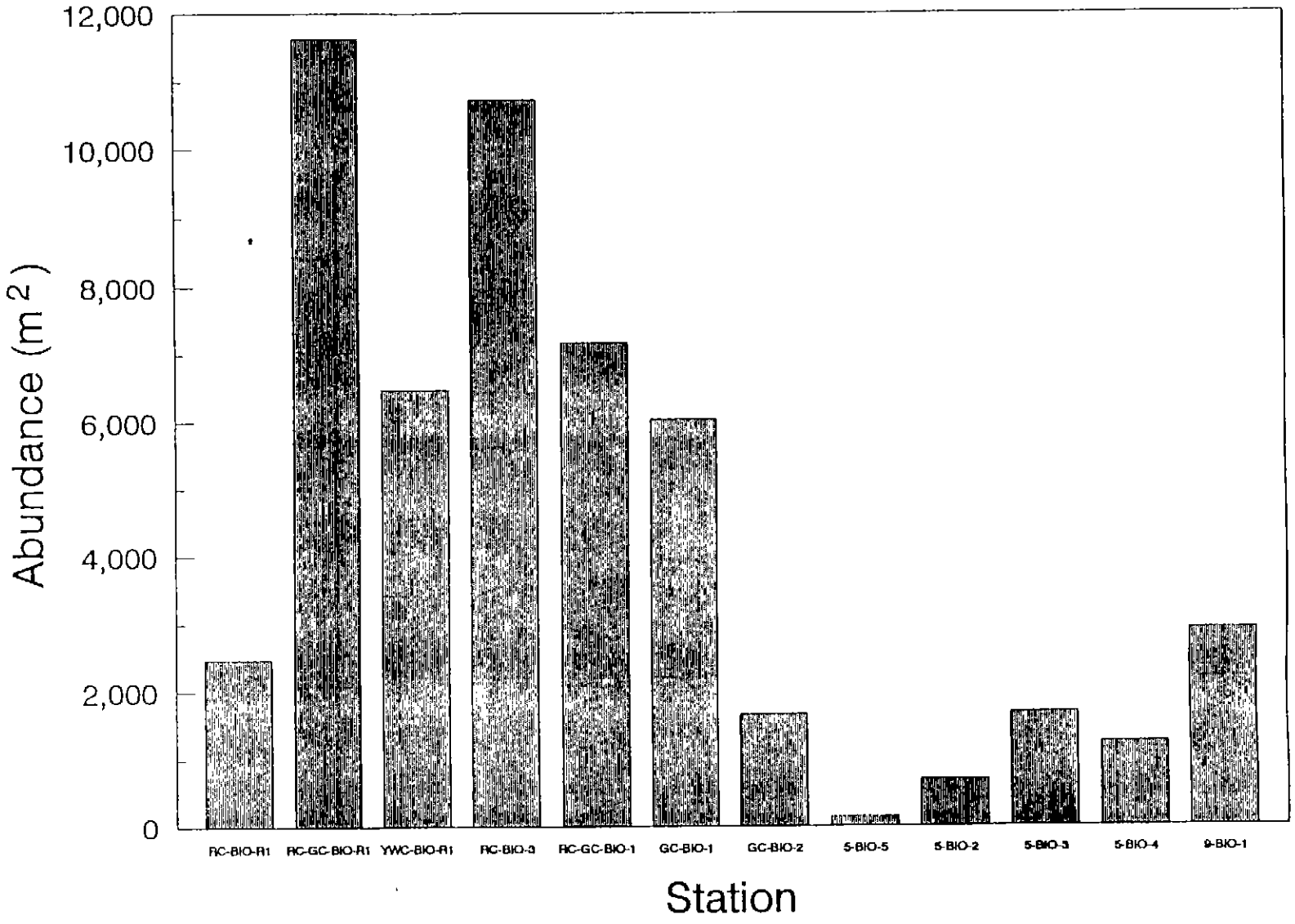

Figure 3-14. Abundance of organisms collected from Ponar samples at Cecil Field.

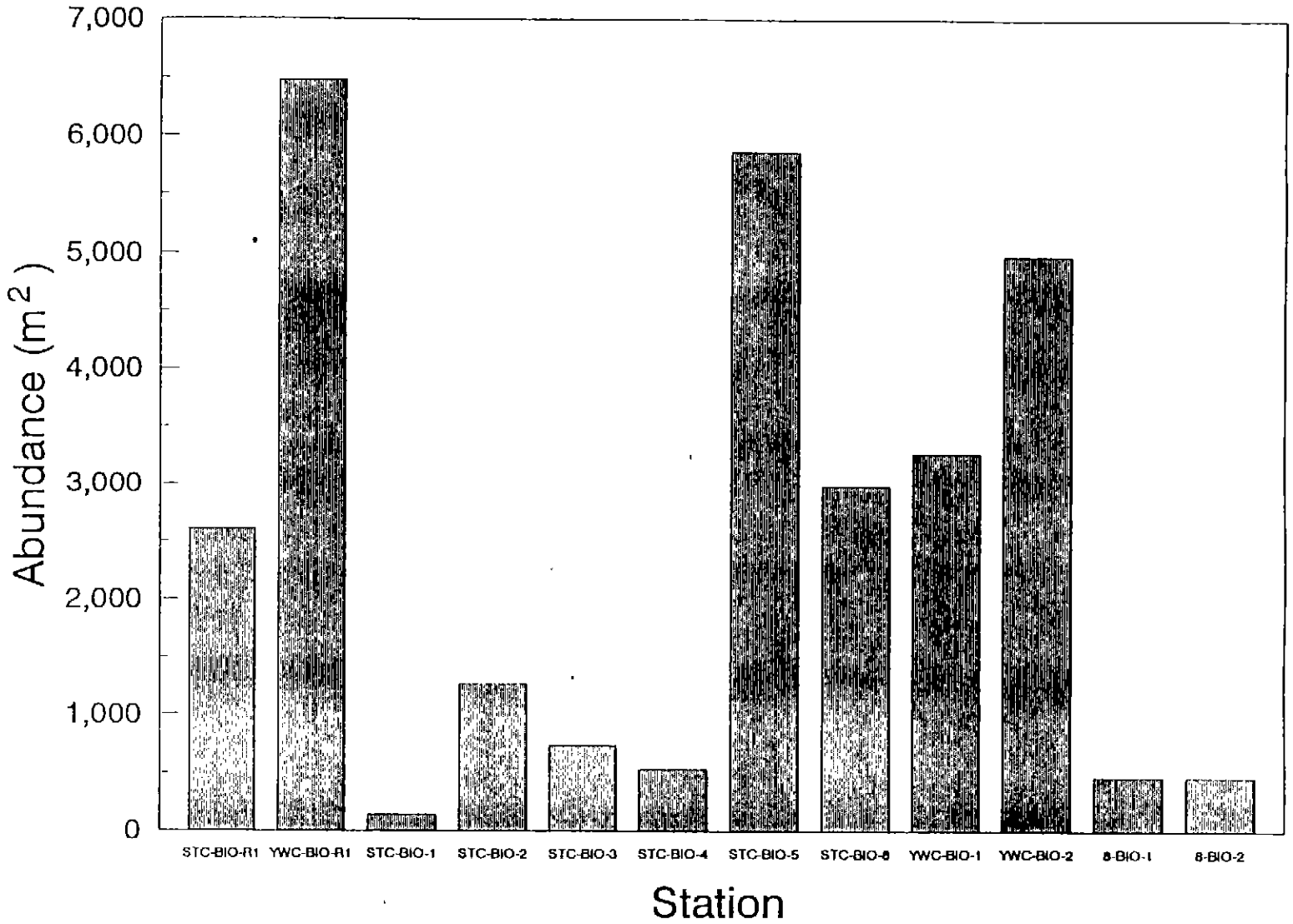

Figure 3-15. Abundance of organisms collected from Ponar samples at Cecil Field.

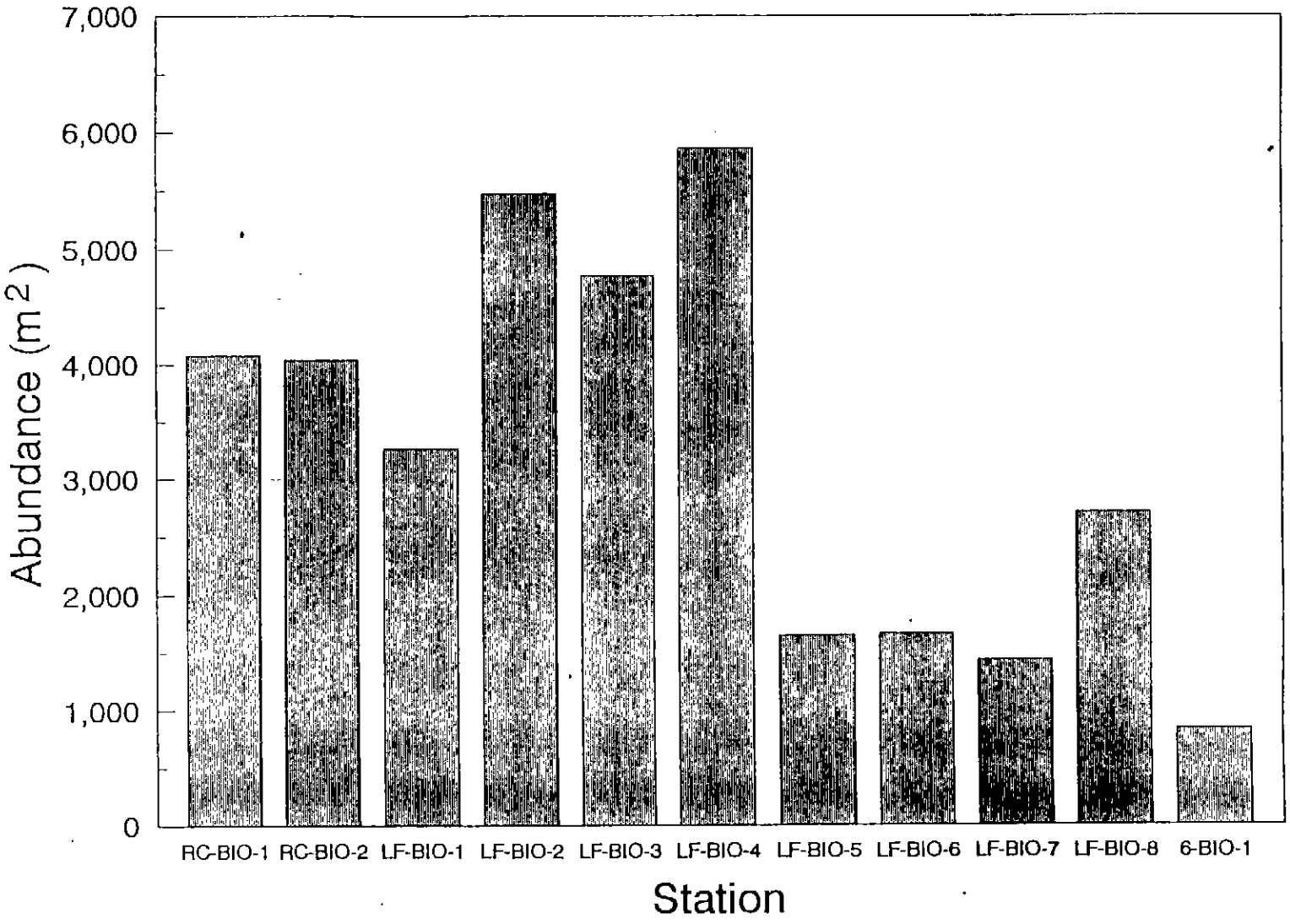

Figure 3-16. Abundance of organisms collected from Ponar samples at Cecil Field.

In Figure 3-17, the Florida index was the same or higher than RC-BIO-R1 (2) at all stations. Index values at all stations were lower than RC-GC-BIO-R1 (12). Compared to YWC-BIO-R1 (6), several stations had lower index values, especially 5-BIO-5 (2) and 5-BIO-4 (2).

The Florida index in Figure 3-18 was lowest at STC-BIO-1 (1), YWC-BIO-1 (1), and 8-BIO-2 (1). Index values at most stations were lower than the reference stations, and except for STC-BIO-3 (2), STC-BIO-4 (2), and 8-BIO-1 (3), the values were comparable.

At the lake stations (Figure 3-19), the lowest Florida index values were at LF-BIO-6 (0), LF-BIO-5 (1), and LF-BIO-8 (1). Index values at all other stations were higher than the reference stations RC-BIO-1 (3) and RC-BIO-2 (2).

The Shannon-Weaver index in Figure 3-20 was slightly lower at 5-BIO-4 (1.973), 5-BIO-5 (2.246), and RC-BIO-3 (2.434). Index values at all other stations were comparable to the reference stations RC-BIO-R1 (2.844), RC-GC-BIO-R1 (3.627), and YWC-BIO-R1 (3.531).

In Figure 3-21, the lowest Shannon-Weaver index value was at STC-BIO-1 (1.357). Index values at all other stations were comparable to the reference stations STC-BIO-R1 (3.003) and YWC-BIO-R1 (3.531).

At the lake stations (Figure 3-22), the lowest Shannon-Weaver index value was at LF-BIO-6 (1.332), followed by LF-BIO-5 (1.978). Index values at the other stations were comparable to the reference stations RC-BIO-1 (2.404) and RC-BIO-2 (3.218).

The percent of EPT individuals, which comprise the most sensitive taxa, was low at all stations, which is to be expected in the community as represented by the Ponar samples (Table 3-8). These taxa are more common on cobble/gravel substrate in riffle habitat or on woody debris than in sand or mud substrate. Most stations had 0 percent EPT and the highest percentages were at RC-BIO-R1 (9.8 percent), GC-BIO-1 (5.9 percent), and LF-BIO-2 (5.5 percent).

The Hilsenhoff Biotic index values were high at most stations, ranging from 6.3 at YWC-BIO-R1 to 9.7 at LF-BIO-4 (Table 3-8). On a scale of 1-10, with the low values indicative of a good quality community, the stations at Cecil Field are all classified as below average, based on the infaunal benthic community.

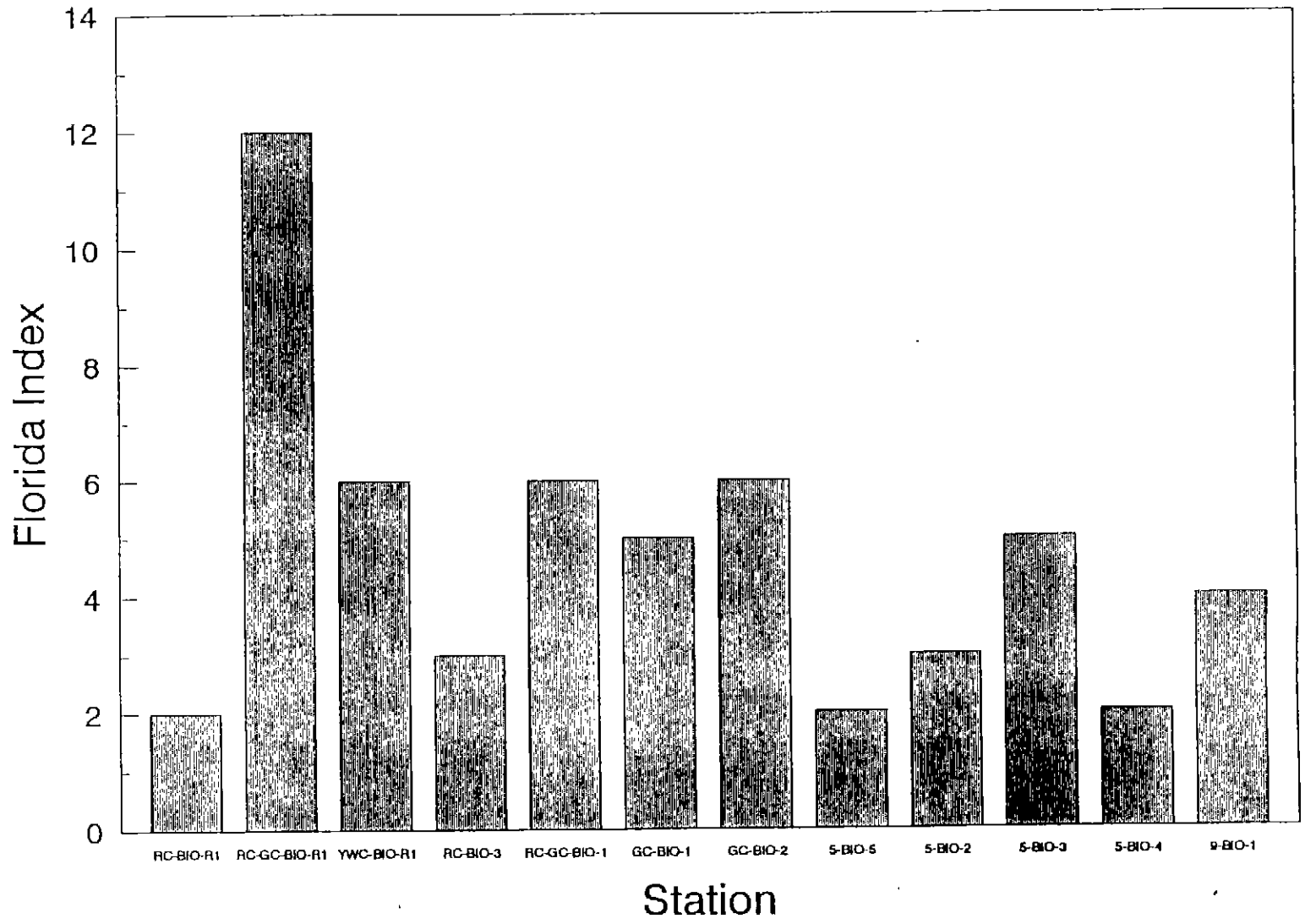

Figure 3-17. Florida Index for Ponar samples collected at Cecil Field.

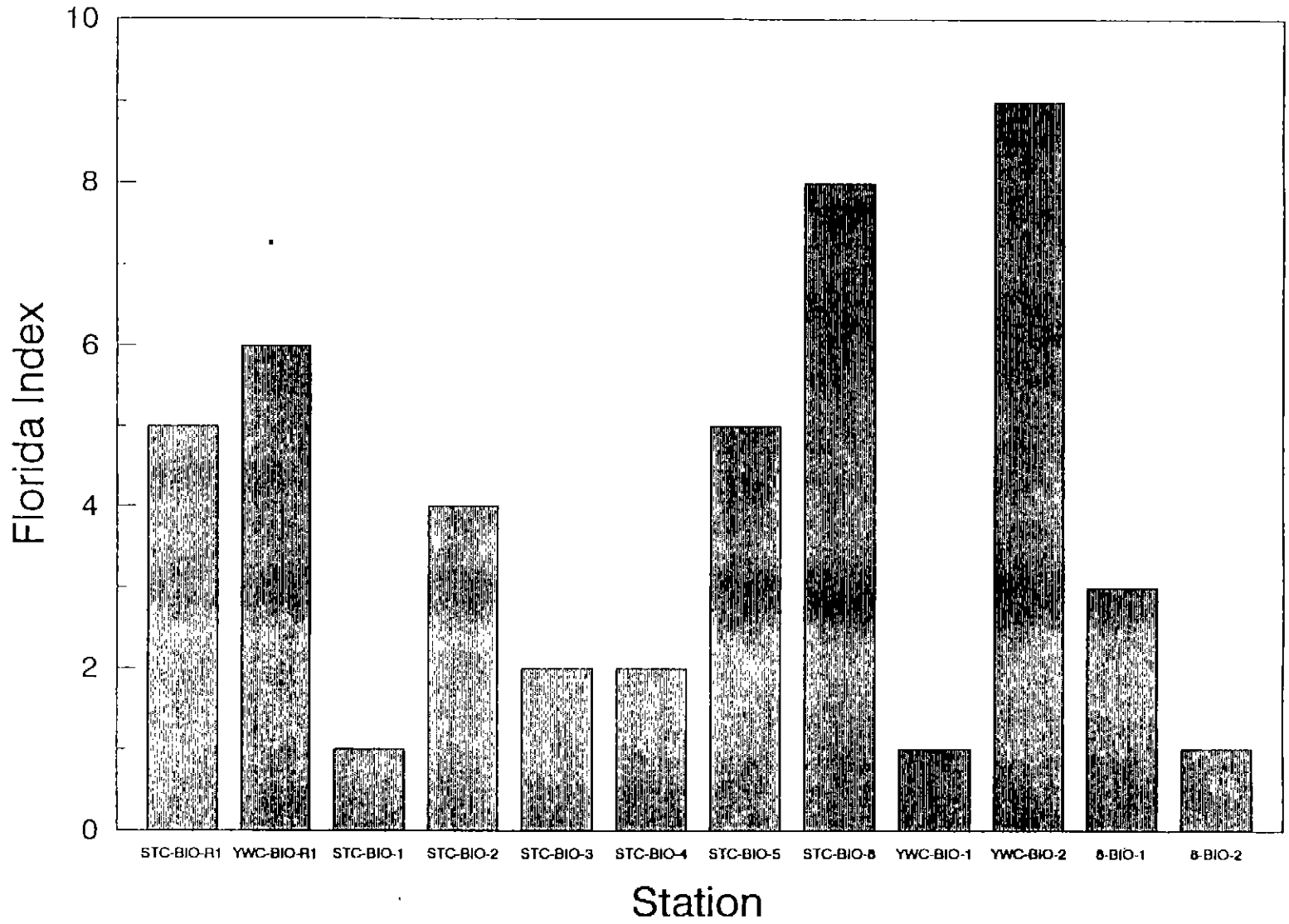

Figure 3-18. Florida Index for Ponar samples collected at Cecil Field.

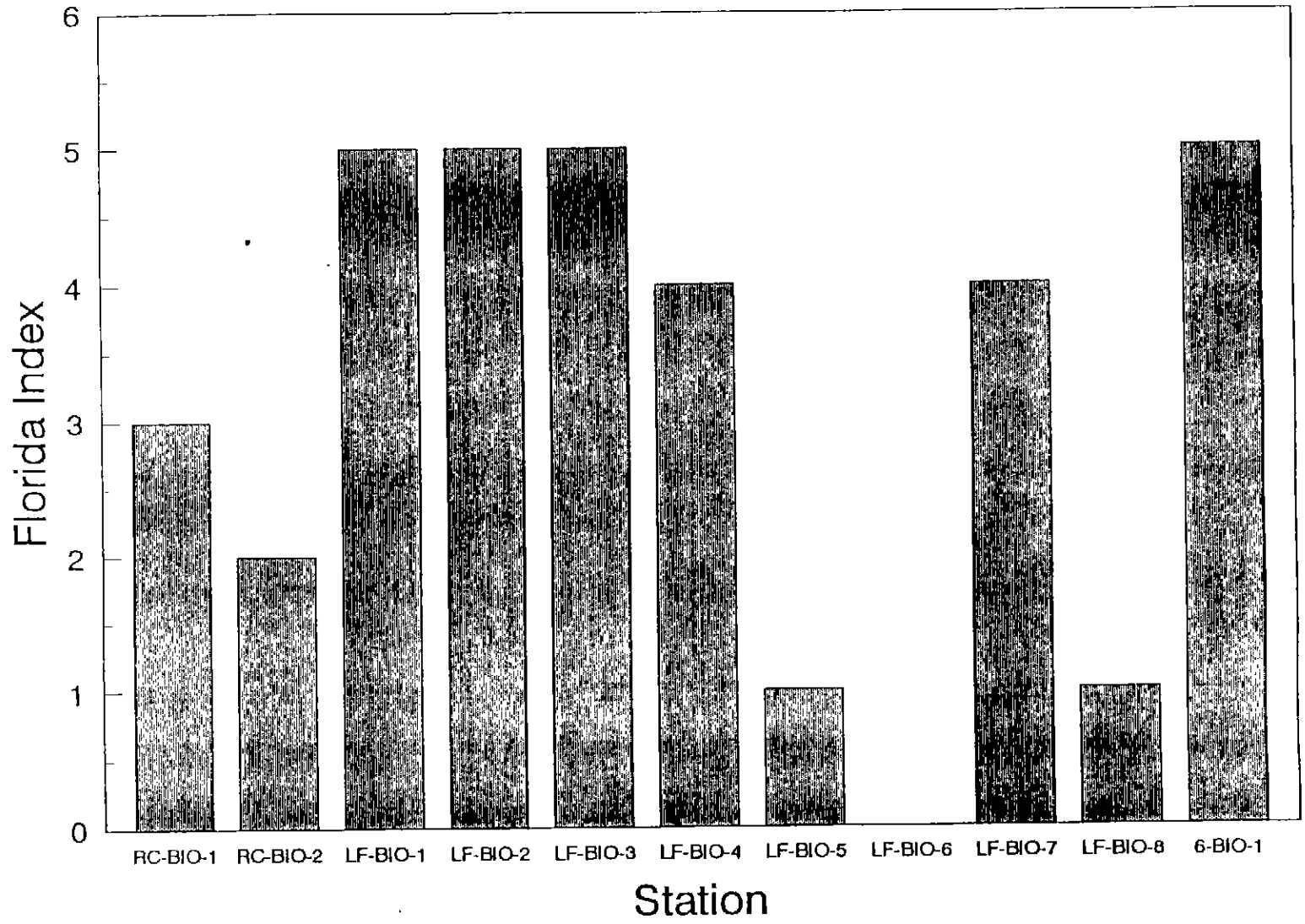

Figure 3-19. Florida Index for Ponar samples collected at Cecil Field.

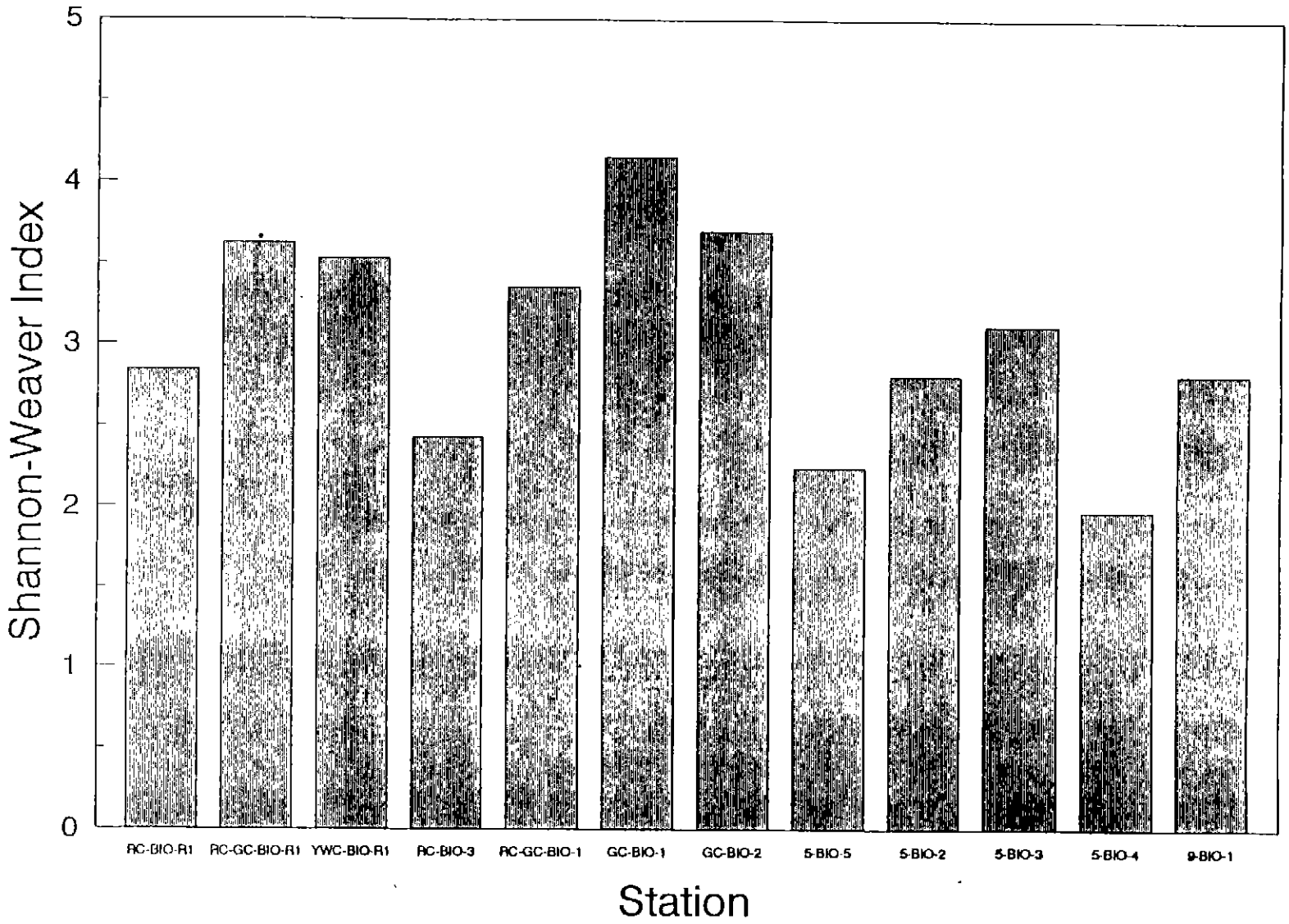

Figure 3-20. Shannon-Weaver Index for Ponar samples collected at Cecil Field.

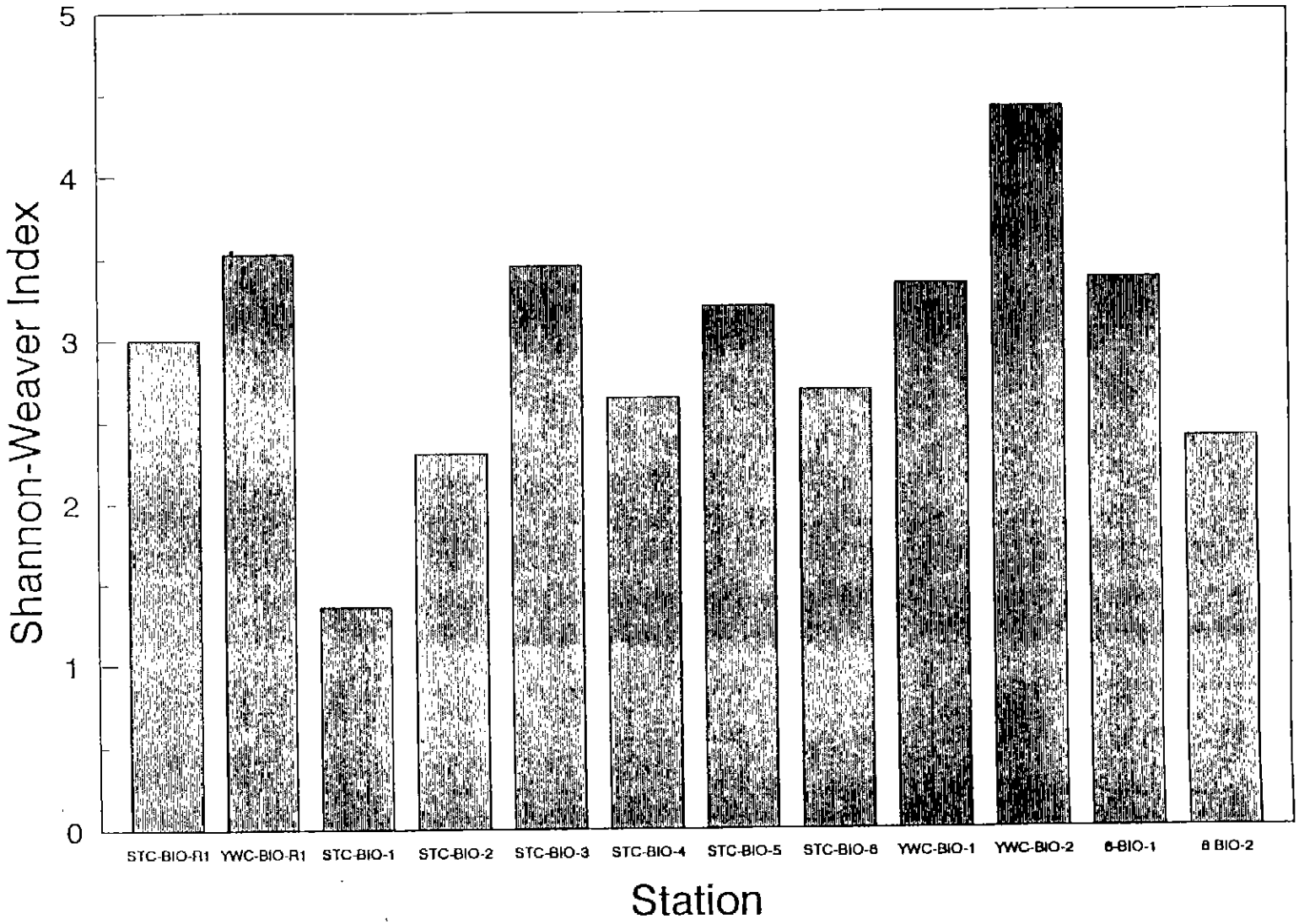

Figure 3-21. Shannon-Weaver Index for Ponar samples collected at Cecil Field.

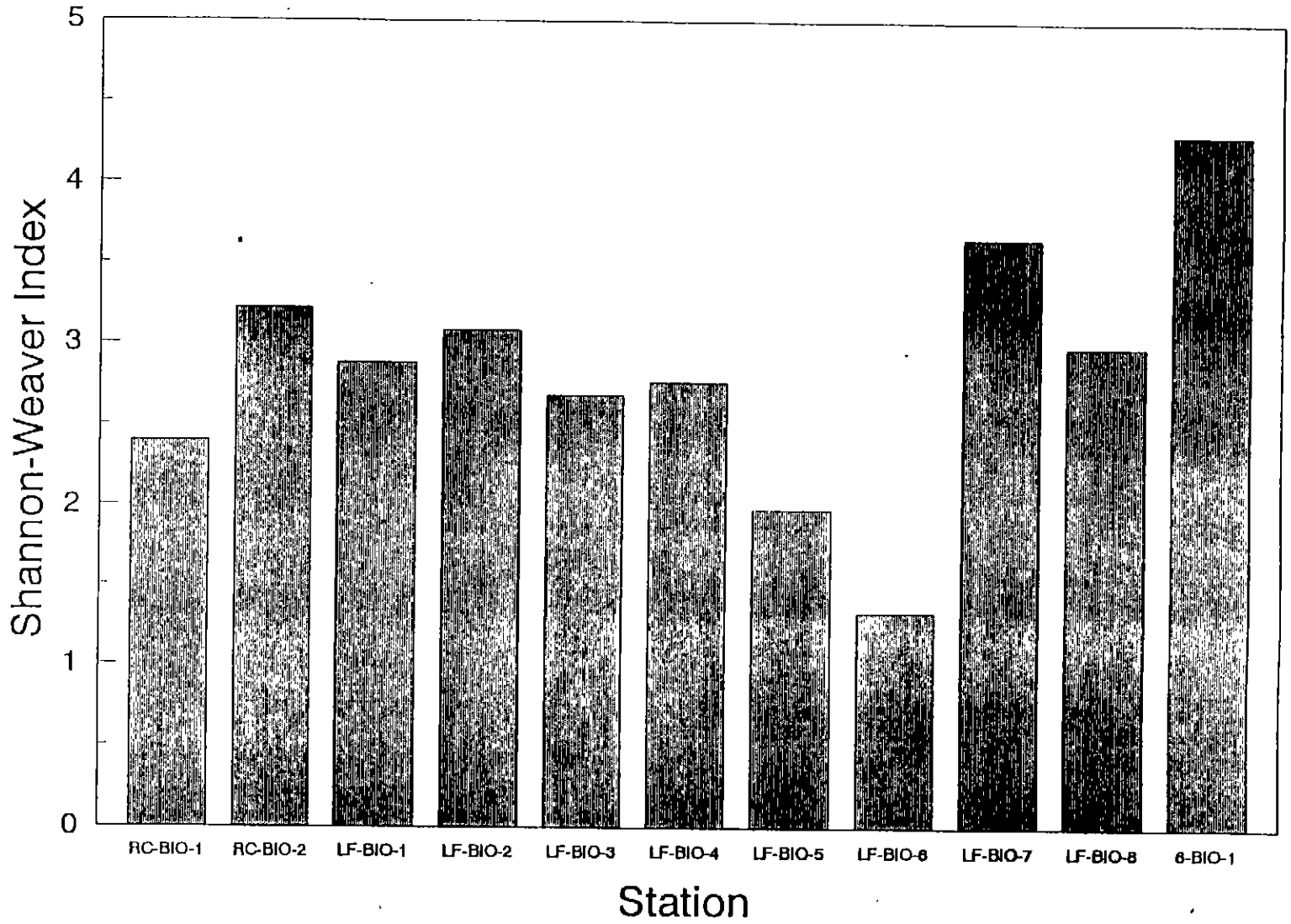

Figure 3-22. Shannon-Weaver Index for Ponar samples collected at Cecil Field.

The trends in metric values indicate that 5-BIO-5, 8-BIO-2, LF-BIO-6, STC-BIO-1, and STC-BIO-4 ranked lower for many of the key metrics compared to the reference stations and even ranked lower than the other stations. Station LF-BIO-6, the deepest station sampled in Lake Fretwell, had very low dissolved oxygen at the bottom, which may have contributed to its low metric values. Stations 5-BIO-5 and 8-BIO-2 also ranked low in the dip net samples. Station STC-BIO-1 ranked low in all three gear type samples and STC-BIO-4 ranked low in the Hester-Dendy and Ponar samples. The stream stations RC-BIO-R1, STC-BIO-R1, and YWC-BIO-R1 were suitable reference stations with high habitat assessment scores and moderate to high metric values. Station RC-GC-BIO-R1 was not representative of most stations sampled, due to low habitat quality and dense growth of aquatic macrophytes, which was not typical of most stations. However, RC-GC-BIO-R1 did score unusually high on many metrics, which may have been due to the unique habitat characteristics.

APPENDIX A

MACROINVERTEBRATE DATA LISTING

DEFINITIONS:

- REP—REPLICATE
- GEAR D—DIP NET
- GEAR H—HESTER-DENDY
- GEAR P—PONAR
- DEN—DENOMINATOR
- NUM—NUMERATOR

IELD NAME	REP	GEAR	DEN	NUM		SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
RIO-2		D	1	1		OECETIS	470628012004	3	0	0
IO-2		D	1	1	*	CULICIDAE	470630009	10	0	0
-BIO-2		D	1	1	*	COENAGRIONIDAE	470606003	19	0	0
5-BIO-2		D	1	1	*	CORDULIIDAE	470605006	35	0	0
5-BIO-2		D	1	1		LACCOPHILUS	470623008024	0	0	1
5-BIO-2		D	1	1		NASIAESCHNA	470605001010	1	0	0
5-BIO-2		D	1	1		CRANGONYX	470532057001	2	0	0
5-BIO-2		D	1	1		CHIRONOMUS	470630014032	4	0	0
5-BIO-2		D	1	1		CHIRONOMIDAE	470630014	0	1	0
5-BIO-2		D	1	1		LABRUNDINIA	470630014103	4	0	0
5-BIO-2		D	1	1		AULODRILUS PIGUETI	450203004008001	1	0	0
5-BIO-2		D	1	1		SPHAERIIDAE	460507046 A	4	0	0
5-BIO-2		D	1	1		ASELLUS	470531015001	3	0	0
5-BIO-2		D	1	1		ASTACIDAE	470534093	1	0	0
5-BIO-2		D	1	1		GOMPHIDAE	470605003	2	0	0
5-BIO-2		D	1	1	*	PROCLADIUS	470630014004	12	0	0
5-BIO-2		D	1	1		POLYPEDILUM ILLINOENSE	470630014036031	3	0	0
5-BIO-2		D	1	1		STICTOCHIRONOMUS	470630014039	1	0	0
5-BIO-2		D	1	1		ANCYLIDAE	460108011	2	0	0
5-BIO-2	A	H	1	1		CULICIDAE	470630009	2	0	0
5-BIO-2	A	H	1	1		TABANIDAE	470630024	1	0	0
5-BIO-2	A	H	1	1		ANCYLIDAE	460108011	2	0	0
5-BIO-2	A	H	1	1		POLYPEDILUM ILLINOENSE	470630014036031	3	0	0
5-BIO-2	A	H	1	1		ABLABESMYIA	470630014042	2	0	0
5-BIO-2	A	H	1	1		LABRUNDINIA	470630014103	1	0	0
5-BIO-2	A	H	1	1	*	CHIRONOMUS	470630014032	60	0	0
5-BIO-2	A	H	1	1		CORDULIIDAE	470605006	1	0	0
5-BIO-2	A	H	1	1		CHIRONOMIDAE	470630014	0	2	0
IO-2	B	H	1	1		CHIRONOMIDAE	470630014	1	0	0
IO-2	B	H	1	1	*	CHIRONOMUS	470630014032	30	0	0
5-BIO-2	B	H	1	1		LABRUNDINIA	470630014103	1	0	0
5-BIO-2	B	H	1	1		POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
5-BIO-2	B	H	1	1		CHIRONOMIDAE	470630014	0	2	0
5-BIO-2	B	H	1	1		TABANIDAE	470630024	1	0	0
5-BIO-2	B	H	1	1		ANCYLIDAE	460108011	4	0	0
5-BIO-2	C	H	1	1	*	CHIRONOMUS	470630014032	63	0	0
5-BIO-2	C	H	1	1		STICTOCHIRONOMUS	470630014039	1	0	0
5-BIO-2	C	H	1	1		LABRUNDINIA	470630014103	1	0	0
5-BIO-2	C	H	1	1		THIENEMANNIMYIA	470630014119	1	0	0
5-BIO-2	C	H	1	1		CHIRONOMIDAE	470630014	0	3	0
5-BIO-2	C	H	1	1		DICROTENDIPES	470630014043	1	0	0
5-BIO-2	C	H	1	1		CORDULIIDAE	470605006	3	0	0
5-BIO-2	C	H	1	1		COENAGRIONIDAE	470606003	3	0	0
5-BIO-2	C	H	1	1		ANCYLIDAE	460108011	1	0	0
5-BIO-2	C	H	1	1		PHAENOPSECTRA	470630014152	1	0	0
5-BIO-2	C	H	1	1		POLYPEDILUM ILLINOENSE	470630014036031	3	0	0
5-BIO-2	A	P	1	1		TUBIFICIDAE IMM. W	450203004 A	2	0	0
5-BIO-2	A	P	1	1		CERATOPOGONIDAE	470630010	1	0	0
5-BIO-2	A	P	1	1		LABRUNDINIA	470630014103	2	0	0
5-BIO-2	A	P	1	1		PROCLADIUS	470630014004	8	0	0
5-BIO-2	A	P	1	1	*	CHIRONOMUS	470630014032	11	0	0
5-BIO-2	B	P	1	1		CORDULIIDAE	470605006	1	0	0
5-BIO-2	B	P	1	1		ANCYLIDAE	460108011	2	0	0
5-BIO-2	C	P	1	1		CRANGONYX	470532057001	1	0	0
5-BIO-2	C	P	1	1		PRISTINA OSBORNI	450203005005009	1	0	0
IO-2	C	P	1	1		TUBIFICIDAE IMM. W/O	450203004 B	2	0	0
IO-2	C	P	1	1		COENAGRIONIDAE	470606003	1	0	0
5-BIO-2	C	P	1	1		CHIRONOMUS	470630014032	2	0	0
5-BIO-2	C	P	1	1		ANCYLIDAE	460108011	1	0	0
5-BIO-2	C	P	1	1		PROCLADIUS	470630014004	7	0	0
5-BIO-2	C	P	1	1		LABRUNDINIA	470630014103	3	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
5-BIO-2	C	P	1	1	TANYTARSUS	470630014030	1	0	0
5-BIO-2	C	P	1	1	CHIRONOMUS	470630014032	2	0	0
5-BIO-2	C	P	1	1	ABLABESMYIA	470630014042	1	0	0
5-BIO-3		D	1	1	ACARINA	47021100	1	0	0
5-BIO-3		D	1	1	TRICLADIDA	350109	1	0	0
5-BIO-3		D	1	1	CRANGONYX	470532057001	2	0	0
5-BIO-3		D	1	1	DERO	450203005006	1	0	0
5-BIO-3		D	1	1	TUBIFICIDAE IMM. W/O	450203004 B	1	0	0
5-BIO-3		D	1	1	STICTOCHIRONOMUS	470630014039	1	0	0
5-BIO-3		D	1	1	CHIRONOMIDAE	470630014	0	1	0
5-BIO-3		D	1	1	* ANCYLIDAE	460108011	28	0	0
5-BIO-3		D	1	1	CULICIDAE	470630009	3	0	0
5-BIO-3		D	1	1	* PROCLADIUS	470630014004	16	0	0
5-BIO-3		D	1	1	* CHIRONOMUS	470630014032	19	0	0
5-BIO-3		D	1	1	POLYPEDILUM ILLINOENSE	470630014036031	4	0	0
5-BIO-3		D	1	1	PHAENOPSECTRA	470630014152	4	0	0
5-BIO-3		D	1	1	COENAGRIONIDAE	470606003	8	0	0
5-BIO-3		D	1	1	ASELLUS	470531015001	7	0	0
5-BIO-3		D	1	1	CORDULIIDAE	470605006	8	0	0
5-BIO-3		D	1	1	DUBIRAPHIA	470623050002	1	0	0
5-BIO-3		D	1	1	CERATOPOGONIDAE	470630010	1	0	0
5-BIO-3		D	1	1	DICROTENDIPES	470630014043	1	0	0
5-BIO-3	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
5-BIO-3	A	P	1	1	CHIRONOMUS	470630014032	3	0	0
5-BIO-3	A	P	1	1	NAIDIDAE	450203005	1	0	0
5-BIO-3	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
5-BIO-3	A	P	1	1	COENAGRIONIDAE	470606003	1	0	0
5-BIO-3	A	P	1	1	ASTACIDAE	470534093	1	0	0
5-BIO-3	A	P	1	1	PROCLADIUS	470630014004	3	0	0
5-BIO-3	A	P	1	1	CHIRONOMUS	470630014032	2	0	0
5-BIO-3	A	P	1	1	COLLEMBOLA	470602	1	0	0
5-BIO-3	A	P	1	1	DYTISCIDAE	470623008	0	0	1
5-BIO-3	A	P	1	1	* TUBIFICIDAE IMM. W/O	450203004 B	29	0	0
5-BIO-3	B	P	1	1	CULICIDAE	470630009	1	0	0
5-BIO-3	B	P	1	1	* PROCLADIUS	470630014004	12	0	0
5-BIO-3	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	7	0	0
5-BIO-3	B	P	1	1	CRANGONYX	470532057001	1	0	0
5-BIO-3	B	P	1	1	ANISOPTERA	47060500	1	0	0
5-BIO-3	B	P	1	1	AULODRILUS PIGUETI	450203004008001	1	0	0
5-BIO-3	B	P	1	1	CHIRONOMUS	470630014032	6	0	0
5-BIO-3	B	P	1	1	ANCYLIDAE	460108011	4	0	0
5-BIO-3	B	P	1	1	SPHAERIIDAE	460507046 A	2	0	0
5-BIO-3	B	P	1	1	ACARINA	47021100	2	0	0
5-BIO-3	B	P	1	1	ASELLUS	470531015001	1	0	0
5-BIO-3	C	P	1	1	SPHAERIIDAE	460507046 A	1	0	0
5-BIO-3	C	P	1	1	LABRUNDINIA	470630014103	1	0	0
5-BIO-3	C	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
5-BIO-3	C	P	1	1	DERO	450203005006	1	0	0
5-BIO-3	C	P	1	1	DIPTERA	470630	1	0	0
5-BIO-3	C	P	1	1	ANISOPTERA	47060500	2	0	0
5-BIO-3	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	2	0	0
5-BIO-3	C	P	1	1	ABLABESMYIA	470630014042	1	0	0
5-BIO-3	C	P	1	1	CHIRONOMUS	470630014032	5	0	0
5-BIO-3	C	P	1	1	AULODRILUS PIGUETI	450203004008001	1	0	0
5-BIO-3	C	P	1	1	* PROCLADIUS	470630014004	16	0	0
5-BIO-3	C	P	1	1	ASELLUS	470531015001	1	0	0
5-BIO-3	C	P	1	1	CRANGONYX	470532057001	1	0	0
5-BIO-3	C	P	1	1	CORDULIIDAE	470605006	1	0	0
5-BIO-4		D	3	28	* STICTOCHIRONOMUS	470630014039	10	0	0
5-BIO-4		D	3	28	NAIDIDAE	450203005	2	0	0
5-BIO-4		D	3	28	* CHIRONOMUS	470630014032	38	0	0

IELD NAME	REP	GEAR	DEN	NUM		SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
10-4		D	3	28		OMISUS	470630014088	1	0	0
10-4		D	3	28		CHIRONOMINI	47063001401	1	0	0
-BIO-4		D	3	28		PHAENOPSECTRA	470630014152	6	0	0
-BIO-4		D	3	28	*	TUBIFICIDAE IMM. W/O	450203004 B	10	0	0
-BIO-4		D	3	28		ZAVRELIELLA	470630014090	1	0	0
-BIO-4		D	3	28	*	PROCLADIUS	470630014004	10	0	0
-BIO-4		D	3	28		DIPTERA	470630	1	0	0
-BIO-4		D	3	28		TABANIDAE	470630024	1	0	0
-BIO-4		D	3	28	*	ASELLUS	470531015001	14	0	0
-BIO-4		D	3	28		ANCYLIDAE	460108011	1	0	0
-BIO-4		D	3	28		LUMBRICULIDAE	450201001	1	0	0
-BIO-4		D	3	28		SPHAERIIDAE	460507046 A	1	0	0
-BIO-4		D	3	28		POLYPEDILUM ILLINOENSE	470630014036031	5	0	0
-BIO-4	A	P	1	1		CRANGONYX	470532057001	2	0	0
-BIO-4	A	P	1	1		SPHAERIIDAE	460507046 A	1	0	0
-BIO-4	A	P	1	1		DIPTERA	470630	1	0	0
-BIO-4	A	P	1	1	*	TUBIFICIDAE IMM. W/O	450203004 B	12	0	0
-BIO-4	A	P	1	1		POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
-BIO-4	A	P	1	1		PROCLADIUS	470630014004	7	0	0
-BIO-4	A	P	1	1		AULODRILUS PIGUETI	450203004008001	1	0	0
-BIO-4	A	P	1	1		TUBIFICIDAE IMM. W	450203004 A	2	0	0
-BIO-4	B	P	1	1		TUBIFICIDAE IMM. W/O	450203004 B	3	0	0
-BIO-4	B	P	1	1		CLADOPELMA	470630014159	1	0	0
-BIO-4	B	P	1	1		PROCLADIUS	470630014004	3	0	0
-BIO-4	B	P	1	1		CHIRONOMUS	470630014032	1	0	0
-BIO-4	B	P	1	1		DIPTERA	470630	1	0	0
-BIO-4	C	P	1	1		CHIRONOMUS	470630014032	4	0	0
RIO-4	C	P	1	1		PROCLADIUS	470630014004	4	0	0
O-4	C	P	1	1		DIPTERA	470630	1	0	0
-BIO-4	C	P	1	1	*	TUBIFICIDAE IMM. W/O	450203004 B	38	0	0
-BIO-4	C	P	1	1		POLYPEDILUM ILLINOENSE	470630014036031	3	0	0
-BIO-5		D	1	1		THIENEMANNIMYIA	470630014119	1	0	0
-BIO-5		D	1	1		CULICIDAE	470630009	2	0	0
-BIO-5		D	1	1		DERO	450203005006	1	0	0
-BIO-5		D	1	1		POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
-BIO-5		D	1	1		ASELLUS	470531015001	4	0	0
-BIO-5		D	1	1		CHIRONOMUS	470630014032	3	0	0
-BIO-5		D	1	1	*	ANCYLIDAE	460108011	53	0	0
-BIO-5		D	1	1		ANISOPTERA	47060500	7	0	0
-BIO-5		D	1	1	*	COENAGRIONIDAE	470606003	18	0	0
-BIO-5		D	1	1		STENELMIS	470623050001	1	0	0
-BIO-5	A	P	1	1		ANCYLIDAE	460108011	2	0	0
-BIO-5	C	P	1	1		COENAGRIONIDAE	470606003	1	0	0
-BIO-5	C	P	1	1		CHIRONOMUS	470630014032	2	0	0
-BIO-5	C	P	1	1		ANISOPTERA	47060500	2	0	0
-BIO-5	C	P	1	1		CULICIDAE	470630009	3	0	0
-BIO-1		D	2	28		DERO FLABELLIGER	450203005006002	87	0	0
-BIO-1		D	2	28		DIPTERA	470630	2	0	0
-BIO-1		D	2	28		PROCLADIUS	470630014004	1	0	0
-BIO-1		D	2	28		STRATIOMYIDAE	470630025	3	0	0
-BIO-1		D	2	28		DICROTENDIPES	470630014043	1	0	0
-BIO-1		D	2	28		CULICIDAE	470630009	6	0	0
-BIO-1		D	2	28		PSEUDOCHIRONOMUS	470630014037	1	0	0
-BIO-1		D	2	28		PLANORBIDAE	460108012	1	0	0
-BIO-1		D	2	28		TANYTARSUS	470630014030	1	0	0
0-1		D	2	28		LYMNAEIDAE	460108010	5	0	0
BIO-1		D	2	28		ABLABESMYIA	470630014042	9	0	0
-BIO-1		D	2	28		PHYSELLA	460108013003	1	0	0
-BIO-1		D	2	28		CULICIDAE	470630009	0	2	0
-BIO-1		D	2	28		PELECYPODA	4605 A	1	0	0
-BIO-1		D	2	28		POLYPEDILUM ILLINOENSE	470630014036031	6	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
6-BIO-1		D	2	28	LIBELLULIDAE	470605004	8	0	0
6-BIO-1		D	2	28	ENDOCHIRONOMUS	470630014086	6	0	0
6-BIO-1		D	2	28	CENTROPTILUM	470604002007	2	0	0
6-BIO-1		D	2	28	NEMERTEA	38	1	0	0
6-BIO-1		D	2	28	TANYTARSUS EPLER F	470630014030025	4	0	0
6-BIO-1		D	2	28	CHIRONOMUS	470630014032	12	0	0
6-BIO-1		D	2	28	COENAGRIONIDAE	470606003	29	0	0
6-BIO-1		D	2	28	COLEOPTERA	470623	0	0	3
6-BIO-1		D	2	28	HYDROPHILIDAE	470623016	0	0	1
6-BIO-1		D	2	28	HEMIPTERA	470621	3	0	0
6-BIO-1		D	2	28	CURCULIONIDAE	470623104	0	0	7
6-BIO-1	A	P	1	1	STRATIOMYIDAE	470630025	1	0	0
6-BIO-1	A	P	1	1	PELECYPODA	4605 A	1	0	0
6-BIO-1	A	P	1	1	ENDOCHIRONOMUS	470630014086	4	0	0
6-BIO-1	A	P	1	1	TANYPUS	470630014033	2	0	0
6-BIO-1	A	P	1	1	OXYETHIRA	470628005005	1	0	0
6-BIO-1	A	P	1	1	DERO	450203005006	1	0	0
6-BIO-1	A	P	1	1	NAIDIDAE	450203005	1	0	0
6-BIO-1	A	P	1	1	CORIXIDAE	470621001	1	0	0
6-BIO-1	A	P	1	1	PALAEMONETES PALUDOSUS	470534015003002	1	0	0
6-BIO-1	A	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
6-BIO-1	A	P	1	1	CHIRONOMUS	470630014032	3	0	0
6-BIO-1	A	P	1	1	CHIRONOMINI	47063001401	2	0	0
6-BIO-1	A	P	1	1	TANYTARSUS	470630014030	1	0	0
6-BIO-1	A	P	1	1	DICROTENDIPES	470630014043	1	0	0
6-BIO-1	A	P	1	1	BAETIDAE	470604002	1	0	0
6-BIO-1	A	P	1	1	TANYPODINAE	470630014 C	3	0	0
6-BIO-1	B	P	1	1	LYMNAEIDAE	460108010	1	0	0
6-BIO-1	B	P	1	1	PELECYPODA	4605 A	5	0	0
6-BIO-1	B	P	1	1	COLEOPTERA	470623	0	0	1
6-BIO-1	B	P	1	1	DERO	450203005006	1	0	0
6-BIO-1	B	P	1	1	NAIDIDAE	450203005	2	0	0
6-BIO-1	B	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
6-BIO-1	B	P	1	1	CHIRONOMUS	470630014032	1	0	0
6-BIO-1	B	P	1	1	DIPTERA	470630	1	0	0
6-BIO-1	B	P	1	1	TABANIDAE	470630024	1	0	0
6-BIO-1	C	P	1	1	TANYPUS	470630014033	2	0	0
6-BIO-1	C	P	1	1	CURCULIONIDAE	470623104	0	0	1
6-BIO-1	C	P	1	1	CERATOPOGONIDAE	470630010	3	0	0
6-BIO-1	C	P	1	1	DERO	450203005006	1	0	0
6-BIO-1	C	P	1	1	HYDROPHILIDAE	470623016	0	0	1
6-BIO-1	C	P	1	1	PELECYPODA	4605 A	1	0	0
6-BIO-1	C	P	1	1	CENTROPTILUM	470604002007	1	0	0
6-BIO-1	C	P	1	1	LYMNAEIDAE	460108010	1	0	0
6-BIO-1	C	P	1	1	CHAOBORUS	470630009001	6	0	0
8-BIO-1		D	1	1	DUBIRAPHIA	470623050002	1	0	0
8-BIO-1		D	1	1	ASTACIDAE	470534093	17	0	0
8-BIO-1		D	1	1	TRIBELOS	470630014117	1	0	0
8-BIO-1		D	1	1	PROCLADIUS	470630014004	6	0	0
8-BIO-1		D	1	1	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
8-BIO-1		D	1	1	CORIXIDAE	470621001	16	0	0
8-BIO-1		D	1	1	DICROTENDIPES	470630014043	1	0	0
8-BIO-1		D	1	1	DIPTERA	470630	1	0	0
8-BIO-1		D	1	1	LIBELLULIDAE	470605004	3	0	0
8-BIO-1		D	1	1	COENAGRIONIDAE	470606003	13	0	0
8-BIO-1		D	1	1	TROPISTERNUS	470623016012	0	0	1
8-BIO-1		D	1	1	DYTISCIDAE	470623008	0	0	1
8-BIO-1	A	P	1	1	ASTACIDAE	470534093	1	0	0
8-BIO-1	A	P	1	1	CORIXIDAE	470621001	2	0	0
8-BIO-1	A	P	1	1	PROCLADIUS	470630014004	3	0	0
8-BIO-1	A	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
3IO-1	A	P	1	1	DICROTENDIPES	470630014043	1	0	0
IO-1	B	P	1	1	TRIBELOS	470630014117	4	0	0
3-BIO-1	B	P	1	1	DICROTENDIPES	470630014043	2	0	0
3-BIO-1	B	P	1	1	PROCLADIUS	470630014004	2	0	0
3-BIO-1	C	P	1	1	CORIXIDAE	470621001	1	0	0
3-BIO-1	C	P	1	1	DUBIRAPHIA	470623050002	5	0	0
3-BIO-1	C	P	1	1	PELECYPODA	4605 A	2	0	0
3-BIO-1	C	P	1	1	ASELLUS	470531015001	1	0	0
3-BIO-1	C	P	1	1	PROCLADIUS	470630014004	1	0	0
3-BIO-1	C	P	1	1	TRIBELOS	470630014117	1	0	0
3-BIO-1	C	P	1	1	NEMATODA	4301	1	0	0
3-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	1	0	0
3-BIO-1	C	P	1	1	LUMBRICULIDAE	450201001	1	0	0
3-BIO-1	C	P	1	1	LIBELLULIDAE	470605004	2	0	0
3-BIO-2		D	1	1	NOTONECTIDAE	470621002	1	0	0
3-BIO-2		D	1	1	THIENEMANNIMYIA	470630014119	1	0	0
3-BIO-2		D	1	1	ABLABESMYIA	470630014042	1	0	0
3-BIO-2		D	1	1	ACARINA	47021100	1	0	0
3-BIO-2		D	1	1	ASTACIDAE	470534093	8	0	0
3-BIO-2		D	1	1	LIBELLULIDAE	470605004	9	0	0
3-BIO-2		D	1	1	COENAGRIONIDAE	470606003	9	0	0
3-BIO-2		D	1	1	DYTISCIDAE	470623008	0	0	8
3-BIO-2	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	2	0	0
3-BIO-2	A	P	1	1	TRIBELOS	470630014117	1	0	0
3-BIO-2	A	P	1	1	DICROTENDIPES	470630014043	1	0	0
3-BIO-2	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
3-BIO-2	A	P	1	1	PROCLADIUS	470630014004	2	0	0
3-BIO-2	B	P	1	1	ASTACIDAE	470534093	1	0	0
IO-2	B	P	1	1	DYTISCIDAE	470623008	0	0	1
BIO-2	B	P	1	1	DICROTENDIPES	470630014043	1	0	0
3-BIO-2	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	2	0	0
3-BIO-2	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	6	0	0
3-BIO-2	C	P	1	1	PROCLADIUS	470630014004	6	0	0
3-BIO-2	C	P	1	1	DICROTENDIPES	470630014043	1	0	0
3-BIO-2	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	4	0	0
3-BIO-2	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	2	0	0
3-BIO-2	C	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
9-BIO-1		D	1	1	BOYERIA	470605001007	2	0	0
9-BIO-1		D	1	1	HEMERODROMIA	470630041004	4	0	0
9-BIO-1		D	1	1	ASTACIDAE	470534093	11	0	0
9-BIO-1		D	1	1	PELECYPODA	4605 A	12	0	0
9-BIO-1		D	1	1	LYMNAEIDAE	460108010	3	0	0
9-BIO-1		D	1	1	NOTONECTIDAE	470621002	4	0	0
9-BIO-1		D	1	1	PLANORBIDAE	460108012	36	0	0
9-BIO-1		D	1	1	PROCLADIUS	470630014004	7	0	0
9-BIO-1		D	1	1	TRIBELOS	470630014117	14	0	0
9-BIO-1		D	1	1	CHIRONOMUS	470630014032	15	0	0
9-BIO-1		D	1	1	TANYTARSUS	470630014030	5	0	0
9-BIO-1		D	1	1	CHIRONOMINI	47063001401	3	0	0
9-BIO-1		D	1	1	POLYPEDILUM ILLINOENSE	470630014036031	24	0	0
9-BIO-1		D	1	1	PHAENOPSECTRA	470630014152	6	0	0
9-BIO-1		D	1	1	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
9-BIO-1		D	1	1	THIENEMANNIMYIA	470630014119	4	0	0
9-BIO-1		D	1	1	AULODRILUS PIGUETI	450203004008001	38	0	0
9-BIO-1		D	1	1	LIBELLULIDAE	470605004	5	0	0
3IO-1		D	1	1	PARATANYTARSUS	470630014091	1	0	0
3IO-1		D	1	1	COELOTANYPUS	470630014002	2	0	0
9-BIO-1		D	1	1	SLAVINA APPENDICULATA	450203005001001	6	0	0
9-BIO-1	A	P	1	1	PELECYPODA	4605 A	1	0	0
9-BIO-1	A	P	1	1	SIALIS	470627001001	1	0	0
9-BIO-1	A	P	1	1	PROGOMPHUS	470605003003	3	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
9-BIO-1	A	P	1	1	TRIBELOS	470630014117	7	0	0
9-BIO-1	A	P	1	1	CHIRONOMUS	470630014032	4	0	0
9-BIO-1	A	P	1	1	PROCLADIUS	470630014004	4	0	0
9-BIO-1	A	P	1	1	AULODRILUS PIGUETI	450203004008001	5	0	0
9-BIO-1	A	P	1	1	HYDROBIIDAE	460102013	1	0	0
9-BIO-1	B	P	1	1	TRIBELOS	470630014117	64	0	0
9-BIO-1	B	P	1	1	NAIDIDAE	450203005	1	0	0
9-BIO-1	B	P	1	1	THIENEMANNIMYIA	470630014119	15	0	0
9-BIO-1	B	P	1	1	PLANORBIDAE	460108012	15	0	0
9-BIO-1	B	P	1	1	SIALIS	470627001001	1	0	0
9-BIO-1	B	P	1	1	PROCLADIUS	470630014004	10	0	0
9-BIO-1	B	P	1	1	DYTISCIDAE	470623008	0	0	2
9-BIO-1	B	P	1	1	PELECYPODA	4605 A	1	0	0
9-BIO-1	B	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	2	0	0
9-BIO-1	B	P	1	1	DICROTENDIPES	470630014043	1	0	0
9-BIO-1	B	P	1	1	ABLABESMYIA	470630014042	1	0	0
9-BIO-1	B	P	1	1	CHIRONOMUS	470630014032	5	0	0
9-BIO-1	B	P	1	1	AULODRILUS PIGUETI	450203004008001	26	0	0
9-BIO-1	C	P	1	1	CHIRONOMUS	470630014032	1	0	0
9-BIO-1	C	P	1	1	PROGOMPHUS	470605003003	2	0	0
9-BIO-1	C	P	1	1	PROCLADIUS	470630014004	1	0	0
9-BIO-1	C	P	1	1	TABANIDAE	470630024	1	0	0
9-BIO-1	C	P	1	1	PELECYPODA	4605 A	3	0	0
9-BIO-1	C	P	1	1	TRIBELOS	470630014117	7	0	0
9-BIO-1	C	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
9-BIO-1	C	P	1	1	PLANORBIDAE	460108012	3	0	0
9-BIO-1	C	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	2	0	0
9-BIO-1	C	P	1	1	AULODRILUS PIGUETI	450203004008001	13	0	0
GC-BIO-01		D	1	28	PALAEMONETES PALUDOSUS	470534015003002	8	0	0
GC-BIO-01		D	1	28	NAIS COMMUNIS	450203005008003	2	0	0
GC-BIO-01		D	1	28	HEMIPTERA	470621	4	0	0
GC-BIO-01		D	1	28	CURCULIONIDAE	470623104	0	0	2
GC-BIO-01		D	1	28	CHIRONOMIDAE	470630014	0	1	0
GC-BIO-01		D	1	28	CORIXIDAE	470621001	2	0	0
GC-BIO-01		D	1	28	TRICLADIDA	350109	2	0	0
GC-BIO-01		D	1	28	TANYTARSUS	470630014030	3	0	0
GC-BIO-01		D	1	28	HYDROPTILIDAE	470628005	1	0	0
GC-BIO-01		D	1	28	BELOSTOMATIDAE	470621005	1	0	0
GC-BIO-01		D	1	28	DICROTENDIPES	470630014043	9	0	0
GC-BIO-01		D	1	28	POLYPEDILUM ILLINOENSE	470630014036031	4	0	0
GC-BIO-01		D	1	28	PSEUDOCHIRONOMUS	470630014037	1	0	0
GC-BIO-01		D	1	28	CERATOPOGONIDAE	470630010	1	0	0
GC-BIO-01		D	1	28	PARATANYTARSUS	470630014091	1	0	0
GC-BIO-01		D	1	28	CLADOTANYTARSUS	470630014041	1	0	0
GC-BIO-01		D	1	28	DERO	450203005006	5	0	0
GC-BIO-01		D	1	28	PLANORBIDAE	460108012	2	0	0
GC-BIO-01		D	1	28	LYMNAEIDAE	460108010	6	0	0
GC-BIO-01		D	1	28	CENTROPTILUM	470604002007	19	0	0
GC-BIO-01		D	1	28	NAIS	450203005008	6	0	0
GC-BIO-01		D	1	28	CAENIS	470604011002	37	0	0
GC-BIO-01		D	1	28	LIBELLULIDAE	470605004	3	0	0
GC-BIO-01		D	1	28	COENAGRIONIDAE	470606003	25	0	0
GC-BIO-1	A	H	1	1	ANCYLIDAE	460108011	8	0	0
GC-BIO-1	A	H	1	1	CAENIS	470604011002	22	0	0
GC-BIO-1	A	H	1	1	LIBELLULIDAE	470605004	2	0	0
GC-BIO-1	A	H	1	1	ASTACIDAE	470534093	1	0	0
GC-BIO-1	A	H	1	1	TRICLADIDA	350109	2	0	0
GC-BIO-1	A	H	1	1	NEMERTEA	38	1	0	0
GC-BIO-1	A	H	1	1	GLOSSIPHONIIDAE	450205002	2	0	0
GC-BIO-1	A	H	1	1	CERATOPOGONIDAE	470630010	1	0	0
GC-BIO-1	A	H	1	1	TANYTARSUS	470630014030	1	0	0

IELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
-BIO-1	A	H	1	1	PROCLADIUS	470630014004	1	0	0
BIO-1	A	H	1	1	CRYPTOCHIRONOMUS	470630014035	2	0	0
C-BIO-1	A	H	1	1	CLINOTANYPUS	470630014001	1	0	0
C-BIO-1	A	H	1	1	DERO DERO	450203005006007	58	0	0
C-BIO-1	A	H	1	1	DERO AULOPHORUS	450203005006 A	1	0	0
C-BIO-1	B	H	1	1	OLIGOCHAETA	4502	1	0	0
C-BIO-1	B	H	1	1	CAENIS	470604011002	5	0	0
C-BIO-1	B	H	1	1	ANCYLIDAE	460108011	5	0	0
C-BIO-1	B	H	1	1	PLANORBIDAE	460108012	4	0	0
C-BIO-1	B	H	1	1	CURCULIONIDAE	470623104	0	0	1
C-BIO-1	B	H	1	1	GLOSSIPHONIIDAE	450205002	1	0	0
C-BIO-1	B	H	1	1	DICROTENDIPES	470630014043	2	0	0
C-BIO-1	B	H	1	1	LIBELLULIDAE	470605004	2	0	0
C-BIO-1	B	H	1	1	DERO DERO	450203005006007	69	0	0
C-BIO-1	B	H	1	1	CRYPTOCHIRONOMUS	470630014035	2	0	0
C-BIO-1	B	H	1	1	TANYTARSUS	470630014030	1	0	0
C-BIO-1	C	H	1	1	CAENIS	470604011002	10	0	0
C-BIO-1	C	H	1	1	ANCYLIDAE	460108011	3	0	0
C-BIO-1	C	H	1	1	COENAGRIONIDAE	470606003	1	0	0
C-BIO-1	C	H	1	1	CERATOPOGONIDAE	470630010	1	0	0
C-BIO-1	C	H	1	1	PROCLADIUS	470630014004	2	0	0
C-BIO-1	C	H	1	1	CRYPTOCHIRONOMUS	470630014035	1	0	0
C-BIO-1	C	H	1	1	PLANORBIDAE	460108012	4	0	0
C-BIO-1	C	H	1	1	LIBELLULIDAE	470605004	3	0	0
C-BIO-1	C	H	1	1	TANYPODINAE	470630014 C	2	0	0
C-BIO-1	C	H	1	1	ABLABESMYIA	470630014042	1	0	0
C-BIO-1	C	H	1	1	TANYTARSUS	470630014030	2	0	0
C-BIO-1	C	H	1	1	DERO DERO	450203005006007	69	0	0
BIO-1	A	P	1	1	CHIRONOMIDAE	470630014	0	6	0
-BIO-1	A	P	1	1	TRICLADIDA	350109	5	0	0
GC-BIO-1	A	P	1	1	ASTACIDAE	470534093	1	0	0
GC-BIO-1	A	P	1	1	PALAEMONETES PALUDOSUS	470534015003002	1	0	0
GC-BIO-1	A	P	1	1	LYMNAEIDAE	460108010	4	0	0
GC-BIO-1	A	P	1	1	ACARINA	47021100	1	0	0
GC-BIO-1	A	P	1	1	CERATOPOGONIDAE	470630010	30	0	0
GC-BIO-1	A	P	1	1	CAENIS	470604011002	2	0	0
GC-BIO-1	A	P	1	1	BAETIDAE	470604002	2	0	0
GC-BIO-1	A	P	1	1	DIPTERA	470630	0	4	0
GC-BIO-1	A	P	1	1	PLANORBIDAE	460108012	2	0	0
GC-BIO-1	A	P	1	1	LIBELLULIDAE	470605004	12	0	0
GC-BIO-1	A	P	1	1	COENAGRIONIDAE	470606003	11	0	0
GC-BIO-1	A	P	1	1	ABLABESMYIA	470630014042	6	0	0
GC-BIO-1	A	P	1	1	PARATANYTARSUS	470630014091	5	0	0
GC-BIO-1	A	P	1	1	DICROTENDIPES	470630014043	11	0	0
GC-BIO-1	A	P	1	1	TANYTARSINI	470630014008	10	0	0
GC-BIO-1	A	P	1	1	TANYTARSUS	470630014030	4	0	0
GC-BIO-1	A	P	1	1	PSEUDOCHIRONOMUS	470630014037	17	0	0
GC-BIO-1	A	P	1	1	CLINOTANYPUS	470630014001	1	0	0
GC-BIO-1	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	15	0	0
GC-BIO-1	A	P	1	1	TANYPODINAE	470630014 C	3	0	0
GC-BIO-1	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
GC-BIO-1	A	P	1	1	DERO	450203005006	6	0	0
GC-BIO-1	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	12	0	0
GC-BIO-1	A	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	7	0	0
GC-BIO-1	A	P	1	1	NEMATODA	4301	1	0	0
-BIO-1	A	P	1	1	ILYODRILUS TEMPLETONI	450203004006002	1	0	0
-BIO-1	B	P	1	1	LUMBRICULIDAE	450201001	1	0	0
GC-BIO-1	B	P	1	1	CHIRONOMIDAE	470630014	0	6	0
GC-BIO-1	B	P	1	1	DIPTERA	470630	0	3	0
GC-BIO-1	B	P	1	1	PALAEMONETES PALUDOSUS	470534015003002	1	0	0
GC-BIO-1	B	P	1	1	PSEUDOCHIRONOMUS	470630014037	6	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
GC-BIO-1	B	P	1	1	COENAGRIONIDAE	470606003	12	0	0
GC-BIO-1	B	P	1	1	LIBELLULIDAE	470605004	3	0	0
GC-BIO-1	B	P	1	1	LEPIDOPTERA	470629	3	0	0
GC-BIO-1	B	P	1	1	CERATOPOGONIDAE	470630010	9	0	0
GC-BIO-1	B	P	1	1	DICROTENDIPES	470630014043	10	0	0
GC-BIO-1	B	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	6	0	0
GC-BIO-1	B	P	1	1	TANYTARSINI	470630014008	4	0	0
GC-BIO-1	B	P	1	1	ABLABESMYIA	470630014042	4	0	0
GC-BIO-1	B	P	1	1	PARACHIRONOMUS	470630014052	2	0	0
GC-BIO-1	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	8	0	0
GC-BIO-1	B	P	1	1	DERO	450203005006	1	0	0
GC-BIO-1	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	8	0	0
GC-BIO-1	B	P	1	1	CORIXIDAE	470621001	2	0	0
GC-BIO-1	B	P	1	1	NEMATODA	4301	1	0	0
GC-BIO-1	B	P	1	1	CENTROPTILUM	470604002007	4	0	0
GC-BIO-1	B	P	1	1	CLINOTANYPUS	470630014001	1	0	0
GC-BIO-1	B	P	1	1	CAENIS	470604011002	6	0	0
GC-BIO-1	C	P	1	1	ABLABESMYIA	470630014042	3	0	0
GC-BIO-1	C	P	1	1	DICROTENDIPES	470630014043	20	0	0
GC-BIO-1	C	P	1	1	CERATOPOGONIDAE	470630010	31	0	0
GC-BIO-1	C	P	1	1	TANYTARSINI	470630014008	12	0	0
GC-BIO-1	C	P	1	1	COENAGRIONIDAE	470606003	11	0	0
GC-BIO-1	C	P	1	1	PARATANYTARSUS	470630014091	5	0	0
GC-BIO-1	C	P	1	1	CENTROPTILUM	470604002007	5	0	0
GC-BIO-1	C	P	1	1	PARACHIRONOMUS	470630014052	6	0	0
GC-BIO-1	C	P	1	1	ACARINA	47021100	1	0	0
GC-BIO-1	C	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	4	0	0
GC-BIO-1	C	P	1	1	CHIRONOMIDAE	470630014	0	5	0
GC-BIO-1	C	P	1	1	CHIRONOMINI	47063001401	1	0	0
GC-BIO-1	C	P	1	1	NEMATODA	4301	1	0	0
GC-BIO-1	C	P	1	1	TANYTARSUS	470630014030	1	0	0
GC-BIO-1	C	P	1	1	CAENIS	470604011002	6	0	0
GC-BIO-1	C	P	1	1	DIPTERA	470630	0	7	0
GC-BIO-1	C	P	1	1	PSEUDOCHIRONOMUS	470630014037	15	0	0
GC-BIO-1	C	P	1	1	LIBELLULIDAE	470605004	8	0	0
GC-BIO-1	C	P	1	1	PALAEMONETES PALUDOSUS	470534015003002	5	0	0
GC-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	17	0	0
GC-BIO-1	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	2	0	0
GC-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
GC-BIO-1	C	P	1	1	DERO	450203005006	2	0	0
GC-BIO-1	C	P	1	1	ILYODRILUS TEMPLETONI	450203004006002	1	0	0
GC-BIO-2		D	3	28	CHIRONOMIDAE	470630014	0	4	0
GC-BIO-2		D	3	28	GOMPHIDAE	470605003	1	0	0
GC-BIO-2		D	3	28	ANCYLIDAE	460108011	4	0	0
GC-BIO-2		D	3	28	LIBELLULIDAE	470605004	2	0	0
GC-BIO-2		D	3	28	NAIS	450203005008	1	0	0
GC-BIO-2		D	3	28	DERO FLABELLIGER	450203005006002	26	0	0
GC-BIO-2		D	3	28	TRICLADIDA	350109	1	0	0
GC-BIO-2		D	3	28	CHIRONOMIDAE	470630014	1	0	0
GC-BIO-2		D	3	28	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
GC-BIO-2		D	3	28	CHIRONOMUS	470630014032	1	0	0
GC-BIO-2		D	3	28	STENOCHIRONOMUS	470630014029	9	0	0
GC-BIO-2		D	3	28	NEMERTEA	38	1	0	0
GC-BIO-2		D	3	28	PELECYPODA	4605 A	2	0	0
GC-BIO-2		D	3	28	TANYTARSUS	470630014030	7	0	0
GC-BIO-2		D	3	28	PHYSELLA	460108013003	3	0	0
GC-BIO-2		D	3	28	LYMNAEIDAE	460108010	1	0	0
GC-BIO-2		D	3	28	PLANORBIDAE	460108012	10	0	0
GC-BIO-2		D	3	28	ERPOBDELLIDAE	450205006	1	0	0
GC-BIO-2		D	3	28	OXYETHIRA	470628005005	3	0	0
GC-BIO-2		D	3	28	CULICIDAE	470630009	1	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
-BIO-2		D	3	28	CERATOPOGONIDAE	470630010	2	0	0
BIO-2		D	3	28	COENAGRIONIDAE	470606003	4	0	0
GC-BIO-2		D	3	28	PHAENOPSECTRA	470630014152	1	0	0
GC-BIO-2		D	3	28	DICROTENDIPES	470630014043	6	0	0
GC-BIO-2		D	3	28	POLYPEDILUM ILLINOENSE	470630014036031	6	0	0
GC-BIO-2	A	H	1	1	COLEOPTERA	470623	0	0	2
GC-BIO-2	A	H	1	1	CHIRONOMINI	47063001401	1	0	0
GC-BIO-2	A	H	1	1	PHYSELLA	460108013003	3	0	0
GC-BIO-2	A	H	1	1	DERO AULOPHORUS	450203005006 A	2	0	0
GC-BIO-2	A	H	1	1	PLANORBIDAE	460108012	10	0	0
GC-BIO-2	A	H	1	1	COENAGRIONIDAE	470606003	1	0	0
GC-BIO-2	A	H	1	1	LIBELLULIDAE	470605004	1	0	0
GC-BIO-2	A	H	1	1	POLYPEDILUM ILLINOENSE	470630014036031	4	0	0
GC-BIO-2	A	H	1	1	LYMNAEIDAE	460108010	3	0	0
GC-BIO-2	A	H	1	1	TRICLADIDA	350109	4	0	0
GC-BIO-2	B	H	1	1	DIPTERA	470630	0	1	0
GC-BIO-2	B	H	1	1	PHYSELLA	460108013003	4	0	0
GC-BIO-2	B	H	1	1	PLANORBIDAE	460108012	19	0	0
GC-BIO-2	B	H	1	1	ANCYLIDAE	460108011	1	0	0
GC-BIO-2	B	H	1	1	CERATOPOGONIDAE	470630010	1	0	0
GC-BIO-2	B	H	1	1	DICROTENDIPES	470630014043	1	0	0
GC-BIO-2	B	H	1	1	TRICLADIDA	350109	1	0	0
GC-BIO-2	B	H	1	1	CHIRONOMIDAE	470630014	0	1	0
GC-BIO-2	C	H	1	1	PHYSELLA	460108013003	4	0	0
GC-BIO-2	C	H	1	1	DIPTERA	470630	0	1	0
GC-BIO-2	C	H	1	1	PLANORBIDAE	460108012	11	0	0
GC-BIO-2	C	H	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
-BIO-2	A	P	1	1	THIENEMANNIMYIA	470630014119	1	0	0
BIO-2	A	P	1	1	ABLABESMYIA	470630014042	2	0	0
GC-BIO-2	A	P	1	1	DICROTENDIPES	470630014043	1	0	0
GC-BIO-2	A	P	1	1	CRYPTOCHIRONOMUS	470630014035	2	0	0
GC-BIO-2	A	P	1	1	PARACHIRONOMUS	470630014052	1	0	0
GC-BIO-2	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	2	0	0
GC-BIO-2	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	12	0	0
GC-BIO-2	A	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	4	0	0
GC-BIO-2	A	P	1	1	TRIBELOS	470630014117	8	0	0
GC-BIO-2	A	P	1	1	LYMNAEIDAE	460108010	1	0	0
GC-BIO-2	A	P	1	1	PHYSELLA	460108013003	2	0	0
GC-BIO-2	A	P	1	1	COENAGRIONIDAE	470606003	1	0	0
GC-BIO-2	A	P	1	1	HALIPLUS	470623006001	1	0	0
GC-BIO-2	A	P	1	1	CERATOPOGONIDAE	470630010	2	0	0
GC-BIO-2	A	P	1	1	PROCLADIUS	470630014004	1	0	0
GC-BIO-2	A	P	1	1	STENOCHIRONOMUS	470630014029	2	0	0
GC-BIO-2	A	P	1	1	CHIRONOMINI	47063001401	1	0	0
GC-BIO-2	A	P	1	1	TANYTARSUS	470630014030	1	0	0
GC-BIO-2	A	P	1	1	LUMBRICULIDAE	450201001	7	0	0
GC-BIO-2	A	P	1	1	PELECYPODA	4605 A	9	0	0
GC-BIO-2	B	P	1	1	GOMPHIDAE	470605003	1	0	0
GC-BIO-2	B	P	1	1	CERATOPOGONIDAE	470630010	1	0	0
GC-BIO-2	B	P	1	1	TRIBELOS	470630014117	16	0	0
GC-BIO-2	B	P	1	1	TANYTARSUS	470630014030	1	0	0
GC-BIO-2	B	P	1	1	ABLABESMYIA	470630014042	1	0	0
GC-BIO-2	B	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
GC-BIO-2	B	P	1	1	HYDROPHILIDAE	470623016	0	0	1
GC-BIO-2	C	P	1	1	CERATOPOGONIDAE	470630010	1	0	0
BIO-2	C	P	1	1	TANYTARSUS	470630014030	3	0	0
-BIO-2	C	P	1	1	TRIBELOS	470630014117	2	0	0
GC-BIO-2	C	P	1	1	PHYSELLA	460108013003	3	0	0
GC-BIO-2	C	P	1	1	CAENIS	470604011002	1	0	0
GC-BIO-2	C	P	1	1	GOMPHIDAE	470605003	1	0	0
GC-BIO-2	C	P	1	1	PELECYPODA	4605 A	12	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
GC-BIO-2	C	P	1	1	PLANORBIDAE	460108012	1	0	0
GC-BIO-2	C	P	1	1	ABLABESMYIA	470630014042	1	0	0
GC-BIO-2	C	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
GC-BIO-2	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	5	0	0
GC-BIO-2	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
GC-BIO-2	C	P	1	1	LUMBRICULIDAE	450201001	1	0	0
LF-BIO-1	A	P	1	1	CLADOPELMA	470630014159	2	0	0
LF-BIO-1	A	P	1	1	ERPOBDELLIDAE	450205006	1	0	0
LF-BIO-1	A	P	1	1	DERO DERO	450203005006007	3	0	0
LF-BIO-1	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	9	0	0
LF-BIO-1	A	P	1	1	OXYETHIRA	470628005005	1	0	0
LF-BIO-1	A	P	1	1	TANYTARSUS	470630014030	9	0	0
LF-BIO-1	A	P	1	1	CHIRONOMUS	470630014032	6	0	0
LF-BIO-1	A	P	1	1	PLANORBIDAE	460108012	3	0	0
LF-BIO-1	A	P	1	1	DICROTENDIPES	470630014043	5	0	0
LF-BIO-1	A	P	1	1	PROCLADIUS	470630014004	4	0	0
LF-BIO-1	A	P	1	1	OECETIS	470628012004	1	0	0
LF-BIO-1	A	P	1	1	ENDOCHIRONOMUS	470630014086	1	0	0
LF-BIO-1	A	P	1	1	TANYPODINAE	470630014 C	1	0	0
LF-BIO-1	A	P	1	1	CRYPTOCHIRONOMUS	470630014035	1	0	0
LF-BIO-1	B	P	1	1	PLANORBIDAE	460108012	4	0	0
LF-BIO-1	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	11	0	0
LF-BIO-1	B	P	1	1	DERO DERO	450203005006007	2	0	0
LF-BIO-1	B	P	1	1	TANYTARSUS	470630014030	5	0	0
LF-BIO-1	B	P	1	1	CRYPTOCHIRONOMUS	470630014035	1	0	0
LF-BIO-1	B	P	1	1	CHIRONOMUS	470630014032	4	0	0
LF-BIO-1	B	P	1	1	CLADOPELMA	470630014159	3	0	0
LF-BIO-1	B	P	1	1	PROCLADIUS	470630014004	1	0	0
LF-BIO-1	C	P	1	1	CHAOBORUS	470630009001	0	1	0
LF-BIO-1	C	P	1	1	CHIRONOMIDAE	470630014	0	4	0
LF-BIO-1	C	P	1	1	DERO	450203005006	4	0	0
LF-BIO-1	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	2	0	0
LF-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	13	0	0
LF-BIO-1	C	P	102	130	CLADOPELMA	470630014159	17	0	0
LF-BIO-1	C	P	102	130	CHIRONOMUS	470630014032	13	0	0
LF-BIO-1	C	P	102	130	TANYTARSUS	470630014030	62	0	0
LF-BIO-1	C	P	1	1	CHAOBORUS	470630009001	1	0	0
LF-BIO-1	C	P	102	130	ABLABESMYIA	470630014042	1	0	0
LF-BIO-1	C	P	102	130	CRYPTOCHIRONOMUS	470630014035	3	0	0
LF-BIO-1	C	P	102	130	CHIRONOMINI	47063001401	4	0	0
LF-BIO-1	C	P	102	130	PROCLADIUS	470630014004	2	0	0
LF-BIO-2	A	P	1	1	PROCLADIUS	470630014004	1	0	0
LF-BIO-2	A	P	1	1	CAENIS	470604011002	5	0	0
LF-BIO-2	A	P	1	1	CRYPTOCHIRONOMUS	470630014035	4	0	0
LF-BIO-2	A	P	1	1	COENAGRIONIDAE	470606003	5	0	0
LF-BIO-2	A	P	1	1	DICROTENDIPES	470630014043	6	0	0
LF-BIO-2	A	P	1	1	PLANORBIDAE	460108012	1	0	0
LF-BIO-2	A	P	1	1	GLYPTOTENDIPES	470630014038	3	0	0
LF-BIO-2	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	7	0	0
LF-BIO-2	A	P	1	1	CHIRONOMIDAE	470630014	0	2	0
LF-BIO-2	A	P	1	1	OECETIS	470628012004	5	0	0
LF-BIO-2	A	P	1	1	CERATOPOGONIDAE	470630010	1	0	0
LF-BIO-2	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	4	0	0
LF-BIO-2	B	P	1	1	DINEUTUS	470623010003	1	0	0
LF-BIO-2	B	P	1	1	CAENIS	470604011002	5	0	0
LF-BIO-2	B	P	1	1	ACARINA	47021100	1	0	0
LF-BIO-2	B	P	1	1	OECETIS	470628012004	6	0	0
LF-BIO-2	B	P	1	1	TANYTARSUS	470630014030	30	0	0
LF-BIO-2	B	P	1	1	DICROTENDIPES	470630014043	21	0	0
LF-BIO-2	B	P	1	1	PELECYPODA	4605 A	3	0	0
LF-BIO-2	B	P	1	1	CHIRONOMIDAE	470630014	0	5	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
-BIO-2	B	P	1	1	ENDOCHIRONOMUS	470630014086	28	0	0
-BIO-2	B	P	1	1	LIBELLULIDAE	470605004	1	0	0
LF-BIO-2	B	P	1	1	PLANORBIDAE	460108012	3	0	0
LF-BIO-2	B	P	1	1	CHIRONOMUS	470630014032	3	0	0
LF-BIO-2	B	P	1	1	TANYTARSUS	470630014030	1	0	0
LF-BIO-2	B	P	1	1	CRYPTOCHIRONOMUS	470630014035	3	0	0
LF-BIO-2	B	P	1	1	ABLABESMYIA	470630014042	1	0	0
LF-BIO-2	B	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
LF-BIO-2	C	P	102	196	TANYTARSUS	470630014030	22	0	0
LF-BIO-2	C	P	102	196	ENDOCHIRONOMUS	470630014086	3	0	0
LF-BIO-2	C	P	102	196	CHIRONOMUS	470630014032	6	0	0
LF-BIO-2	C	P	1	1	DERO	450203005006	7	0	0
LF-BIO-2	C	P	102	196	CRYPTOTENDIPES	470630014143	3	0	0
LF-BIO-2	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	25	0	0
LF-BIO-2	C	P	102	196	TANYPUS	470630014033	1	0	0
LF-BIO-2	C	P	1	1	AULODRILUS PIGUETI	450203004008001	2	0	0
LF-BIO-2	C	P	1	1	TUBIFICIDAE IMM. W	450203004 A	2	0	0
LF-BIO-2	C	P	102	196	CRYPTOCHIRONOMUS	470630014035	2	0	0
LF-BIO-2	C	P	102	196	PROCLADIUS	470630014004	5	0	0
LF-BIO-2	C	P	102	196	DICROTENDIPES	470630014043	8	0	0
LF-BIO-2	C	P	102	196	TANYTARSUS	470630014030	48	0	0
LF-BIO-2	C	P	102	196	CLADOPELMA	470630014159	4	0	0
LF-BIO-2	C	P	1	1	CHIRONOMIDAE	470630014	0	16	0
LF-BIO-3	A	P	1	1	TANYTARSUS	470630014030	5	0	0
LF-BIO-3	A	P	1	1	CLADOPELMA	470630014159	1	0	0
LF-BIO-3	A	P	1	1	DICROTENDIPES	470630014043	17	0	0
LF-BIO-3	A	P	1	1	DERO	450203005006	1	0	0
LF-BIO-3	A	P	1	1	TANYTARSUS	470630014030	63	0	0
-BIO-3	A	P	1	1	CRYPTOCHIRONOMUS	470630014035	3	0	0
LF-BIO-3	A	P	1	1	CHIRONOMUS	470630014032	3	0	0
LF-BIO-3	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	2	0	0
LF-BIO-3	A	P	1	1	ENDOCHIRONOMUS	470630014086	1	0	0
LF-BIO-3	A	P	1	1	PROCLADIUS	470630014004	4	0	0
LF-BIO-3	A	P	1	1	ACARINA	47021100	2	0	0
LF-BIO-3	A	P	1	1	PLANORBIDAE	460108012	3	0	0
LF-BIO-3	A	P	1	1	CHIRONOMIDAE	470630014	0	3	0
LF-BIO-3	A	P	1	1	OECETIS	470628012004	3	0	0
LF-BIO-3	A	P	1	1	OXYETHIRA	470628005005	1	0	0
LF-BIO-3	B	P	1	1	GLOSSIPHONIIDAE	450205002	1	0	0
LF-BIO-3	B	P	1	1	OECETIS	470628012004	1	0	0
LF-BIO-3	B	P	1	1	PROCLADIUS	470630014004	9	0	0
LF-BIO-3	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	27	0	0
LF-BIO-3	B	P	1	1	ACARINA	47021100	1	0	0
LF-BIO-3	B	P	1	1	PLANORBIDAE	460108012	3	0	0
LF-BIO-3	B	P	1	1	PARACHIRONOMUS	470630014052	1	0	0
LF-BIO-3	B	P	1	1	CAENIS	470604011002	1	0	0
LF-BIO-3	B	P	1	1	TANYTARSUS	470630014030	44	0	0
LF-BIO-3	B	P	1	1	CLADOPELMA	470630014159	7	0	0
LF-BIO-3	B	P	1	1	CHIRONOMUS	470630014032	7	0	0
LF-BIO-3	B	P	1	1	CRYPTOCHIRONOMUS	470630014035	2	0	0
LF-BIO-3	B	P	1	1	OXYETHIRA	470628005005	0	1	0
LF-BIO-3	B	P	1	1	TRIBELOS	470630014117	1	0	0
LF-BIO-3	B	P	1	1	CHIRONOMIDAE	470630014	1	0	0
LF-BIO-3	B	P	1	1	DICROTENDIPES	470630014043	14	0	0
LF-BIO-3	B	P	1	1	DERO	450203005006	7	0	0
-BIO-3	B	P	1	1	OXYETHIRA	470628005005	2	0	0
-BIO-3	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	3	0	0
LF-BIO-3	C	P	1	1	CRYPTOCHIRONOMUS	470630014035	1	0	0
LF-BIO-3	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	31	0	0
LF-BIO-3	C	P	1	1	DERO	450203005006	1	0	0
LF-BIO-3	C	P	1	1	PARACHIRONOMUS	470630014052	1	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
LF-BIO-3	C	P	1	1	AULODRILUS PIGUETI	450203004008001	1	0	0
LF-BIO-3	C	P	1	1	DICROTENDIPES	470630014043	5	0	0
LF-BIO-3	C	P	1	1	ENDOCHIRONOMUS	470630014086	1	0	0
LF-BIO-3	C	P	1	1	TANYTARSUS	470630014030	42	0	0
LF-BIO-3	C	P	1	1	CHIRONOMUS	470630014032	1	0	0
LF-BIO-3	C	P	1	1	PROCLADIUS	470630014004	6	0	0
LF-BIO-3	C	P	1	1	OECETIS	470628012004	2	0	0
LF-BIO-4	A	P	1	1	PLANORBIDAE	460108012	6	0	0
LF-BIO-4	A	P	1	1	CHIRONOMIDAE	470630014	0	10	0
LF-BIO-4	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	4	0	0
LF-BIO-4	A	P	102	179	CHIRONOMUS	470630014032	22	0	0
LF-BIO-4	A	P	102	179	TANYTARSUS	470630014030	68	0	0
LF-BIO-4	A	P	102	179	DICROTENDIPES	470630014043	6	0	0
LF-BIO-4	A	P	102	179	PROCLADIUS	470630014004	1	0	0
LF-BIO-4	A	P	102	179	ENDOCHIRONOMUS	470630014086	1	0	0
LF-BIO-4	A	P	102	179	CLADOPELMA	470630014159	4	0	0
LF-BIO-4	A	P	1	1	DERO	450203005006	17	0	0
LF-BIO-4	B	P	1	1	TANYTARSUS	470630014030	29	0	0
LF-BIO-4	B	P	1	1	CAENIS	470604011002	7	0	0
LF-BIO-4	B	P	1	1	DICROTENDIPES	470630014043	26	0	0
LF-BIO-4	B	P	1	1	PLANORBIDAE	460108012	3	0	0
LF-BIO-4	B	P	1	1	PROCLADIUS	470630014004	14	0	0
LF-BIO-4	B	P	1	1	CHIRONOMIDAE	470630014	0	2	0
LF-BIO-4	B	P	1	1	CHIRONOMUS	470630014032	12	0	0
LF-BIO-4	B	P	1	1	DERO	450203005006	6	0	0
LF-BIO-4	B	P	1	1	TRICLADIDA	350109	1	0	0
LF-BIO-4	B	P	1	1	PHYSELLA	460108013003	1	0	0
LF-BIO-4	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	17	0	0
LF-BIO-4	B	P	1	1	BOTHRIONEURUM VEJDOVSKYANUM	450203004028001	1	0	0
LF-BIO-4	B	P	1	1	CLADOPELMA	470630014159	2	0	0
LF-BIO-4	B	P	1	1	PARACHIRONOMUS	470630014052	1	0	0
LF-BIO-4	B	P	1	1	CRYPTOCHIRONOMUS	470630014035	1	0	0
LF-BIO-4	B	P	1	1	CHIRONOMINI	47063001401	1	0	0
LF-BIO-4	C	P	1	1	ACARINA	47021100	1	0	0
LF-BIO-4	C	P	1	1	CLADOPELMA	470630014159	1	0	0
LF-BIO-4	C	P	1	1	CRYPTOCHIRONOMUS	470630014035	3	0	0
LF-BIO-4	C	P	1	1	CHIRONOMINI	47063001401	2	0	0
LF-BIO-4	C	P	1	1	CHIRONOMIDAE	470630014	1	0	0
LF-BIO-4	C	P	1	1	OXYETHIRA	470628005005	1	0	0
LF-BIO-4	C	P	1	1	PROCLADIUS	470630014004	4	0	0
LF-BIO-4	C	P	1	1	CHIRONOMIDAE	470630014	0	8	0
LF-BIO-4	C	P	1	1	TANYTARSUS	470630014030	30	0	0
LF-BIO-4	C	P	1	1	CAENIS	470604011002	2	0	0
LF-BIO-4	C	P	1	1	PLANORBIDAE	460108012	3	0	0
LF-BIO-4	C	P	1	1	DICROTENDIPES	470630014043	11	0	0
LF-BIO-4	C	P	1	1	TANYTARSUS	470630014030	1	0	0
LF-BIO-4	C	P	1	1	ENDOCHIRONOMUS	470630014086	1	0	0
LF-BIO-4	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	18	0	0
LF-BIO-4	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
LF-BIO-4	C	P	1	1	DERO	450203005006	1	0	0
LF-BIO-5	A	P	1	1	CLADOPELMA	470630014159	4	0	0
LF-BIO-5	A	P	1	1	PROCLADIUS	470630014004	2	0	0
LF-BIO-5	A	P	1	1	CHIRONOMUS	470630014032	4	0	0
LF-BIO-5	A	P	1	1	CHIRONOMINI	47063001401	2	0	0
LF-BIO-5	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	9	0	0
LF-BIO-5	B	P	1	1	CHIRONOMUS	470630014032	4	0	0
LF-BIO-5	B	P	1	1	CLADOPELMA	470630014159	2	0	0
LF-BIO-5	B	P	1	1	PROCLADIUS	470630014004	1	0	0
LF-BIO-5	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	16	0	0
LF-BIO-5	B	P	1	1	DERO	450203005006	1	0	0
LF-BIO-5	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
-BIO-5	C	P	1	1	CHIRONOMUS	470630014032	23	0	0
-BIO-5	C	P	1	1	TANYPUS	470630014033	1	0	0
LF-BIO-5	C	P	1	1	CLADOPELMA	470630014159	2	0	0
LF-BIO-5	C	P	1	1	NEMATODA	4301	1	0	0
LF-BIO-5	C	P	1	1	CHIRONOMINI	47063001401	1	0	0
LF-BIO-5	C	P	1	1	PROCLADIUS	470630014004	2	0	0
LF-BIO-5	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
LF-BIO-5	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	36	0	0
LF-BIO-5	C	P	1	1	CHAOBORUS	470630009001	2	0	0
LF-BIO-6	A	P	1	1	CHAOBORUS	470630009001	19	0	0
LF-BIO-6	A	P	1	1	CHAOBORUS	470630009001	0	2	0
LF-BIO-6	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	7	0	0
LF-BIO-6	A	P	1	1	AULODRILUS PIGUETI	450203004008001	1	0	0
LF-BIO-6	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
LF-BIO-6	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	10	0	0
LF-BIO-6	B	P	1	1	CHAOBORUS	470630009001	18	0	0
LF-BIO-6	B	P	1	1	CHAOBORUS	470630009001	0	7	0
LF-BIO-6	B	P	1	1	DICROTENDIPES	470630014043	1	0	0
LF-BIO-6	C	P	1	1	CHAOBORUS	470630009001	37	0	0
LF-BIO-6	C	P	1	1	NEMATODA	4301	1	0	0
LF-BIO-6	C	P	1	1	CHAOBORUS	470630009001	0	2	0
LF-BIO-6	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	18	0	0
LF-BIO-6	C	P	1	1	AULODRILUS PIGUETI	450203004008001	1	0	0
LF-BIO-6	C	P	1	1	CHIRONOMINI	47063001401	1	0	0
LF-BIO-6	C	P	1	1	TANYTARSUS	470630014030	1	0	0
LF-BIO-7	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	2	0	0
LF-BIO-7	A	P	1	1	ANCYLIDAE	460108011	1	0	0
-BIO-7	A	P	1	1	PLANORBIDAE	460108012	1	0	0
-BIO-7	A	P	1	1	CHIRONOMINI	47063001401	1	0	0
LF-BIO-7	A	P	1	1	TANYPUS	470630014033	1	0	0
LF-BIO-7	A	P	1	1	CERATOPOGONIDAE	470630010	2	0	0
LF-BIO-7	A	P	1	1	CLADOPELMA	470630014159	6	0	0
LF-BIO-7	A	P	1	1	CHIRONOMUS	470630014032	1	0	0
LF-BIO-7	A	P	1	1	TANYTARSINI	470630014008	26	0	0
LF-BIO-7	A	P	1	1	PELECYPODA	4605 A	1	0	0
LF-BIO-7	A	P	1	1	CHIRONOMIDAE	470630014	0	4	0
LF-BIO-7	A	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
LF-BIO-7	A	P	1	1	TANYPODINAE	470630014 C	1	0	0
LF-BIO-7	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
LF-BIO-7	A	P	1	1	PROCLADIUS	470630014004	13	0	0
LF-BIO-7	A	P	1	1	DERO	450203005006	1	0	0
LF-BIO-7	B	P	1	1	TANYTARSUS	470630014030	7	0	0
LF-BIO-7	B	P	1	1	PROCLADIUS	470630014004	2	0	0
LF-BIO-7	B	P	1	1	LIBELLULIDAE	470605004	1	0	0
LF-BIO-7	B	P	1	1	PHYSELLA	460108013003	3	0	0
LF-BIO-7	B	P	1	1	CHIRONOMIDAE	470630014	0	3	0
LF-BIO-7	B	P	1	1	CHIRONOMUS	470630014032	1	0	0
LF-BIO-7	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	3	0	0
LF-BIO-7	B	P	1	1	DICROTENDIPES	470630014043	4	0	0
LF-BIO-7	B	P	1	1	CHIRONOMINI	47063001401	1	0	0
LF-BIO-7	C	P	1	1	PHYSELLA	460108013003	1	0	0
LF-BIO-7	C	P	1	1	PLANORBIDAE	460108012	3	0	0
LF-BIO-7	C	P	1	1	ACARINA	47021100	1	0	0
LF-BIO-7	C	P	1	1	OXYETHIRA	470628005005	1	0	0
F-BIO-7	C	P	1	1	DICROTENDIPES	470630014043	2	0	0
-BIO-7	C	P	1	1	CLADOPELMA	470630014159	1	0	0
LF-BIO-7	C	P	1	1	PROCLADIUS	470630014004	1	0	0
LF-BIO-7	C	P	1	1	CHIRONOMINI	47063001401	1	0	0
LF-BIO-7	C	P	1	1	ENDOCHIRONOMUS	470630014086	1	0	0
LF-BIO-7	C	P	1	1	THIENEMANNIMYIA	470630014119	1	0	0
LF-BIO-7	C	P	1	1	TANYTARSUS	470630014030	2	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
LF-BIO-7	C	P	1	1	ZAVRELIELLA	470630014090	1	0	0
LF-BIO-7	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	3	0	0
LF-BIO-8	A	P	1	1	PLANORBIDAE	460108012	2	0	0
LF-BIO-8	A	P	1	1	DERO	450203005006	7	0	0
LF-BIO-8	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	6	0	0
LF-BIO-8	A	P	1	1	TANYTARSUS	470630014030	14	0	0
LF-BIO-8	A	P	1	1	PROCLADIUS	470630014004	3	0	0
LF-BIO-8	A	P	1	1	DICROTENDIPES	470630014043	1	0	0
LF-BIO-8	A	P	1	1	CHIRONOMUS	470630014032	1	0	0
LF-BIO-8	B	P	1	1	CERATOPOGONIDAE	470630010	3	0	0
LF-BIO-8	B	P	1	1	PLANORBIDAE	460108012	1	0	0
LF-BIO-8	B	P	1	1	ACARINA	47021100	1	0	0
LF-BIO-8	B	P	1	1	CHIRONOMIDAE	470630014	0	2	0
LF-BIO-8	B	P	1	1	CRYPTOCHIRONOMUS	470630014035	4	0	0
LF-BIO-8	B	P	1	1	CLADOPELMA	470630014159	2	0	0
LF-BIO-8	B	P	1	1	THIENEMANNIMYIA	470630014119	2	0	0
LF-BIO-8	B	P	1	1	TANYPUS	470630014033	2	0	0
LF-BIO-8	B	P	1	1	PROCLADIUS	470630014004	4	0	0
LF-BIO-8	B	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
LF-BIO-8	B	P	1	1	TANYTARSUS	470630014030	12	0	0
LF-BIO-8	B	P	1	1	DICROTENDIPES	470630014043	1	0	0
LF-BIO-8	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	15	0	0
LF-BIO-8	B	P	1	1	AULODRILUS PIGUETI	450203004008001	2	0	0
LF-BIO-8	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
LF-BIO-8	B	P	1	1	DERO	450203005006	1	0	0
LF-BIO-8	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	9	0	0
LF-BIO-8	C	P	1	1	CHIRONOMINI	47063001401	1	0	0
LF-BIO-8	C	P	1	1	PLANORBIDAE	460108012	2	0	0
LF-BIO-8	C	P	1	1	CLADOPELMA	470630014159	3	0	0
LF-BIO-8	C	P	1	1	DICROTENDIPES	470630014043	4	0	0
LF-BIO-8	C	P	1	1	PHAENOPSECTRA	470630014152	1	0	0
LF-BIO-8	C	P	1	1	CHIRONOMUS	470630014032	1	0	0
LF-BIO-8	C	P	1	1	DERO DERO	450203005006007	24	0	0
LF-BIO-8	C	P	1	1	TANYTARSUS	470630014030	52	0	0
LF-BIO-8	C	P	1	1	ANCYLIDAE	460108011	1	0	0
LF-BIO-8	C	P	1	1	CHIRONOMIDAE	470630014	0	1	0
LF-BIO-8	C	P	1	1	AULODRILUS PIGUETI	450203004008001	2	0	0
LF-BIO-8	C	P	1	1	SLAVINA APPENDICULATA	450203005001001	1	0	0
LF-BIO-8	C	P	1	1	PROCLADIUS	470630014004	2	0	0
RC-BIO-1		D	2	28	TUBIFICIDAE IMM. W/O	450203004 B	2	0	0
RC-BIO-1		D	2	28	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
RC-BIO-1		D	2	28	DERO AULOPHORUS	450203005006 A	2	0	0
RC-BIO-1		D	2	28	ABLABESMYIA	470630014042	1	0	0
RC-BIO-1		D	2	28	CHIRONOMINI	47063001401	4	0	0
RC-BIO-1		D	2	28	PROCLADIUS	470630014004	1	0	0
RC-BIO-1		D	2	28	DICROTENDIPES	470630014043	1	0	0
RC-BIO-1		D	2	28	STENOCHIRONOMUS	470630014029	12	0	0
RC-BIO-1		D	2	28	ENDOCHIRONOMUS	470630014086	6	0	0
RC-BIO-1		D	2	28	POLYPEDILUM SCALAENUM	470630014036038	5	0	0
RC-BIO-1		D	2	28	PLANORBIDAE	460108012	7	0	0
RC-BIO-1		D	2	28	TANYTARSUS	470630014030	16	0	0
RC-BIO-1		D	2	28	ACARINA	47021100	3	0	0
RC-BIO-1		D	2	28	PELECYPODA	4605 A	1	0	0
RC-BIO-1		D	2	28	PHYSELLA	460108013003	21	0	0
RC-BIO-1		D	2	28	ANCYLIDAE	460108011	3	0	0
RC-BIO-1		D	2	28	CHAOBORUS	470630009001	3	0	0
RC-BIO-1		D	2	28	LIBELLULIDAE	470605004	4	0	0
RC-BIO-1		D	2	28	COENAGRIONIDAE	470606003	4	0	0
RC-BIO-1		D	2	28	CHIRONOMIDAE	470630014	0	5	0
RC-BIO-1	A	P	1	1	DERO DERO	450203005006007	31	0	0
RC-BIO-1	A	P	1	1	AULODRILUS PIGUETI	450203004008001	2	0	0

IELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
3IO-1	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	2	0	0
3IO-1	A	P	1	1	CHAOBORUS	470630009001	0	1	0
C-BIO-1	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	62	0	0
C-BIO-1	A	P	1	1	NEMATODA	4301	1	0	0
C-BIO-1	A	P	1	1	CHAOBORUS	470630009001	20	0	0
C-BIO-1	B	P	1	1	CHAOBORUS	470630009001	1	0	0
C-BIO-1	B	P	1	1	DERO DERO	450203005006007	12	0	0
C-BIO-1	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
C-BIO-1	B	P	1	1	PROCLADIUS	470630014004	2	0	0
C-BIO-1	B	P	1	1	SPHAERIIDAE	460507046 A	3	0	0
C-BIO-1	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	20	0	0
C-BIO-1	B	P	1	1	CHAOBORUS	470630009001	0	2	0
C-BIO-1	B	P	1	1	PLANORBIDAE	460108012	3	0	0
C-BIO-1	B	P	1	1	TUBIFICIDAE IMM. W	450203004 A	3	0	0
C-BIO-1	B	P	1	1	CHIRONOMUS	470630014032	3	0	0
C-BIO-1	B	P	1	1	TANYTARSUS	470630014030	2	0	0
C-BIO-1	B	P	1	1	PARACHIRONOMUS	470630014052	1	0	0
C-BIO-1	B	P	1	1	DICROTENDIPES	470630014043	1	0	0
C-BIO-1	C	P	1	1	DICROTENDIPES	470630014043	1	0	0
C-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	71	0	0
C-BIO-1	C	P	1	1	TANYTARSUS	470630014030	16	0	0
C-BIO-1	C	P	1	1	NEMATODA	4301	1	0	0
C-BIO-1	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	3	0	0
C-BIO-1	C	P	1	1	AULODRILUS PIGUETI	450203004008001	2	0	0
C-BIO-1	C	P	1	1	DERO DERO	450203005006007	3	0	0
C-BIO-1	C	P	1	1	PLANORBIDAE	460108012	1	0	0
C-BIO-1	C	P	1	1	STENOCHIRONOMUS	470630014029	2	0	0
C-BIO-1	C	P	1	1	PROCLADIUS	470630014004	2	0	0
3IO-1	C	P	1	1	PARACHIRONOMUS	470630014052	1	0	0
C-BIO-1	C	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	2	0	0
C-BIO-1	C	P	1	1	SPHAERIIDAE	460507046 A	10	0	0
C-BIO-2		D	1	28	PLANORBIDAE	460108012	20	0	0
C-BIO-2		D	1	28	PARACHIRONOMUS	470630014052	1	0	0
C-BIO-2		D	1	28	PHYSELLA	460108013003	19	0	0
C-BIO-2		D	1	28	CHIRONOMIDAE	470630014	1	0	0
C-BIO-2		D	1	28	ANCYLIDAE	460108011	3	0	0
C-BIO-2		D	1	28	DERO	450203005006	1	0	0
C-BIO-2		D	1	28	ASELLUS	470531015001	2	0	0
C-BIO-2		D	1	28	AULODRILUS PIGUETI	450203004008001	1	0	0
C-BIO-2		D	1	28	PELECYPODA	4605 A	3	0	0
C-BIO-2		D	1	28	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
C-BIO-2		D	1	28	COENAGRIONIDAE	470606003	4	0	0
C-BIO-2		D	1	28	PARATANYTARSUS	470630014091	2	0	0
C-BIO-2		D	1	28	LIBELLULIDAE	470605004	4	0	0
C-BIO-2		D	1	28	ENDOCHIRONOMUS	470630014086	10	0	0
C-BIO-2		D	1	28	CAENIS	470604011002	4	0	0
C-BIO-2		D	1	28	CHIRONOMINI	47063001401	1	0	0
C-BIO-2		D	1	28	ANCYRONYX VARIEGATA	470623050009001	0	0	1
C-BIO-2		D	1	28	DERO AULOPHORUS	450203005006 A	1	0	0
C-BIO-2		D	1	28	HYDROPHILIDAE	470623016	0	0	1
C-BIO-2		D	1	28	POLYPEDILUM SCALAENUM	470630014036038	4	0	0
C-BIO-2		D	1	28	TRICLADIDA	350109	4	0	0
C-BIO-2		D	1	28	DERO FLABELLIGER	450203005006002	5	0	0
C-BIO-2		D	1	28	STENOCHIRONOMUS	470630014029	2	0	0
C-BIO-2		D	1	28	CLADOTANYTARSUS	470630014041	1	0	0
3IO-2		D	1	28	CURCULIONIDAE	470623104	0	0	1
BIO-2		D	1	28	DUBIRAPHIA	470623050002	2	0	0
C-BIO-2		D	1	28	LEPTOCERIDAE	470628012	1	0	0
C-BIO-2		D	1	28	HYDROPTILIDAE	470628005	0	1	0
C-BIO-2		D	1	28	CHIRONOMIDAE	470630014	0	3	0
C-BIO-2		D	1	28	TANYTARSUS	470630014030	7	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
RC-BIO-2		D	1	28	PROCLADIUS	470630014004	1	0	0
RC-BIO-2	A	P	1	1	PLANORBIDAE	460108012	6	0	0
RC-BIO-2	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
RC-BIO-2	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	8	0	0
RC-BIO-2	A	P	1	1	AULODRILUS PIGUETI	450203004008001	6	0	0
RC-BIO-2	A	P	1	1	DERO DERO	450203005006007	7	0	0
RC-BIO-2	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
RC-BIO-2	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	32	0	0
RC-BIO-2	B	P	1	1	DERO DERO	450203005006007	64	0	0
RC-BIO-2	B	P	1	1	PLANORBIDAE	460108012	27	0	0
RC-BIO-2	B	P	1	1	PHYSELLA	460108013003	8	0	0
RC-BIO-2	B	P	1	1	CHIRONOMINI	47063001401	1	0	0
RC-BIO-2	B	P	1	1	PARATANYTARSUS	470630014091	2	0	0
RC-BIO-2	B	P	1	1	DICROTENDIPES	470630014043	4	0	0
RC-BIO-2	B	P	1	1	CLADOPELMA	470630014159	3	0	0
RC-BIO-2	B	P	1	1	MESOSMITTIA	470630014187	1	0	0
RC-BIO-2	B	P	1	1	CHIRONOMUS	470630014032	3	0	0
RC-BIO-2	B	P	1	1	TANYTARSUS	470630014030	20	0	0
RC-BIO-2	B	P	1	1	PROCLADIUS	470630014004	1	0	0
RC-BIO-2	C	P	1	1	CERATOPOGONIDAE	470630010	1	0	0
RC-BIO-2	C	P	1	1	PLANORBIDAE	460108012	6	0	0
RC-BIO-2	C	P	1	1	PHYSELLA	460108013003	6	0	0
RC-BIO-2	C	P	1	1	DUBIRAPHIA	470623050002	1	0	0
RC-BIO-2	C	P	1	1	ANCYLIDAE	460108011	2	0	0
RC-BIO-2	C	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	25	0	0
RC-BIO-2	C	P	1	1	CAENIS	470604011002	3	0	0
RC-BIO-2	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
RC-BIO-2	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	17	0	0
RC-BIO-2	C	P	1	1	TANYTARSUS	470630014030	14	0	0
RC-BIO-2	C	P	1	1	LIBELLULIDAE	470605004	1	0	0
RC-BIO-2	C	P	1	1	ENDOCHIRONOMUS	470630014086	1	0	0
RC-BIO-2	C	P	1	1	PROCLADIUS	470630014004	6	0	0
RC-BIO-2	C	P	1	1	DICROTENDIPES	470630014043	1	0	0
RC-BIO-2	C	P	1	1	TRIBELOS	470630014117	1	0	0
RC-BIO-2	C	P	1	1	CHIRONOMUS	470630014032	1	0	0
RC-BIO-2	C	P	1	1	CHIRONOMIDAE	470630014	0	2	0
RC-BIO-3		D	1	28	HYDROPHILIDAE	470623016	0	0	1
RC-BIO-3		D	100	366	CHIRONOMUS	470630014032	1	0	0
RC-BIO-3		D	100	366	POLYPEDILUM ILLINOENSE	470630014036031	96	0	0
RC-BIO-3		D	1	28	TUBIFICIDAE IMM. W/O	450203004 B	1	0	0
RC-BIO-3		D	1	28	NEMERTEA	38	2	0	0
RC-BIO-3		D	100	366	CHIRONOMINI	47063001401	2	0	0
RC-BIO-3		D	1	28	STENELMIS	470623050001	0	0	1
RC-BIO-3		D	1	28	COENAGRIONIDAE	470606003	1	0	0
RC-BIO-3		D	1	28	PLANORBIDAE	460108012	1	0	0
RC-BIO-3		D	1	28	PELECYPODA	4605 A	1	0	0
RC-BIO-3		D	1	28	CHIRONOMIDAE	470630014	0	15	0
RC-BIO-3		D	100	366	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
RC-BIO-3	A	H	1	1	ANCYRONYX VARIEGATA	470623050009001	6	0	0
RC-BIO-3	A	H	1	1	CHIRONOMIDAE	470630014	0	239	0
RC-BIO-3	A	H	1	1	STENELMIS	470623050001	3	0	0
RC-BIO-3	A	H	1	1	CORYDALIDAE	470627002	1	0	0
RC-BIO-3	A	H	1	1	PHYSELLA	460108013003	1	0	0
RC-BIO-3	A	H	1	1	NEMERTEA	38	3	0	0
RC-BIO-3	A	H	1	1	CHEUMATOPSYCHE	470628004002	1	0	0
RC-BIO-3	A	H	1	1	PLANORBIDAE	460108012	1	0	0
RC-BIO-3	A	H	1	1	DERO DERO	450203005006007	2	0	0
RC-BIO-3	A	H	1	1	NAIDIDAE	450203005	1	0	0
RC-BIO-3	A	H	1	28	POLYPEDILUM ILLINOENSE	470630014036031	102	0	0
RC-BIO-3	B	H	1	1	NEMERTEA	38	4	0	0
RC-BIO-3	B	H	1	1	POLYCENTROPUS	470628018002	1	0	0

IELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
-BIO-3	B	H	1	28	POLYPEDILUM ILLINOENSE	470630014036031	158	0	0
BIO-3	B	H	1	1	ANCYRONYX VARIEGATA	470623050009001	5	0	0
C-BIO-3	B	H	1	28	POLYPEDILUM FALLAX	470630014036003	3	0	0
C-BIO-3	B	H	1	1	DERO DERO	450203005006007	5	0	0
C-BIO-3	B	H	1	1	NAIS	450203005008	1	0	0
C-BIO-3	B	H	1	1	CHIRONOMIDAE	470630014	0	253	0
C-BIO-3	B	H	1	1	ARGIA	470606003009	2	0	0
C-BIO-3	B	H	1	1	TUBIFICIDAE IMM. W/O	450203004 B	1	0	0
C-BIO-3	C	H	1	1	COENAGRIONIDAE	470606003	3	0	0
C-BIO-3	C	H	2	28	CHIRONOMINI	47063001401	2	0	0
C-BIO-3	C	H	1	1	STENELMIS	470623050001	0	0	2
C-BIO-3	C	H	2	28	ABLABESMYIA	470630014042	4	0	0
C-BIO-3	C	H	1	1	SLAVINA APPENDICULATA	450203005001001	4	0	0
C-BIO-3	C	H	2	28	POLYPEDILUM FALLAX	470630014036003	2	0	0
C-BIO-3	C	H	1	1	CHIRONOMIDAE	470630014	0	174	0
C-BIO-3	C	H	1	1	DERO DERO	450203005006007	2	0	0
C-BIO-3	C	H	2	28	POLYPEDILUM SCALAENUM	470630014036038	4	0	0
C-BIO-3	C	H	2	28	POLYPEDILUM ILLINOENSE	470630014036031	182	0	0
C-BIO-3	C	H	1	1	CORYDALIDAE	470627002	1	0	0
C-BIO-3	C	H	1	1	NEMEROOROMIA	470630041004	1	0	0
C-BIO-3	C	H	1	1	NEMERTEA	38	3	0	0
C-BIO-3	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	15	0	0
C-BIO-3	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	41	0	0
C-BIO-3	A	P	1	1	SPHAERIIDAE	460507046 A	2	0	0
C-BIO-3	A	P	102	169	POLYPEDILUM ILLINOENSE	470630014036031	55	0	0
C-BIO-3	A	P	102	169	CHIRONOMUS	470630014032	22	0	0
C-BIO-3	A	P	1	1	CHIRONOMIDAE	470630014	0	5	0
C-BIO-3	A	P	102	169	CHIRONOMINI	47063001401	1	0	0
BIO-3	A	P	102	169	CRYPTOCHIRONOMUS	470630014035	5	0	0
L-BIO-3	A	P	102	169	POLYPEDILUM SCALAENUM	470630014036038	19	0	0
C-BIO-3	B	P	1	1	BOTHRIONEURUM VEJDOVSKYANUM	450203004028001	1	0	0
C-BIO-3	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	17	0	0
C-BIO-3	B	P	101	129	CHIRONOMUS	470630014032	31	0	0
C-BIO-3	B	P	1	1	NEMATODA	4301	1	0	0
C-BIO-3	B	P	1	1	DUBIRAPHIA	470623050002	2	0	0
C-BIO-3	B	P	1	1	CHIRONOMIDAE	470630014	0	5	0
C-BIO-3	B	P	101	129	POLYPEDILUM ILLINOENSE	470630014036031	47	0	0
C-BIO-3	B	P	101	129	POLYPEDILUM SCALAENUM	470630014036038	14	0	0
C-BIO-3	B	P	1	1	SPHAERIIDAE	460507046 A	5	0	0
C-BIO-3	B	P	101	129	CHIRONOMINI	47063001401	1	0	0
C-BIO-3	B	P	101	129	CRYPTOCHIRONOMUS	470630014035	8	0	0
C-BIO-3	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	22	0	0
C-BIO-3	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	44	0	0
C-BIO-3	C	P	1	1	CHIRONOMIDAE	470630014	0	4	0
C-BIO-3	C	P	1	1	DUBIRAPHIA	470623050002	1	0	0
C-BIO-3	C	P	1	1	SPHAERIIDAE	460507046 A	4	0	0
C-BIO-3	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	15	0	0
C-BIO-3	C	P	1	1	COENAGRIONIDAE	470606003	1	0	0
C-BIO-3	C	P	102	280	CRYPTOCHIRONOMUS	470630014035	5	0	0
C-BIO-3	C	P	102	280	POLYPEDILUM ILLINOENSE	470630014036031	60	0	0
C-BIO-3	C	P	102	280	CHIRONOMUS	470630014032	22	0	0
C-BIO-3	C	P	102	280	HARNISCHIA	470630014162	1	0	0
C-BIO-3	C	P	102	280	CHIRONOMIDAE	470630014	1	0	0
C-BIO-3	C	P	102	280	POLYPEDILUM SCALAENUM	470630014036038	13	0	0
C-GC-BIO-01	A	H	1	1	COENAGRIONIDAE	470606003	1	0	0
GC-BIO-01	A	H	99	128	POLYPEDILUM ILLINOENSE	470630014036031	14	0	0
GC-BIO-01	A	H	1	1	DUBIRAPHIA	470623050002	1	0	0
C-GC-BIO-01	A	H	99	128	CHIRONOMUS	470630014032	25	0	0
C-GC-BIO-01	A	H	1	1	CHIRONOMIDAE	470630014	0	5	0
C-GC-BIO-01	A	H	99	128	PHAENOPSECTRA	470630014152	4	0	0
C-GC-BIO-01	A	H	1	1	ANCYLIDAE	460108011	2	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
RC-GC-BIO-01	A	H	99	128	ABLABESMYIA	470630014042	19	0	0
RC-GC-BIO-01	A	H	1	1	TRICLADIDA	350109	1	0	0
RC-GC-BIO-01	A	H	1	1	DUBIRAPHIA	470623050002	0	0	1
RC-GC-BIO-01	A	H	1	1	ARGIA	470606003009	4	0	0
RC-GC-BIO-01	A	H	1	1	CAENIS	470604011002	1	0	0
RC-GC-BIO-01	A	H	1	1	DERO DERO	450203005006007	14	0	0
RC-GC-BIO-01	A	H	99	128	TANYTARSUS	470630014030	3	0	0
RC-GC-BIO-01	A	H	99	128	DICROTENDIPES	470630014043	20	0	0
RC-GC-BIO-01	A	H	99	128	TRIBELOS	470630014117	9	0	0
RC-GC-BIO-01	A	H	99	128	CHIRONOMINI	47063001401	4	0	0
RC-GC-BIO-01	A	H	99	128	LABRUNDINIA	470630014103	1	0	0
RC-GC-BIO-01	B	H	102	130	CHIRONOMUS	470630014032	26	0	0
RC-GC-BIO-01	B	H	102	130	POLYPEDILUM ILLINOENSE	470630014036031	9	0	0
RC-GC-BIO-01	B	H	102	130	TRIBELOS	470630014117	23	0	0
RC-GC-BIO-01	B	H	1	1	PARALEPTOPHLEBIA	470604002009	1	0	0
RC-GC-BIO-01	B	H	102	130	ABLABESMYIA	470630014042	23	0	0
RC-GC-BIO-01	B	H	1	1	ANCYLIDAE	460108011	1	0	0
RC-GC-BIO-01	B	H	1	1	CHIRONOMIDAE	470630014	0	3	0
RC-GC-BIO-01	B	H	1	1	STENONEMA	470604001004	1	0	0
RC-GC-BIO-01	B	H	102	130	DICROTENDIPES	470630014043	12	0	0
RC-GC-BIO-01	B	H	102	130	PHAENOPSECTRA	470630014152	6	0	0
RC-GC-BIO-01	B	H	102	130	TANYTARSUS	470630014030	2	0	0
RC-GC-BIO-01	B	H	102	130	POLYPEDILUM FALLAX	470630014036003	1	0	0
RC-GC-BIO-01	B	H	1	1	DERO DERO	450203005006007	12	0	0
RC-GC-BIO-01	C	H	1	1	DERO AULOPHORUS	450203005006 A	1	0	0
RC-GC-BIO-01	C	H	1	1	CHIRONOMIDAE	470630014	0	2	0
RC-GC-BIO-01	C	H	1	1	ANCYLIDAE	460108011	3	0	0
RC-GC-BIO-01	C	H	1	1	TRIBELOS	470630014117	15	0	0
RC-GC-BIO-01	C	H	1	1	CAENIS	470604011002	1	0	0
RC-GC-BIO-01	C	H	1	1	DICROTENDIPES	470630014043	25	0	0
RC-GC-BIO-01	C	H	1	1	DUBIRAPHIA	470623050002	1	0	0
RC-GC-BIO-01	C	H	1	1	PHAENOPSECTRA	470630014152	1	0	0
RC-GC-BIO-01	C	H	1	1	ERPOBDELLIDAE	450205006	1	0	0
RC-GC-BIO-01	C	H	1	1	CHIRONOMUS	470630014032	32	0	0
RC-GC-BIO-01	C	H	1	1	STENACRON	470604001017	1	0	0
RC-GC-BIO-01	C	H	1	1	LIBELLULIDAE	470605004	1	0	0
RC-GC-BIO-01	C	H	1	1	POLYPEDILUM ILLINOENSE	470630014036031	15	0	0
RC-GC-BIO-01	C	H	1	1	TANYTARSUS	470630014030	1	0	0
RC-GC-BIO-01	C	H	1	1	ABLABESMYIA	470630014042	8	0	0
RC-GC-BIO-01	C	H	1	1	CHIRONOMINI	47063001401	1	0	0
RC-GC-BIO-01	C	H	1	1	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
RC-GC-BIO-01	C	H	1	1	DERO DERO	450203005006007	33	0	0
RC-GC-BIO-1		D	3	28	PHAENOPSECTRA	470630014152	5	0	0
RC-GC-BIO-1		D	3	28	LIBELLULIDAE	470605004	17	0	0
RC-GC-BIO-1		D	3	28	BOYERIA	470605001007	1	0	0
RC-GC-BIO-1		D	3	28	CHIRONOMIDAE	470630014	0	4	0
RC-GC-BIO-1		D	3	28	DERO FLABELLIGER	450203005006002	3	0	0
RC-GC-BIO-1		D	3	28	ANCYLIDAE	460108011	6	0	0
RC-GC-BIO-1		D	3	28	ANCYRONYX VARIEGATA	470623050009001	0	0	1
RC-GC-BIO-1		D	3	28	ACARINA	47021100	2	0	0
RC-GC-BIO-1		D	3	28	ANCYRONYX VARIEGATA	470623050009001	4	0	0
RC-GC-BIO-1		D	3	28	ABLABESMYIA	470630014042	3	0	0
RC-GC-BIO-1		D	3	28	CAENIS	470604011002	9	0	0
RC-GC-BIO-1		D	3	28	POLYPEDILUM ILLINOENSE	470630014036031	5	0	0
RC-GC-BIO-1		D	3	28	DERO	450203005006	2	0	0
RC-GC-BIO-1		D	3	28	DUBIRAPHIA	470623050002	0	0	12
RC-GC-BIO-1		D	3	28	ELMIDAE	470623050	1	0	0
RC-GC-BIO-1		D	3	28	COENAGRIONIDAE	470606003	16	0	0
RC-GC-BIO-1		D	3	28	DUBIRAPHIA	470623050002	10	0	0
RC-GC-BIO-1		D	3	28	PARATANYTARSUS	470630014091	2	0	0
RC-GC-BIO-1		D	3	28	TRIBELOS	470630014117	3	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
GC-BIO-1		D	3	28	CHIRONOMUS	470630014032	3	0	0
GC-BIO-1		D	3	28	DERO AULOPHORUS	450203005006 A	2	0	0
RC-GC-BIO-1	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	26	0	0
RC-GC-BIO-1	A	P	1	1	GLOSSIPHONIIDAE	450205002	1	0	0
RC-GC-BIO-1	A	P	1	1	DUBIRAPHIA	470623050002	22	0	0
RC-GC-BIO-1	A	P	1	1	COENAGRIONIDAE	470606003	1	0	0
RC-GC-BIO-1	A	P	1	1	LIBELLULIDAE	470605004	1	0	0
RC-GC-BIO-1	A	P	1	1	CHIRONOMIDAE	470630014	0	1	0
RC-GC-BIO-1	A	P	1	1	ANCYLIDAE	460108011	2	0	0
RC-GC-BIO-1	A	P	1	1	ELMIDAE	470623050	1	0	0
RC-GC-BIO-1	A	P	1	1	DERO DERO	450203005006007	20	0	0
RC-GC-BIO-1	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	3	0	0
RC-GC-BIO-1	A	P	102	165	DICROTENDIPES	470630014043	8	0	0
RC-GC-BIO-1	A	P	102	165	TRIBELOS	470630014117	31	0	0
RC-GC-BIO-1	A	P	102	165	CHIRONOMUS	470630014032	47	0	0
RC-GC-BIO-1	A	P	102	165	ABLABESMYIA	470630014042	4	0	0
RC-GC-BIO-1	A	P	102	165	POLYPEDILUM ILLINOENSE	470630014036031	3	0	0
RC-GC-BIO-1	A	P	1	1	PHYLOCENTROPUS	470628018006	2	0	0
RC-GC-BIO-1	A	P	102	165	PROCLADIUS	470630014004	8	0	0
RC-GC-BIO-1	A	P	1	1	DUBIRAPHIA	470623050002	0	0	1
RC-GC-BIO-1	A	P	102	165	STENOCHIRONOMUS	470630014029	1	0	0
RC-GC-BIO-1	B	P	1	1	DERO	450203005006	9	0	0
RC-GC-BIO-1	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	14	0	0
RC-GC-BIO-1	B	P	1	1	DUBIRAPHIA	470623050002	0	0	1
RC-GC-BIO-1	B	P	1	1	DUBIRAPHIA	470623050002	11	0	0
RC-GC-BIO-1	B	P	1	1	AULODRILUS PIGUETI	450203004008001	2	0	0
RC-GC-BIO-1	B	P	99	140	CHIRONOMUS	470630014032	21	0	0
RC-GC-BIO-1	B	P	99	140	ABLABESMYIA	470630014042	18	0	0
GC-BIO-1	B	P	99	140	TRIBELOS	470630014117	46	0	0
RC-GC-BIO-1	B	P	99	140	DICROTENDIPES	470630014043	9	0	0
RC-GC-BIO-1	B	P	99	140	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
RC-GC-BIO-1	B	P	99	140	PARATANYTARSUS	470630014091	3	0	0
RC-GC-BIO-1	B	P	1	1	LIBELLULIDAE	470605004	1	0	0
RC-GC-BIO-1	B	P	1	1	CHIRONOMIDAE	470630014	0	1	0
RC-GC-BIO-1	B	P	1	1	CAENIS	470604011002	1	0	0
RC-GC-BIO-1	B	P	1	1	STENELMIS	470623050001	1	0	0
RC-GC-BIO-1	C	P	1	1	PLANORBIDAE	460108012	2	0	0
RC-GC-BIO-1	C	P	1	1	ANCYLIDAE	460108011	10	0	0
RC-GC-BIO-1	C	P	1	1	CHIRONOMIDAE	470630014	0	1	0
RC-GC-BIO-1	C	P	1	1	COENAGRIONIDAE	470606003	1	0	0
RC-GC-BIO-1	C	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
RC-GC-BIO-1	C	P	1	1	DICROTENDIPES	470630014043	2	0	0
RC-GC-BIO-1	C	P	1	1	PARATANYTARSUS	470630014091	1	0	0
RC-GC-BIO-1	C	P	1	1	LIBELLULIDAE	470605004	1	0	0
RC-GC-BIO-1	C	P	1	1	CHIRONOMUS	470630014032	10	0	0
RC-GC-BIO-1	C	P	1	1	CHIRONOMINI	47063001401	1	0	0
RC-GC-BIO-1	C	P	1	1	ACARINA	47021100	2	0	0
RC-GC-BIO-1	C	P	1	1	HALIPLUS	470623006001	1	0	0
RC-GC-BIO-1	C	P	1	1	DERO DERO	450203005006007	7	0	0
RC-GC-BIO-1	C	P	1	1	TRIBELOS	470630014117	4	0	0
RC-GC-BIO-1	C	P	1	1	CERATOPOGONIDAE	470630010	1	0	0
RC-GC-BIO-1	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	8	0	0
RC-GC-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	23	0	0
RC-GC-BIO-2		D	2	28	PALAEMONETES PALUDOSUS	470534015003002	1	0	0
RC-GC-BIO-2		D	2	28	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
GC-BIO-2		D	2	28	PHAENOPSECTRA	470630014152	2	0	0
-GC-BIO-2		D	2	28	DICROTENDIPES	470630014043	12	0	0
RC-GC-BIO-2		D	2	28	TRIBELOS	470630014117	3	0	0
RC-GC-BIO-2		D	2	28	CHIRONOMUS	470630014032	4	0	0
RC-GC-BIO-2		D	2	28	PARATANYTARSUS	470630014091	2	0	0
RC-GC-BIO-2		D	2	28	SLAVINA APPENDICULATA	450203005001001	4	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
RC-GC-BIO-2		D	2	28	DERO DERO	450203005006007	16	0	0
RC-GC-BIO-2		D	2	28	DERO FLABELLIGER	450203005006002	2	0	0
RC-GC-BIO-2		D	2	28	DERO AULOPHORUS	450203005006 A	4	0	0
RC-GC-BIO-2		D	2	28	PLANORBIDAE	460108012	6	0	0
RC-GC-BIO-2		D	2	28	ANCYLIDAE	460108011	8	0	0
RC-GC-BIO-2		D	2	28	CAENIS	470604011002	10	0	0
RC-GC-BIO-2		D	2	28	OXYETHIRA	470628005005	2	0	0
RC-GC-BIO-2		D	2	28	ACARINA	47021100	3	0	0
RC-GC-BIO-2		D	2	28	CHIRONOMIDAE	470630014	0	1	0
RC-GC-BIO-2		D	2	28	DUBIRAPHIA	470623050002	0	0	4
RC-GC-BIO-2		D	2	28	DUBIRAPHIA	470623050002	1	0	0
RC-GC-BIO-2		D	2	28	COENAGRIONIDAE	470606003	8	0	0
RC-GC-BIO-2		D	2	28	LIBELLULIDAE	470605004	2	0	0
RC-GC-BIO-2		D	2	28	DYTISCIDAE	470623008	0	0	1
RC-GC-BIO-3		D	7	28	TRIBELOS	470630014117	2	0	0
RC-GC-BIO-3		D	7	28	CHIRONOMUS	470630014032	3	0	0
RC-GC-BIO-3		D	7	28	PARATANYTARSUS	470630014091	4	0	0
RC-GC-BIO-3		D	7	28	TANYTARSUS	470630014030	1	0	0
RC-GC-BIO-3		D	7	28	CHIRONOMIDAE	470630014	1	0	0
RC-GC-BIO-3		D	7	28	POLYPEDILUM ILLINOENSE	470630014036031	7	0	0
RC-GC-BIO-3		D	7	28	DERO DERO	450203005006007	2	0	0
RC-GC-BIO-3		D	7	28	ANCYLIDAE	460108011	9	0	0
RC-GC-BIO-3		D	7	28	PLANORBIDAE	460108012	1	0	0
RC-GC-BIO-3		D	7	28	PHYSELLA	460108013003	1	0	0
RC-GC-BIO-3		D	7	28	PELECYPODA	4605 A	5	0	0
RC-GC-BIO-3		D	7	28	CHIRONOMIDAE	470630014	0	7	0
RC-GC-BIO-3		D	7	28	DUBIRAPHIA	470623050002	0	0	1
RC-GC-BIO-3		D	7	28	STENELMIS	470623050001	0	0	1
RC-GC-BIO-3		D	7	28	ANCYRONYX VARIEGATA	470623050009001	2	0	0
RC-GC-BIO-3		D	7	28	ELMIDAE	470623050	6	0	0
RC-GC-BIO-3		D	7	28	LIBELLULIDAE	470605004	7	0	0
RC-GC-BIO-3		D	7	28	COENAGRIONIDAE	470606003	7	0	0
RC-GC-BIO-3		D	7	28	AESHNIDAE	470605001	1	0	0
RC-GC-BIO-3		D	7	28	SIALIS	470627001001	2	0	0
RC-GC-BIO-3		D	7	28	CORIXIDAE	470621001	2	0	0
RC-GC-BIO-3		D	7	28	CULICIDAE	470630009	1	0	0
RC-GC-BIO-3		D	7	28	PHAENOPSECTRA	470630014152	3	0	0
RC-GC-BIO-3		D	7	28	DICROTENDIPES	470630014043	19	0	0
STC-BIO-1		D	2	28	COENAGRIONIDAE	470606003	3	0	0
STC-BIO-1		D	2	28	CORIXIDAE	470621001	1	0	0
STC-BIO-1		D	2	28	CHIRONOMUS	470630014032	2	0	0
STC-BIO-1		D	2	28	TUBIFICIDAE IMM. W/O	450203004 B	3	0	0
STC-BIO-1		D	2	28	DERO DERO	450203005006007	58	0	0
STC-BIO-1		D	2	28	ENCHYTRAEIDAE	450203003	5	0	0
STC-BIO-1		D	2	28	TUBIFICIDAE IMM. W	450203004 A	18	0	0
STC-BIO-1	A	H	1	1	DERO DERO	450203005006007	1	0	0
STC-BIO-1	A	H	1	1	TUBIFICIDAE IMM. W	450203004 A	20	0	0
STC-BIO-1	B	H	1	1	DERO DERO	450203005006007	3	0	0
STC-BIO-1	B	H	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
STC-BIO-1	C	H	1	1	DERO DERO	450203005006007	9	0	0
STC-BIO-1	C	H	1	1	TUBIFICIDAE IMM. W	450203004 A	2	0	0
STC-BIO-1	A	P	1	1	NAIDIDAE	450203005	1	0	0
STC-BIO-1	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	2	0	0
STC-BIO-1	C	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
STC-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
STC-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	5	0	0
STC-BIO-2		D	5	28	CHIRONOMIDAE	470630014	0	2	0
STC-BIO-2		D	5	28	COENAGRIONIDAE	470606003	8	0	0
STC-BIO-2		D	5	28	PELTODYTES	470623006003	0	0	1
STC-BIO-2		D	5	28	CORDULIIDAE	470605006	5	0	0
STC-BIO-2		D	5	28	NAIS	450203005008	2	0	0

IELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
BIO-2		D	5	28	DERO	450203005006	3	0	0
BIO-2		D	5	28	ANCYLIDAE	460108011	3	0	0
TC-BIO-2		D	5	28	LIMNODRILUS HOFFMEISTERI	450203004005001	2	0	0
TC-BIO-2		D	5	28	TANYPODINAE	470630014 C	6	0	0
TC-BIO-2		D	5	28	PARACHIRONOMUS	470630014052	2	0	0
TC-BIO-2		D	5	28	ABLABESMYIA	470630014042	2	0	0
TC-BIO-2		D	5	28	CERATOPOGONIDAE	470630010	4	0	0
TC-BIO-2		D	5	28	TUBIFICIDAE IMM. W/O	450203004 B	5	0	0
TC-BIO-2		D	5	28	ASTACIDAE	470534093	2	0	0
TC-BIO-2		D	5	28	DICROTENDIPES	470630014043	46	0	0
TC-BIO-2		D	5	28	POLYPEDILUM ILLINOENSE	470630014036031	11	0	0
TC-BIO-2	A	H	1	1	CHIRONOMIDAE	470630014	0	1	0
TC-BIO-2	A	H	1	1	CORDULIIDAE	470605006	1	0	0
TC-BIO-2	A	H	1	1	DICROTENDIPES	470630014043	23	0	0
TC-BIO-2	A	H	1	1	ABLABESMYIA	470630014042	3	0	0
TC-BIO-2	B	H	1	1	ABLABESMYIA	470630014042	4	0	0
TC-BIO-2	B	H	1	1	DICROTENDIPES	470630014043	28	0	0
TC-BIO-2	B	H	1	1	DERO AULOPHORUS	450203005006 A	3	0	0
TC-BIO-2	B	H	1	1	ANCYLIDAE	460108011	2	0	0
TC-BIO-2	B	H	1	1	DERO	450203005006	22	0	0
TC-BIO-2	C	H	1	1	ABLABESMYIA	470630014042	3	0	0
TC-BIO-2	C	H	1	1	DICROTENDIPES	470630014043	30	0	0
TC-BIO-2	A	P	1	1	RHEOCRICOTOPUS	470630014110	1	0	0
TC-BIO-2	A	P	1	1	ABLABESMYIA	470630014042	1	0	0
TC-BIO-2	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
TC-BIO-2	A	P	1	1	LUMBRICULIDAE	450201001	1	0	0
TC-BIO-2	A	P	1	1	DICROTENDIPES	470630014043	7	0	0
TC-BIO-2	B	P	1	1	ABLABESMYIA	470630014042	1	0	0
BIO-2	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	4	0	0
TC-BIO-2	B	P	1	1	TANYPODINAE	470630014 C	1	0	0
TC-BIO-2	B	P	1	1	PRISTINA LEIDYI	450203005005013	1	0	0
TC-BIO-2	B	P	1	1	PROCLADIUS	470630014004	1	0	0
TC-BIO-2	B	P	1	1	PARACHIRONOMUS	470630014052	1	0	0
TC-BIO-2	B	P	1	1	DICROTENDIPES	470630014043	40	0	0
TC-BIO-2	B	P	1	1	COENAGRIONIDAE	470606003	1	0	0
TC-BIO-2	B	P	1	1	CHIRONOMIDAE	470630014	0	1	0
TC-BIO-2	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	4	0	0
TC-BIO-2	B	P	1	1	DERO	450203005006	1	0	0
TC-BIO-2	B	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
TC-BIO-2	B	P	1	1	NAIS COMMUNIS	450203005008003	1	0	0
TC-BIO-2	C	P	1	1	ASTACIDAE	470534093	1	0	0
TC-BIO-2	C	P	1	1	DICROTENDIPES	470630014043	7	0	0
TC-BIO-2	C	P	1	1	LARSIA	470630014102	2	0	0
TC-BIO-2	C	P	1	1	CELINA	470623008010	1	0	0
TC-BIO-2	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	2	0	0
TC-BIO-2	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	6	0	0
TC-BIO-3		D	6	28	CHIRONOMUS	470630014032	1	0	0
TC-BIO-3		D	6	28	CRICOTOPUS BICINCTUS	470630014025004	1	0	0
TC-BIO-3		D	6	28	TUBIFICIDAE IMM. W	450203004 A	1	0	0
TC-BIO-3		D	6	28	PROCLADIUS	470630014004	1	0	0
TC-BIO-3		D	6	28	TUBIFICIDAE IMM. W/O	450203004 B	5	0	0
TC-BIO-3		D	6	28	THIENEMANNIMYIA	470630014119	6	0	0
TC-BIO-3		D	6	28	DICROTENDIPES	470630014043	31	0	0
TC-BIO-3		D	6	28	NANOCLADIUS	470630014044	1	0	0
TC-BIO-3		D	1	1	ASTACIDAE	470534093	3	0	0
BIO-3		D	6	28	SPHAERIIDAE	460507046 A	1	0	0
TC-BIO-3		D	6	28	CHIRONOMIDAE	470630014	0	2	0
TC-BIO-3		D	6	28	LIMNODRILUS HOFFMEISTERI	450203004005001	2	0	0
TC-BIO-3		D	6	28	ABLABESMYIA	470630014042	3	0	0
TC-BIO-3		D	6	28	COENAGRIONIDAE	470606003	8	0	0
TC-BIO-3		D	6	28	CORDULIIDAE	470605006	1	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
STC-BIO-3		D	6	28	POLYPEDILUM ILLINOENSE	470630014036031	33	0	0
STC-BIO-3		D	6	28	HYDROPHILIDAE	470623016	1	0	0
STC-BIO-3		D	6	28	PELTODYTES	470623006003	3	0	0
STC-BIO-3	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	4	0	0
STC-BIO-3	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
STC-BIO-3	A	P	1	1	DERO	450203005006	1	0	0
STC-BIO-3	A	P	1	1	SPHAERIIDAE	460507046 A	3	0	0
STC-BIO-3	A	P	1	1	HEMERODROMIA	470630041004	1	0	0
STC-BIO-3	A	P	1	1	CHIRONOMIDAE	470630014	0	1	0
STC-BIO-3	A	P	1	1	HYDROBIIDAE	460102013	3	0	0
STC-BIO-3	A	P	1	1	PROCLADIUS	470630014004	1	0	0
STC-BIO-3	A	P	1	1	DICROTENDIPES	470630014043	3	0	0
STC-BIO-3	A	P	1	1	ABLABESMYIA	470630014042	3	0	0
STC-BIO-3	B	P	1	1	CHIRONOMUS	470630014032	1	0	0
STC-BIO-3	C	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
STC-BIO-3	C	P	1	1	CHIRONOMINI	47063001401	1	0	0
STC-BIO-3	C	P	1	1	DICROTENDIPES	470630014043	5	0	0
STC-BIO-3	C	P	1	1	ABLABESMYIA	470630014042	2	0	0
STC-BIO-3	C	P	1	1	CHIRONOMUS	470630014032	1	0	0
STC-BIO-3	C	P	1	1	SPHAERIIDAE	460507046 A	1	0	0
STC-BIO-3	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	10	0	0
STC-BIO-3	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	3	0	0
STC-BIO-3	C	P	1	1	COLEOPTERA	470623	0	0	1
STC-BIO-3	C	P	1	1	CHIRONOMUS	470630014032	1	0	0
STC-BIO-3	C	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
STC-BIO-3	C	P	1	1	CHIRONOMIDAE	470630014	1	0	0
STC-BIO-3	C	P	1	1	DERO DIGITATA	450203005006004	1	0	0
STC-BIO-3	C	P	1	1	LUMBRICULIDAE	450201001	1	0	0
STC-BIO-4		D	1	1	PARACHIRONOMUS	470630014052	3	0	0
STC-BIO-4		D	1	1	PROCLADIUS	470630014004	24	0	0
STC-BIO-4		D	1	1	CHIRONOMUS	470630014032	12	0	0
STC-BIO-4		D	1	1	DICROTENDIPES	470630014043	23	0	0
STC-BIO-4		D	1	1	POLYPEDILUM ILLINOENSE	470630014036031	13	0	0
STC-BIO-4		D	1	1	CERATOPOGONIDAE	470630010	2	0	0
STC-BIO-4		D	1	1	CORDULIIDAE	470605006	1	0	0
STC-BIO-4		D	1	1	TROPISTERNUS	470623016012	0	0	1
STC-BIO-4		D	1	1	LARSIA	470630014102	25	0	0
STC-BIO-4		D	1	1	COENAGRIONIDAE	470606003	8	0	0
STC-BIO-4		D	1	1	ABLABESMYIA	470630014042	1	0	0
STC-BIO-4		D	1	1	DERO FURCATA	450203005006008	2	0	0
STC-BIO-4		D	1	1	THIENEMANNIMYIA	470630014119	5	0	0
STC-BIO-4		D	1	1	PELTODYTES	470623006003	0	0	1
STC-BIO-4		D	1	1	GASTROPODA	4601	1	0	0
STC-BIO-4		D	1	1	NAIDIDAE	450203005	1	0	0
STC-BIO-4		D	1	1	CHIRONOMINI	47063001401	1	0	0
STC-BIO-4		D	1	1	LABRUNDINIA	470630014103	1	0	0
STC-BIO-4		D	1	1	ASTACIDAE	470534093	1	0	0
STC-BIO-4		D	1	1	CHIRONOMIDAE	470630014	0	5	0
STC-BIO-4	A	H	1	1	CHIRONOMINI	47063001401	1	0	0
STC-BIO-4	A	H	1	1	LARSIA	470630014102	1	0	0
STC-BIO-4	A	H	1	1	CHIRONOMIDAE	470630014	0	1	0
STC-BIO-4	A	H	1	1	DICROTENDIPES	470630014043	3	0	0
STC-BIO-4	B	H	1	1	CHIRONOMIDAE	470630014	0	1	0
STC-BIO-4	B	H	1	1	DERO	450203005006	1	0	0
STC-BIO-4	B	H	1	1	DICROTENDIPES	470630014043	4	0	0
STC-BIO-4	C	H	1	1	CHIRONOMUS	470630014032	2	0	0
STC-BIO-4	C	H	1	1	DICROTENDIPES	470630014043	6	0	0
STC-BIO-4	C	H	1	1	POLYPEDILUM ILLINOENSE	470630014036031	8	0	0
STC-BIO-4	C	H	1	1	LARSIA	470630014102	2	0	0
STC-BIO-4	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	1	0	0
STC-BIO-4	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0

IELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
-BIO-4	B	P	1	1	DICROTENDIPES	470630014043	1	0	0
.C-BIO-4	B	P	1	1	PROCLADIUS	470630014004	3	0	0
TC-BIO-4	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	1	0	0
TC-BIO-4	C	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
TC-BIO-4	C	P	1	1	ILYODRILUS TEMPLETONI	450203004006002	1	0	0
TC-BIO-4	C	P	1	1	CERATOPOGONIDAE	470630010	2	0	0
TC-BIO-4	C	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	4	0	0
TC-BIO-4	C	P	1	1	PROCLADIUS	470630014004	12	0	0
TC-BIO-4	C	P	1	1	LARSIA	470630014102	3	0	0
TC-BIO-4	C	P	1	1	CHIRONOMUS	470630014032	2	0	0
TC-BIO-4	C	P	1	1	DICROTENDIPES	470630014043	5	0	0
TC-BIO-4	C	P	1	1	CHIRONOMIDAE	470630014	0	1	0
TC-BIO-5		D	1	28	PROCLADIUS	470630014004	3	0	0
TC-BIO-5		D	1	28	ORTHOCLADIINAE	470630014 B	1	0	0
TC-BIO-5		D	1	28	ABLABESMYIA	470630014042	2	0	0
TC-BIO-5		D	1	28	SPHAERIIDAE	460507046 A	27	0	0
TC-BIO-5		D	1	28	DERO	450203005006	1	0	0
TC-BIO-5		D	1	28	LEPTOCERIDAE	470628012	1	0	0
TC-BIO-5		D	1	28	DUBIRAPHIA	470623050002	1	0	0
TC-BIO-5		D	1	28	GOMPHIDAE	470605003	1	0	0
TC-BIO-5		D	1	28	CORDULIIDAE	470605006	7	0	0
TC-BIO-5		D	1	28	HYDROPTILIDAE	470628005	2	0	0
TC-BIO-5		D	1	28	DICROTENDIPES	470630014043	3	0	0
TC-BIO-5		D	1	28	TUBIFICIDAE IMM. W/O	450203004 B	1	0	0
TC-BIO-5		D	1	28	CRYPTOTENDIPES	470630014143	1	0	0
TC-BIO-5		D	1	28	TRIBELOS	470630014117	9	0	0
TC-BIO-5		D	1	28	ANCYLIDAE	460108011	1	0	0
-BIO-5		D	1	28	HYDROBIIDAE	460102013	77	0	0
-BIO-5		D	1	28	OECETIS	470628012004	1	0	0
TC-BIO-5		D	1	28	PELTODYTES	470623006003	1	0	0
TC-BIO-5		D	1	28	PALAEMONETES PALUDOSUS	470534015003002	1	0	0
TC-BIO-5		D	1	28	CHIRONOMIDAE	470630014	0	1	0
TC-BIO-5		D	1	28	LUMBRICULIDAE	450201001	2	0	0
TC-BIO-5		D	1	28	TANYTARSUS	470630014030	6	0	0
TC-BIO-5	A	H	1	1	ANCYLIDAE	460108011	1	0	0
TC-BIO-5	A	H	1	1	CYRNELLUS FRATERNUS	470628018005001	1	0	0
TC-BIO-5	A	H	1	1	CHIRONOMINI	47063001401	1	0	0
TC-BIO-5	A	H	1	1	TANYTARSUS	470630014030	2	0	0
TC-BIO-5	A	H	1	1	PROCLADIUS	470630014004	1	0	0
TC-BIO-5	A	H	1	1	TRICLADIDA	350109	2	0	0
TC-BIO-5	A	H	1	1	TRIBELOS	470630014117	3	0	0
TC-BIO-5	A	H	1	1	DICROTENDIPES	470630014043	12	0	0
TC-BIO-5	A	H	1	1	GASTROPODA	4601	10	0	0
TC-BIO-5	A	H	1	1	POLYPEDILUM SCALAENUM	470630014036038	3	0	0
TC-BIO-5	A	H	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
TC-BIO-5	A	H	1	1	DINEUTUS	470623010003	2	0	0
TC-BIO-5	A	H	1	1	ABLABESMYIA	470630014042	18	0	0
TC-BIO-5	A	H	1	1	POLYPEDILUM FALLAX	470630014036003	3	0	0
TC-BIO-5	A	H	1	1	PHAENOPSECTRA	470630014152	3	0	0
TC-BIO-5	B	H	1	1	CHIRONOMINI	47063001401	1	0	0
TC-BIO-5	B	H	1	1	TANYTARSUS	470630014030	5	0	0
TC-BIO-5	B	H	1	1	LABRUNDINIA	470630014103	1	0	0
TC-BIO-5	B	H	1	1	PHAENOPSECTRA	470630014152	3	0	0
TC-BIO-5	B	H	1	1	CHIRONOMUS	470630014032	1	0	0
TC-BIO-5	B	H	1	1	TRIBELOS	470630014117	4	0	0
-BIO-5	B	H	1	1	PROCLADIUS	470630014004	3	0	0
C-BIO-5	B	H	1	1	ABLABESMYIA	470630014042	30	0	0
C-BIO-5	B	H	1	1	POLYPEDILUM SCALAENUM	470630014036038	23	0	0
C-BIO-5	B	H	1	1	TRICLADIDA	350109	4	0	0
C-BIO-5	B	H	1	1	CORDULIIDAE	470605006	1	0	0
C-BIO-5	B	H	1	1	COENAGRIONIDAE	470606003	2	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
STC-BIO-5	B	H	1	1	HYDROBIIDAE	460102013	13	0	0
STC-BIO-5	B	H	1	1	CHIRONOMIDAE	470630014	0	5	0
STC-BIO-5	B	H	1	1	ANCYLIDAE	460108011	1	0	0
STC-BIO-5	B	H	1	1	DERO	450203005006	1	0	0
STC-BIO-5	B	H	1	1	DICROTENDIPES	470630014043	10	0	0
STC-BIO-5	B	H	1	1	POLYPEDILUM FALLAX	470630014036003	8	0	0
STC-BIO-5	C	H	1	1	PROCLADIUS	470630014004	2	0	0
STC-BIO-5	C	H	1	1	ABLABESMYIA	470630014042	22	0	0
STC-BIO-5	C	H	1	1	CAENIS	470604011002	1	0	0
STC-BIO-5	C	H	1	1	POLYPEDILUM SCALAENUM	470630014036038	22	0	0
STC-BIO-5	C	H	1	1	DERO DERO	450203005006007	4	0	0
STC-BIO-5	C	H	1	1	POLYCENTROPODIDAE	470628018	1	0	0
STC-BIO-5	C	H	1	1	TRIBELOS	470630014117	6	0	0
STC-BIO-5	C	H	1	1	CHIRONOMIDAE	470630014	0	1	0
STC-BIO-5	C	H	1	1	TRICLADIDA	350109	11	0	0
STC-BIO-5	C	H	1	1	GASTROPODA	4601	57	0	0
STC-BIO-5	C	H	1	1	TANYTARSUS	470630014030	11	0	0
STC-BIO-5	C	H	1	1	COENAGRIONIDAE	470606003	2	0	0
STC-BIO-5	C	H	1	1	PHAENOPSECTRA	470630014152	6	0	0
STC-BIO-5	C	H	1	1	DICROTENDIPES	470630014043	8	0	0
STC-BIO-5	C	H	1	1	POLYPEDILUM FALLAX	470630014036003	1	0	0
STC-BIO-5	C	H	1	1	CLADOTANYTARSUS	470630014041	1	0	0
STC-BIO-5	C	H	1	1	LABRUNDINIA	470630014103	4	0	0
STC-BIO-5	C	H	1	1	CHIRONOMINI	47063001401	2	0	0
STC-BIO-5	C	H	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
STC-BIO-5	A	P	1	1	AULODRILUS PIGUETI	450203004008001	4	0	0
STC-BIO-5	A	P	1	1	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
STC-BIO-5	A	P	1	1	DERO DERO	450203005006007	1	0	0
STC-BIO-5	A	P	1	1	CLINOTANYPUS	470630014001	1	0	0
STC-BIO-5	A	P	1	1	PARALAUTERBORNIELLA	470630014045	2	0	0
STC-BIO-5	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	21	0	0
STC-BIO-5	A	P	1	1	ABLABESMYIA	470630014042	2	0	0
STC-BIO-5	A	P	1	1	CHIRONOMUS	470630014032	3	0	0
STC-BIO-5	A	P	1	1	PROCLADIUS	470630014004	15	0	0
STC-BIO-5	A	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	7	0	0
STC-BIO-5	A	P	1	1	TRIBELOS	470630014117	9	0	0
STC-BIO-5	A	P	1	1	HYDROBIIDAE	460102013	8	0	0
STC-BIO-5	A	P	1	1	SPHAERIIDAE	460507046 A	54	0	0
STC-BIO-5	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	4	0	0
STC-BIO-5	A	P	1	1	CHIRONOMINI	47063001401	1	0	0
STC-BIO-5	A	P	1	1	TANYTARSUS	470630014030	6	0	0
STC-BIO-5	A	P	1	1	DICROTENDIPES	470630014043	3	0	0
STC-BIO-5	A	P	1	1	DERO AULOPHORUS	450203005006 A	1	0	0
STC-BIO-5	B	P	1	1	CORDULIIDAE	470605006	1	0	0
STC-BIO-5	B	P	1	1	COENAGRIONIDAE	470606003	1	0	0
STC-BIO-5	B	P	1	1	HYDROBIIDAE	460102013	1	0	0
STC-BIO-5	B	P	1	1	COLLEMBOLA	470602	1	0	0
STC-BIO-5	B	P	1	1	SPHAERIIDAE	460507046 A	36	0	0
STC-BIO-5	B	P	1	1	TRIBELOS	470630014117	6	0	0
STC-BIO-5	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	10	0	0
STC-BIO-5	B	P	1	1	TUBIFICIDAE IMM. W	450203004 A	19	0	0
STC-BIO-5	B	P	1	1	DERO	450203005006	1	0	0
STC-BIO-5	B	P	1	1	CHIRONOMUS	470630014032	1	0	0
STC-BIO-5	B	P	1	1	AULODRILUS PIGUETI	450203004008001	1	0	0
STC-BIO-5	B	P	1	1	DICROTENDIPES	470630014043	3	0	0
STC-BIO-5	B	P	1	1	ABLABESMYIA	470630014042	1	0	0
STC-BIO-5	B	P	1	1	PRISTINA AEQUISETA	450203005005003	1	0	0
STC-BIO-5	B	P	1	1	CHIRONOMIDAE	470630014	1	0	0
STC-BIO-5	B	P	1	1	PARALAUTERBORNIELLA	470630014045	2	0	0
STC-BIO-5	B	P	1	1	PROCLADIUS	470630014004	11	0	0
STC-BIO-5	B	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	11	0	0

ELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
-BIO-5	B	P	1	1	DUBIRAPHIA	470623050002	1	0	0
BIO-5	C	P	1	1	ACARINA	47021100	1	0	0
C-BIO-5	C	P	1	1	TANYTARSUS	470630014030	3	0	0
C-BIO-5	C	P	1	1	PLACOBDELLA PAPILLIFERA	450205002002001	1	0	0
C-BIO-5	C	P	1	1	ABLABESMYIA	470630014042	1	0	0
C-BIO-5	C	P	1	1	DERO DERO	450203005006007	2	0	0
C-BIO-5	C	P	1	1	AULODRILUS PIGUETI	450203004008001	2	0	0
C-BIO-5	C	P	1	1	NAIS	450203005008	1	0	0
C-BIO-5	C	P	1	1	TRIBELOS	470630014117	10	0	0
C-BIO-5	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	27	0	0
C-BIO-5	C	P	1	1	TUBIFICIDAE IMM. W	450203004 A	22	0	0
C-BIO-5	C	P	1	1	TANYPODINAE	470630014 C	1	0	0
C-BIO-5	C	P	1	1	CHIRONOMIDAE	470630014	0	1	0
C-BIO-5	C	P	1	1	HYDROBIIDAE	460102013	6	0	0
C-BIO-5	C	P	1	1	PLANORBIDAE	460108012	1	0	0
C-BIO-5	C	P	1	1	TANYPUS	470630014033	1	0	0
C-BIO-5	C	P	1	1	SPHAERIIDAE	460507046 A	61	0	0
C-BIO-5	C	P	1	1	DICROTENDIPES	470630014043	2	0	0
C-BIO-5	C	P	1	1	CLADOPELMA	470630014159	1	0	0
C-BIO-5	C	P	1	1	PROCLADIUS	470630014004	7	0	0
C-BIO-5	C	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	7	0	0
C-BIO-6		D	3	28	ELMIDAE	470623050	0	0	3
C-BIO-6		D	3	28	DERO DERO	450203005006007	1	0	0
C-BIO-6		D	3	28	LUMBRICULIDAE	450201001	2	0	0
C-BIO-6		D	3	28	STENOCHIRONOMUS	470630014029	2	0	0
C-BIO-6		D	3	28	TANYTARSUS	470630014030	16	0	0
C-BIO-6		D	3	28	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
C-BIO-6		D	3	28	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
BIO-6		D	3	28	PALAEMONETES PALUDOSUS	470534015003002	20	0	0
-BIO-6		D	3	28	TRICHOPTERA	470628	1	0	0
C-BIO-6		D	3	28	GASTROPODA	4601	1	0	0
C-BIO-6		D	3	28	ABLABESMYIA	470630014042	3	0	0
C-BIO-6		D	3	28	LABRUNDINIA	470630014103	1	0	0
C-BIO-6		D	3	28	STENELMIS	470623050001	0	0	2
C-BIO-6		D	3	28	CENTROPTILUM	470604002007	1	0	0
C-BIO-6		D	3	28	CHIRONOMIDAE	470630014	0	9	0
C-BIO-6		D	3	28	OXYETHIRA	470628005005	7	0	0
C-BIO-6		D	3	28	PELECYPODA	4605 A	3	0	0
C-BIO-6		D	3	28	GOMPHIDAE	470605003	4	0	0
C-BIO-6		D	3	28	PLANORBIDAE	460108012	1	0	0
C-BIO-6		D	3	28	COENAGRIONIDAE	470606003	6	0	0
C-BIO-6		D	3	28	HYDROBIIDAE	460102013	11	0	0
C-BIO-6		D	3	28	ELMIDAE	470623050	7	0	0
C-BIO-6		D	3	28	ASTACIDAE	470534093	2	0	0
C-BIO-6		D	3	28	BAETIS	470604002006	1	0	0
C-BIO-6		D	3	28	LEPTOCERIDAE	470628012	10	0	0
C-BIO-6		D	3	28	ARGIA	470606003009	2	0	0
C-BIO-6		D	3	28	DUBIRAPHIA	470623050002	0	0	1
C-BIO-6		D	3	28	ANCYRONYX VARIEGATA	470623050009001	1	0	0
C-BIO-6		D	3	28	PROCLADIUS	470630014004	1	0	0
C-BIO-6		D	3	28	CAENIS	470604011002	2	0	0
C-BIO-6		D	3	28	ANCYLIDAE	460108011	1	0	0
C-BIO-6		D	3	28	NEMERTEA	38	1	0	0
C-BIO-6		D	3	28	DICROTENDIPES	470630014043	4	0	0
C-BIO-7		D	3	28	TANYTARSUS	470630014030	9	0	0
BIO-7		D	3	28	DICROTENDIPES	470630014043	5	0	0
-BIO-7		D	3	28	BAETIS	470604002006	1	0	0
C-BIO-7		D	3	28	POLYPEDILUM ILLINOENSE	470630014036031	12	0	0
C-BIO-7		D	3	28	HEMERODROMIA	470630041004	2	0	0
C-BIO-7		D	3	28	DERO DERO	450203005006007	1	0	0
C-BIO-7		D	3	28	CHIRONOMIDAE	470630014	1	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
STC-BIO-7		D	3	28	LUMBRICULIDAE	450201001	1	0	0
STC-BIO-7		D	3	28	ANCYRONYX VARIEGATA	470623050009001	1	0	0
STC-BIO-7		D	3	28	ASTACIDAE	470534093	1	0	0
STC-BIO-7		D	3	28	PELECYPODA	4605 A	3	0	0
STC-BIO-7		D	3	28	TUBIFICIDAE IMM. W/O	450203004 B	1	0	0
STC-BIO-7		D	3	28	PALAEMONETES PALUDOSUS	470534015003002	3	0	0
STC-BIO-7		D	3	28	GASTROPODA	4601	3	0	0
STC-BIO-7		D	3	28	ELMIDAE	470623050	0	0	2
STC-BIO-7		D	3	28	ELMIDAE	470623050	4	0	0
STC-BIO-7		D	3	28	COENAGRIONIDAE	470606003	4	0	0
STC-BIO-7		D	3	28	CALOPTERYX	470606001004	2	0	0
STC-BIO-7		D	3	28	GOMPHIDAE	470605003	1	0	0
STC-BIO-7		D	3	28	POLYPEDILUM SCALAENUM	470630014036038	2	0	0
STC-BIO-7		D	3	28	OXYETHIRA	470628005005	3	0	0
STC-BIO-7		D	3	28	CHEUMATOPSYCHE	470628004002	3	0	0
STC-BIO-7		D	3	28	OECETIS	470628012004	8	0	0
STC-BIO-7		D	3	28	LEPTOCERIDAE	470628012	4	0	0
STC-BIO-7		D	3	28	TRICLADIDA	350109	1	0	0
STC-BIO-7		D	3	28	STENONEMA	470604001004	1	0	0
STC-BIO-7		D	3	28	DINEUTUS	470623010003	1	0	0
STC-BIO-7		D	3	28	HYDROPHILIDAE	470623016	1	0	0
STC-BIO-7		D	3	28	HYDROPTILIDAE	470628005	1	0	0
STC-BIO-7		D	3	28	TANYPODINAE	470630014 C	1	0	0
STC-BIO-7		D	3	28	TRIBELOS	470630014117	1	0	0
STC-BIO-7		D	3	28	STENOCHIRONOMUS	470630014029	6	0	0
STC-BIO-7		D	3	28	TRICHOPTERA	470628	1	0	0
STC-BIO-7		D	3	28	ABLABESMYIA	470630014042	2	0	0
STC-BIO-7		D	3	28	CHIRONOMIDAE	470630014	0	4	0
STC-BIO-R1		D	1	1	PHAENOPSECTRA	470630014152	1	0	0
STC-BIO-R1		D	1	1	STENELMIS	470623050001	0	0	2
STC-BIO-R1		D	1	1	CHIRONOMUS	470630014032	1	0	0
STC-BIO-R1		D	1	1	LYMNAEIDAE	460108010	2	0	0
STC-BIO-R1		D	1	1	ANCYLIDAE	460108011	4	0	0
STC-BIO-R1		D	1	1	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
STC-BIO-R1		D	1	1	COENAGRIONIDAE	470606003	3	0	0
STC-BIO-R1		D	1	1	PLANORBIDAE	460108012	1	0	0
STC-BIO-R1		D	1	1	CHIRONOMIDAE	470630014	0	1	0
STC-BIO-R1		D	1	1	TIPULIDAE	470630001	1	0	0
STC-BIO-R1		D	1	1	ASTACIDAE	470534093	1	0	0
STC-BIO-R1		D	1	1	ASELLUS	470531015001	3	0	0
STC-BIO-R1		D	1	1	AULODRILUS PIGUETI	450203004008001	4	0	0
STC-BIO-R1		D	1	1	CORDULIIDAE	470605006	17	0	0
STC-BIO-R1	A	P	1	1	DUBIRAPHIA	470623050002	1	0	0
STC-BIO-R1	A	P	1	1	LUMBRICULIDAE	450201001	8	0	0
STC-BIO-R1	A	P	1	1	AULODRILUS PIGUETI	450203004008001	5	0	0
STC-BIO-R1	A	P	1	1	BOTHRIONEURUM VEJDOVSKYANUM	450203004028001	2	0	0
STC-BIO-R1	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	11	0	0
STC-BIO-R1	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
STC-BIO-R1	A	P	1	1	CHIRONOMIDAE	470630014	0	1	0
STC-BIO-R1	A	P	1	1	DERO DERO	450203005006007	2	0	0
STC-BIO-R1	A	P	1	1	DICROTENDIPES	470630014043	1	0	0
STC-BIO-R1	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	25	0	0
STC-BIO-R1	A	P	1	1	PLANORBIDAE	460108012	3	0	0
STC-BIO-R1	A	P	1	1	ANCYLIDAE	460108011	5	0	0
STC-BIO-R1	A	P	1	1	CORDULIIDAE	470605006	2	0	0
STC-BIO-R1	A	P	1	1	COLLEMBOLA	470602	1	0	0
STC-BIO-R1	A	P	1	1	ASELLUS	470531015001	1	0	0
STC-BIO-R1	A	P	1	1	NATARSIA	470630014098	3	0	0
STC-BIO-R1	A	P	1	1	LABRUNDINIA	470630014103	1	0	0
STC-BIO-R1	A	P	1	1	NILOTANYPUS	470630014108	1	0	0
STC-BIO-R1	A	P	1	1	PHAENOPSECTRA	470630014152	1	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
TC-BIO-R1	A	P	1	1	SPHAERIIDAE	460507046 A	13	0	0
-BIO-R1	B	P	1	1	OXYETHIRA	470628005005	1	0	0
C-BIO-R1	B	P	1	1	ILYODRILUS TEMPLETONI	450203004006002	1	0	0
STC-BIO-R1	B	P	1	1	DUBIRAPHIA	470623050002	1	0	0
STC-BIO-R1	B	P	1	1	TUBIFICIDAE IMM. W	450203004 A	4	0	0
STC-BIO-R1	B	P	1	1	AULODRILUS PIGUETI	450203004008001	5	0	0
STC-BIO-R1	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
STC-BIO-R1	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	22	0	0
STC-BIO-R1	B	P	1	1	DICROTENDIPES	470630014043	1	0	0
STC-BIO-R1	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	25	0	0
STC-BIO-R1	C	P	1	1	NEMATODA	4301	1	0	0
STC-BIO-R1	C	P	1	1	COENAGRIONIDAE	470606003	1	0	0
STC-BIO-R1	C	P	1	1	AULODRILUS PIGUETI	450203004008001	1	0	0
STC-BIO-R1	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
STC-BIO-R1	C	P	1	1	TUBIFICIDAE IMM. W	450203004 A	4	0	0
STC-BIO-R1	C	P	1	1	LUMBRICULIDAE	450201001	26	0	0
WC-BIO-1		D	3	28	ANCYRONYX VARIEGATA	470623050009001	0	0	2
WC-BIO-1		D	3	28	DUBIRAPHIA	470623050002	1	0	0
WC-BIO-1		D	3	28	ANCYRONYX VARIEGATA	470623050009001	1	0	0
WC-BIO-1		D	3	28	STENELMIS	470623050001	3	0	0
WC-BIO-1		D	3	28	STENELMIS	470623050001	0	0	3
WC-BIO-1		D	3	28	ELMIDAE	470623050	9	0	0
WC-BIO-1		D	3	28	CAENIS	470604011002	5	0	0
WC-BIO-1		D	3	28	STENACRON	470604001017	2	0	0
WC-BIO-1		D	3	28	PELECYPODA	4605 A	4	0	0
WC-BIO-1		D	3	28	CERATOPOGONIDAE	470630010	1	0	0
WC-BIO-1		D	3	28	PSYCHODIDAE	470630003	1	0	0
WC-BIO-1		D	3	28	HYDROBIIDAE	460102013	9	0	0
-BIO-1		D	3	28	ANCYLIDAE	460108011	1	0	0
-BIO-1		D	3	28	ASELLUS	470531015001	23	0	0
WC-BIO-1		D	3	28	TRICLADIDA	350109	1	0	0
WC-BIO-1		D	3	28	GLOSSIPHONIIDAE	450205002	1	0	0
WC-BIO-1		D	3	28	CRANGONYX	470532057001	1	0	0
WC-BIO-1		D	3	28	BELOSTOMATIDAE	470621005	1	0	0
WC-BIO-1		D	3	28	TRIBELOS	470630014117	10	0	0
WC-BIO-1		D	3	28	DICROTENDIPES	470630014043	5	0	0
WC-BIO-1		D	3	28	STENOCHIRONOMUS	470630014029	1	0	0
WC-BIO-1		D	3	28	POLYPEDILUM SCALAENUM	470630014036038	3	0	0
WC-BIO-1		D	3	28	CHIRONOMINI	47063001401	2	0	0
WC-BIO-1		D	3	28	ABLABESMYIA	470630014042	1	0	0
WC-BIO-1		D	3	28	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
WC-BIO-1		D	3	28	DERO DERO	450203005006007	3	0	0
WC-BIO-1		D	3	28	DERO AULOPHORUS	450203005006 A	1	0	0
WC-BIO-1	A	H	102	186	PHAENOPSECTRA	470630014152	1	0	0
WC-BIO-1	A	H	1	1	DERO DERO	450203005006007	51	0	0
WC-BIO-1	A	H	102	186	CRICOTOPUS BICINCTUS	470630014025004	1	0	0
WC-BIO-1	A	H	102	186	POLYPEDILUM FALLAX	470630014036003	2	0	0
WC-BIO-1	A	H	102	186	CHIRONOMUS	470630014032	1	0	0
WC-BIO-1	A	H	1	1	HEMERODROMIA	470630041004	6	0	0
WC-BIO-1	A	H	1	1	HYDROBIIDAE	460102013	10	0	0
WC-BIO-1	A	H	102	186	CHIRONOMINI	47063001401	1	0	0
WC-BIO-1	A	H	102	186	ABLABESMYIA	470630014042	2	0	0
WC-BIO-1	A	H	102	186	PENTANEURA	470630014054	1	0	0
WC-BIO-1	A	H	102	186	TRIBELOS	470630014117	3	0	0
WC-BIO-1	A	H	1	1	STENACRON	470604001017	7	0	0
-BIO-1	A	H	102	186	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
-BIO-1	A	H	1	1	CHIRONOMIDAE	470630014	0	8	0
WC-BIO-1	A	H	102	186	PARATANYTARSUS	470630014091	1	0	0
WC-BIO-1	A	H	1	1	ANCYLIDAE	460108011	1	0	0
WC-BIO-1	A	H	102	186	DICROTENDIPES	470630014043	81	0	0
WC-BIO-1	A	H	1	1	GLOSSIPHONIIDAE	450205002	1	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
YWC-BIO-1	A	H	102	186	CRYPTOCHIRONOMUS	470630014035	1	0	0
YWC-BIO-1	A	H	102	186	TANYTARSUS	470630014030	5	0	0
YWC-BIO-1	A	H	1	1	ANCYRONYX VARIEGATA	470623050009001	2	0	0
YWC-BIO-1	A	H	1	1	CAENIS	470604011002	5	0	0
YWC-BIO-1	A	H	1	1	COENAGRIONIDAE	470606003	3	0	0
YWC-BIO-1	B	H	1	1	DERO DERO	450203005006007	7	0	0
YWC-BIO-1	B	H	1	1	TUBIFICIDAE IMM. W/O	450203004 B	1	0	0
YWC-BIO-1	B	H	101	152	CHIRONOMUS	470630014032	1	0	0
YWC-BIO-1	B	H	101	152	TRIBELOS	470630014117	2	0	0
YWC-BIO-1	B	H	1	1	ANCYRONYX VARIEGATA	470623050009001	0	0	1
YWC-BIO-1	B	H	101	152	TANYTARSUS	470630014030	1	0	0
YWC-BIO-1	B	H	1	1	STENACRON	470604001017	7	0	0
YWC-BIO-1	B	H	101	152	DICROTENDIPES	470630014043	90	0	0
YWC-BIO-1	B	H	1	1	CAENIS	470604011002	5	0	0
YWC-BIO-1	B	H	1	1	HYDROBIIDAE	460102013	2	0	0
YWC-BIO-1	B	H	1	1	DINEUTUS	470623010003	1	0	0
YWC-BIO-1	B	H	101	152	ABLABESMYIA	470630014042	3	0	0
YWC-BIO-1	B	H	1	1	GAMMARIDAE	470532021	1	0	0
YWC-BIO-1	B	H	1	1	GLOSSIPHONIIDAE	450205002	1	0	0
YWC-BIO-1	B	H	1	1	COENAGRIONIDAE	470606003	4	0	0
YWC-BIO-1	B	H	1	1	AESHNIDAE	470605001	1	0	0
YWC-BIO-1	B	H	1	1	TRICLADIDA	350109	4	0	0
YWC-BIO-1	B	H	1	1	HEMERODROMIA	470630041004	2	0	0
YWC-BIO-1	B	H	1	1	CHIRONOMIDAE	470630014	0	5	0
YWC-BIO-1	B	H	101	152	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
YWC-BIO-1	B	H	101	152	POLYPEDILUM FALLAX	470630014036003	3	0	0
YWC-BIO-1	C	H	1	1	PLANORBIDAE	460108012	1	0	0
YWC-BIO-1	C	H	1	1	CHIRONOMIDAE	470630014	0	6	0
YWC-BIO-1	C	H	1	1	ANCYRONYX VARIEGATA	470623050009001	0	0	1
YWC-BIO-1	C	H	1	1	STENACRON	470604001017	6	0	0
YWC-BIO-1	C	H	102	195	PHAENOPSECTRA	470630014152	2	0	0
YWC-BIO-1	C	H	1	1	CAENIS	470604011002	5	0	0
YWC-BIO-1	C	H	102	195	TANYTARSUS	470630014030	5	0	0
YWC-BIO-1	C	H	1	1	COENAGRIONIDAE	470606003	1	0	0
YWC-BIO-1	C	H	102	195	POLYPEDILUM SCALAENUM	470630014036038	3	0	0
YWC-BIO-1	C	H	1	1	TRICLADIDA	350109	2	0	0
YWC-BIO-1	C	H	102	195	DICROTENDIPES	470630014043	79	0	0
YWC-BIO-1	C	H	102	195	TRIBELOS	470630014117	2	0	0
YWC-BIO-1	C	H	1	1	DINEUTUS	470623010003	1	0	0
YWC-BIO-1	C	H	102	195	CHIRONOMINI	47063001401	1	0	0
YWC-BIO-1	C	H	102	195	ABLABESMYIA	470630014042	5	0	0
YWC-BIO-1	C	H	102	195	POLYPEDILUM FALLAX	470630014036003	1	0	0
YWC-BIO-1	C	H	102	195	POLYPEDILUM ILLINOENSE	470630014036031	2	0	0
YWC-BIO-1	C	H	102	195	ENDOCHIRONOMUS	470630014086	1	0	0
YWC-BIO-1	C	H	102	195	PARALAUTERBORNIELLA	470630014045	1	0	0
YWC-BIO-1	C	H	1	1	SLAVINA APPENDICULATA	450203005001001	1	0	0
YWC-BIO-1	C	H	1	1	DERO AULOPHORUS	450203005006 A	1	0	0
YWC-BIO-1	C	H	1	1	DERO DERO	450203005006007	7	0	0
YWC-BIO-1	C	H	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
YWC-BIO-1	C	H	1	1	HEMERODROMIA	470630041004	4	0	0
YWC-BIO-1	C	H	1	1	HYDROBIIDAE	460102013	10	0	0
YWC-BIO-1	A	P	1	1	CHIRONOMIDAE	470630014	0	2	0
YWC-BIO-1	A	P	1	1	CERATOPOGONIDAE	470630010	6	0	0
YWC-BIO-1	A	P	1	1	HYDROBIIDAE	460102013	2	0	0
YWC-BIO-1	A	P	1	1	PELECYPODA	4605 A	17	0	0
YWC-BIO-1	A	P	1	1	CAENIS	470604011002	1	0	0
YWC-BIO-1	A	P	1	1	ASELLUS	470531015001	10	0	[illegible]
YWC-BIO-1	A	P	1	1	PHYLOCENTROPUS	470628018006	1	0	0
YWC-BIO-1	A	P	1	1	DROMOGOMPHUS	470605003005	1	0	0
YWC-BIO-1	A	P	1	1	UNIONIDAE	460504002	3	0	0
YWC-BIO-1	A	P	1	1	LUMBRICULIDAE	450201001	5	0	0

IELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
-BIO-1	A	P	1	1	NAIDIDAE	450203005	1	0	0
-BIO-1	A	P	1	1	MICROTENDIPES	470630014027	1	0	0
WC-BIO-1	A	P	1	1	THIENEMANNIMYIA	470630014119	1	0	0
WC-BIO-1	A	P	1	1	DICROTENDIPES	470630014043	1	0	0
WC-BIO-1	A	P	1	1	STENELMIS	470623050001	10	0	0
WC-BIO-1	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
WC-BIO-1	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	53	0	0
WC-BIO-1	A	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	16	0	0
WC-BIO-1	A	P	1	1	CRYPTOCHIRONOMUS	470630014035	1	0	0
WC-BIO-1	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	2	0	0
WC-BIO-1	A	P	1	1	TRIBELOS	470630014117	2	0	0
WC-BIO-1	A	P	1	1	PARACLADOPELMA	470630014151	1	0	0
WC-BIO-1	A	P	1	1	CHIRONOMINI	47063001401	1	0	0
WC-BIO-1	A	P	1	1	TANYTARSUS	470630014030	1	0	0
WC-BIO-1	B	P	1	1	CHIRONOMIDAE	470630014	0	1	0
WC-BIO-1	B	P	1	1	STENELMIS	470623050001	0	0	1
WC-BIO-1	B	P	1	1	CRYPTOCHIRONOMUS	470630014035	2	0	0
WC-BIO-1	B	P	1	1	UNIONIDAE	460504002	1	0	0
WC-BIO-1	B	P	1	1	CERATOPOGONIDAE	470630010	3	0	0
WC-BIO-1	B	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	6	0	0
WC-BIO-1	B	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
WC-BIO-1	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
WC-BIO-1	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	2	0	0
WC-BIO-1	B	P	1	1	PHYLOCENTROPUS	470628018006	1	0	0
WC-BIO-1	B	P	1	1	LUMBRICULIDAE	450201001	1	0	0
WC-BIO-1	B	P	1	1	PELECYPODA	4605 A	4	0	0
WC-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
WC-BIO-1	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	10	0	0
-BIO-1	C	P	1	1	TANYPODINAE	470630014 C	2	0	0
WC-BIO-1	C	P	1	1	CHIRONOMUS	470630014032	1	0	0
WC-BIO-1	C	P	1	1	TRIBELOS	470630014117	3	0	0
WC-BIO-1	C	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	6	0	0
WC-BIO-1	C	P	1	1	LUMBRICULIDAE	450201001	7	0	0
WC-BIO-1	C	P	1	1	UNIONIDAE	460504002	1	0	0
WC-BIO-1	C	P	1	1	PELECYPODA	4605 A	51	0	0
WC-BIO-1	C	P	1	1	PLANORBIDAE	460108012	2	0	0
WC-BIO-1	C	P	1	1	CERATOPOGONIDAE	470630010	1	0	0
WC-BIO-1	C	P	1	1	HEXATOMA	470630001038	1	0	0
WC-BIO-1	C	P	1	1	HEMERODROMIA	470630041004	1	0	0
WC-BIO-2		D	3	28	HYDROPHILIDAE	470623016	0	0	2
WC-BIO-2		D	3	28	ELMIDAE	470623050	5	0	0
WC-BIO-2		D	3	28	DUBIRAPHIA	470623050002	0	0	1
WC-BIO-2		D	3	28	CAENIS	470604011002	1	0	0
WC-BIO-2		D	3	28	BELOSTOMATIDAE	470621005	1	0	0
WC-BIO-2		D	3	28	STENELMIS	470623050001	0	0	2
WC-BIO-2		D	3	28	ANCYRONYX VARIEGATA	470623050009001	2	0	0
WC-BIO-2		D	3	28	OECETIS	470628012004	6	0	0
WC-BIO-2		D	3	28	CHIRONOMIDAE	470630014	0	3	0
WC-BIO-2		D	3	28	STENACRON	470604001017	4	0	0
WC-BIO-2		D	3	28	COENAGRIONIDAE	470606003	16	0	0
WC-BIO-2		D	3	28	CALOPTERYX	470606001004	1	0	0
WC-BIO-2		D	3	28	LIBELLULIDAE	470605004	2	0	0
WC-BIO-2		D	3	28	GOMPHIDAE	470605003	1	0	0
WC-BIO-2		D	3	28	BOYERIA	470605001007	4	0	0
WC-BIO-2		D	3	28	ANCYLIDAE	460108011	6	0	0
-BIO-2		D	3	28	PELECYPODA	4605 A	1	0	0
-BIO-2		D	3	28	PALAEMONETES PALUDOSUS	470534015003002	7	0	0
WC-BIO-2		D	3	28	PLANORBIDAE	460108012	2	0	0
WC-BIO-2		D	3	28	PHYSELLA	460108013003	6	0	0
WC-BIO-2		D	3	28	HYDROBIIDAE	460102013	4	0	0
WC-BIO-2		D	3	28	ASELLUS	470531015001	5	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
YWC-BIO-2		D	3	28	TRICLADIDA	350109	1	0	0
YWC-BIO-2		D	3	28	ACARINA	47021100	2	0	0
YWC-BIO-2		D	3	28	DEROVATELLUS	470623008014	1	0	0
YWC-BIO-2		D	3	28	POLYPEDILUM ILLINOENSE	470630014036031	1	0	0
YWC-BIO-2		D	3	28	DICROTENDIPES	470630014043	1	0	0
YWC-BIO-2		D	3	28	TANYTARSUS	470630014030	8	0	0
YWC-BIO-2		D	3	28	STENOCHIRONOMUS	470630014029	2	0	0
YWC-BIO-2		D	3	28	STELECHOMYIA	470630014165	1	0	0
YWC-BIO-2		D	3	28	CHIRONOMINI	47063001401	1	0	0
YWC-BIO-2		D	3	28	PHAENOPSECTRA	470630014152	1	0	0
YWC-BIO-2		D	3	28	POLYPEDILUM SCALAENUM	470630014036038	3	0	0
YWC-BIO-2		D	3	28	ABLABESMYIA	470630014042	1	0	0
YWC-BIO-2		D	3	28	ELMIDAE	470623050	5	0	0
YWC-BIO-2		D	3	28	STENELMIS	470623050001	5	0	0
YWC-BIO-2		D	3	28	POLYCENTROPUS	470628018002	1	0	0
YWC-BIO-2	A	H	103	162	POLYPEDILUM FALLAX	470630014036003	1	0	0
YWC-BIO-2	A	H	103	162	ABLABESMYIA	470630014042	3	0	0
YWC-BIO-2	A	H	1	1	ARGIA	470606003009	1	0	0
YWC-BIO-2	A	H	103	162	PHAENOPSECTRA	470630014152	1	0	0
YWC-BIO-2	A	H	1	1	STENACRON	470604001017	2	0	0
YWC-BIO-2	A	H	103	162	POLYPEDILUM SCALAENUM	470630014036038	2	0	0
YWC-BIO-2	A	H	103	162	DICROTENDIPES	470630014043	77	0	0
YWC-BIO-2	A	H	103	162	TRIBELOS	470630014117	6	0	0
YWC-BIO-2	A	H	103	162	POLYPEDILUM ILLINOENSE	470630014036031	3	0	0
YWC-BIO-2	A	H	1	1	CAENIS	470604011002	2	0	0
YWC-BIO-2	A	H	1	1	TRICLADIDA	350109	1	0	0
YWC-BIO-2	A	H	103	162	TANYTARSUS	470630014030	6	0	0
YWC-BIO-2	A	H	1	1	CHIRONOMIDAE	470630014	0	2	0
YWC-BIO-2	A	H	103	162	CHIRONOMINI	47063001401	2	0	0
YWC-BIO-2	A	H	103	162	LABRUNDINIA	470630014103	2	0	0
YWC-BIO-2	A	H	1	1	DERO DERO	450203005006007	2	0	0
YWC-BIO-2	A	H	1	1	DERO AULOPHORUS	450203005006 A	1	0	0
YWC-BIO-2	A	H	1	1	NAIDIDAE	450203005	1	0	0
YWC-BIO-2	B	H	102	180	DICROTENDIPES	470630014043	49	0	0
YWC-BIO-2	B	H	1	1	PLANORBIDAE	460108012	1	0	0
YWC-BIO-2	B	H	102	180	TANYTARSUS	470630014030	25	0	0
YWC-BIO-2	B	H	1	1	STENELMIS	470623050001	0	0	1
YWC-BIO-2	B	H	102	180	TRIBELOS	470630014117	9	0	0
YWC-BIO-2	B	H	1	1	NAIDIDAE	450203005	1	0	0
YWC-BIO-2	B	H	1	1	PARALEPTOPHLEBIA	470604002009	2	0	0
YWC-BIO-2	B	H	1	1	DERO DERO	450203005006007	6	0	0
YWC-BIO-2	B	H	1	1	STENACRON	470604001017	6	0	0
YWC-BIO-2	B	H	102	180	CHIRONOMINI	47063001401	2	0	0
YWC-BIO-2	B	H	1	1	LIBELLULIDAE	470605004	4	0	0
YWC-BIO-2	B	H	102	180	ABLABESMYIA	470630014042	9	0	0
YWC-BIO-2	B	H	1	1	COENAGRIONIDAE	470606003	1	0	0
YWC-BIO-2	B	H	1	1	CHIRONOMIDAE	470630014	0	4	0
YWC-BIO-2	B	H	102	180	LABRUNDINIA	470630014103	2	0	0
YWC-BIO-2	B	H	102	180	POLYPEDILUM FALLAX	470630014036003	6	0	0
YWC-BIO-2	B	H	1	1	DERO AULOPHORUS	450203005006 A	1	0	0
YWC-BIO-2	B	H	1	1	ARGIA	470606003009	1	0	0
YWC-BIO-2	B	H	1	1	TRICLADIDA	350109	8	0	0
YWC-BIO-2	B	H	1	1	CERATOPOGONIDAE	470630010	1	0	0
YWC-BIO-2	C	H	1	1	DERO DERO	450203005006007	1	0	0
YWC-BIO-2	C	H	1	1	ANCYLIDAE	460108011	1	0	0
YWC-BIO-2	C	H	1	1	CHIRONOMIDAE	470630014	0	2	0
YWC-BIO-2	C	H	1	1	PARALEPTOPHLEBIA	470604002009	2	0	0
YWC-BIO-2	C	H	1	1	ABLABESMYIA	470630014042	5	0	0
YWC-BIO-2	C	H	1	1	LABRUNDINIA	470630014103	1	0	0
YWC-BIO-2	C	H	1	1	STENACRON	470604001017	8	0	0
YWC-BIO-2	C	H	1	1	POLYPEDILUM FALLAX	470630014036003	5	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
C-BIO-2	C	H	1	1	ARGIA	470606003009	1	0	0
C-BIO-2	C	H	1	1	CHIRONOMUS	470630014032	1	0	0
YWC-BIO-2	C	H	1	1	TANYTARSUS	470630014030	17	0	0
YWC-BIO-2	C	H	1	1	PHAENOPSECTRA	470630014152	3	0	0
YWC-BIO-2	C	H	1	1	DICROTENDIPES	470630014043	45	0	0
YWC-BIO-2	C	H	1	1	TRICLADIDA	350109	1	0	0
YWC-BIO-2	C	H	1	1	LIBELLULIDAE	470605004	1	0	0
YWC-BIO-2	C	H	1	1	TRIBELOS	470630014117	18	0	0
YWC-BIO-2	C	H	1	1	CAENIS	470604011002	1	0	0
YWC-BIO-2	C	H	1	1	PROCLADIUS	470630014004	1	0	0
YWC-BIO-2	C	H	1	1	PARACHIRONOMUS	470630014052	1	0	0
YWC-BIO-2	C	H	1	1	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
YWC-BIO-2	C	H	1	1	CHIRONOMINI	47063001401	8	0	0
YWC-BIO-2	C	H	1	1	CHIRONOMIDAE	470630014	1	0	0
YWC-BIO-2	A	P	1	1	ARGIA	470606003009	2	0	0
YWC-BIO-2	A	P	1	1	DICROTENDIPES	470630014043	2	0	0
YWC-BIO-2	A	P	1	1	PHYLOCENTROPUS	470628018006	1	0	0
YWC-BIO-2	A	P	1	1	LUMBRICULIDAE	450201001	2	0	0
YWC-BIO-2	A	P	1	1	NEMATODA	4301	1	0	0
YWC-BIO-2	A	P	1	1	TRIBELOS	470630014117	4	0	0
YWC-BIO-2	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	4	0	0
YWC-BIO-2	A	P	1	1	NEMERTEA	38	1	0	0
YWC-BIO-2	A	P	1	1	PLEUROCERIDAE	460102040	1	0	0
YWC-BIO-2	A	P	1	1	UNIONIDAE	460504002	8	0	0
YWC-BIO-2	A	P	1	1	TRICLADIDA	350109	1	0	0
YWC-BIO-2	A	P	1	1	CAENIS	470604011002	1	0	0
YWC-BIO-2	A	P	1	1	PLANORBIDAE	460108012	3	0	0
C-BIO-2	A	P	1	1	THIENEMANNIMYIA	470630014119	1	0	0
C-BIO-2	A	P	1	1	PELECYPODA	4605 A	22	0	0
YWC-BIO-2	A	P	1	1	DROMOGOMPHUS	470605003005	1	0	0
YWC-BIO-2	A	P	1	1	HYDROBIIDAE	460102013	6	0	0
YWC-BIO-2	A	P	1	1	CHIRONOMINI	47063001401	3	0	0
YWC-BIO-2	A	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	12	0	0
YWC-BIO-2	A	P	1	1	PARALAUTERBORNIELLA	470630014045	3	0	0
YWC-BIO-2	A	P	1	1	TANYTARSUS	470630014030	4	0	0
YWC-BIO-2	A	P	1	1	CHIRONOMIDAE	470630014	2	0	0
YWC-BIO-2	A	P	1	1	TANYPODINAE	470630014 C	1	0	0
YWC-BIO-2	A	P	1	1	TUBIFICIDAE IMM. W	450203004 A	1	0	0
YWC-BIO-2	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	25	0	0
YWC-BIO-2	A	P	1	1	CERATOPOGONIDAE	470630010	2	0	0
YWC-BIO-2	A	P	1	1	SIALIS	470627001001	1	0	0
YWC-BIO-2	A	P	1	1	LEPTOCERIDAE	470628012	2	0	0
YWC-BIO-2	A	P	1	1	PSYCHOMYIA FLAVIDA	470628003001001	1	0	0
YWC-BIO-2	A	P	1	1	POLYCENTROPODIDAE	470628018	1	0	0
YWC-BIO-2	A	P	1	1	DUBIRAPHIA	470623050002	7	0	0
YWC-BIO-2	A	P	1	1	STENELMIS	470623050001	12	0	0
YWC-BIO-2	A	P	1	1	ABLABESMYIA	470630014042	4	0	0
YWC-BIO-2	B	P	1	1	STENELMIS	470623050001	1	0	0
YWC-BIO-2	B	P	1	1	ELMIDAE	470623050	1	0	0
YWC-BIO-2	B	P	1	1	DUBIRAPHIA	470623050002	2	0	0
YWC-BIO-2	B	P	1	1	HEMERODROMIA	470630041004	2	0	0
YWC-BIO-2	B	P	1	1	ANCYLIDAE	460108011	2	0	0
YWC-BIO-2	B	P	1	1	CERATOPOGONIDAE	470630010	8	0	0
YWC-BIO-2	B	P	1	1	PLANORBIDAE	460108012	6	0	0
YWC-BIO-2	B	P	1	1	HYDROBIIDAE	460102013	5	0	0
C-BIO-2	B	P	1	1	PELECYPODA	4605 A	5	0	0
YWC-BIO-2	B	P	1	1	PHYLOCENTROPUS	470628018006	1	0	0
YWC-BIO-2	B	P	1	1	LEPTOCERIDAE	470628012	1	0	0
YWC-BIO-2	B	P	1	1	SIALIS	470627001001	2	0	0
YWC-BIO-2	B	P	1	1	LUMBRICULIDAE	450201001	3	0	0
YWC-BIO-2	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	17	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
YWC-BIO-2	B	P	1	1	UNIONIDAE	460504002	3	0	0
YWC-BIO-2	B	P	1	1	NAIDIDAE	450203005	1	0	0
YWC-BIO-2	B	P	1	1	ABLABESMYIA	470630014042	7	0	0
YWC-BIO-2	B	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	2	0	0
YWC-BIO-2	B	P	1	1	MICROTENDIPES	470630014027	2	0	0
YWC-BIO-2	B	P	1	1	DICROTENDIPES	470630014043	8	0	0
YWC-BIO-2	B	P	1	1	PROCLADIUS	470630014004	1	0	0
YWC-BIO-2	B	P	1	1	CHIRONOMINI	47063001401	5	0	0
YWC-BIO-2	B	P	1	1	TRIBELOS	470630014117	1	0	0
YWC-BIO-2	B	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	10	0	0
YWC-BIO-2	B	P	1	1	CRYPTOCHIRONOMUS	470630014035	1	0	0
YWC-BIO-2	B	P	1	1	TANYTARSUS	470630014030	1	0	0
YWC-BIO-2	C	P	1	1	HYDROBIIDAE	460102013	2	0	0
YWC-BIO-2	C	P	1	1	PLANORBIDAE	460108012	3	0	0
YWC-BIO-2	C	P	1	1	PELECYPODA	4605 A	10	0	0
YWC-BIO-2	C	P	1	1	SIALIS	470627001001	1	0	0
YWC-BIO-2	C	P	1	1	TANYTARSUS	470630014030	1	0	0
YWC-BIO-2	C	P	1	1	STENELMIS	470623050001	6	0	0
YWC-BIO-2	C	P	1	1	TRICLADIDA	350109	1	0	0
YWC-BIO-2	C	P	1	1	CAENIS	470604011002	1	0	0
YWC-BIO-2	C	P	1	1	PHYLOCENTROPUS	470628018006	1	0	0
YWC-BIO-2	C	P	1	1	ASELLUS	470531015001	3	0	0
YWC-BIO-2	C	P	1	1	CHIRONOMIDAE	470630014	0	1	0
YWC-BIO-2	C	P	1	1	DROMOGOMPHUS	470605003005	1	0	0
YWC-BIO-2	C	P	1	1	UNIONIDAE	460504002	3	0	0
YWC-BIO-2	C	P	1	1	ERPOBDELLIDAE	450205006	1	0	0
YWC-BIO-2	C	P	1	1	GAMMARIDAE	470532021	1	0	0
YWC-BIO-2	C	P	1	1	NEMERTEA	38	1	0	0
YWC-BIO-2	C	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	9	0	0
YWC-BIO-2	C	P	1	1	ABLABESMYIA	470630014042	1	0	0
YWC-BIO-2	C	P	1	1	TANYPODINAE	470630014 C	1	0	0
YWC-BIO-2	C	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	5	0	0
YWC-BIO-2	C	P	1	1	PARACHIRONOMUS	470630014052	1	0	0
YWC-BIO-2	C	P	1	1	TRIBELOS	470630014117	3	0	0
YWC-BIO-2	C	P	1	1	LABRUNDINIA	470630014103	1	0	0
YWC-BIO-2	C	P	1	1	DICROTENDIPES	470630014043	5	0	0
YWC-BIO-2	C	P	1	1	PROCLADIUS	470630014004	1	0	0
YWC-BIO-2	C	P	1	1	CRYPTOCHIRONOMUS	470630014035	2	0	0
YWC-BIO-2	C	P	1	1	MICROTENDIPES	470630014027	1	0	0
YWC-BIO-2	C	P	1	1	CERATOPOGONIDAE	470630010	12	0	0
YWC-BIO-2	C	P	1	1	ANCYRONYX VARIEGATA	470623050009001	1	0	0
YWC-BIO-2	C	P	1	1	DUBIRAPHIA	470623050002	1	0	0
YWC-BIO-2	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	27	0	0
YWC-BIO-R1		D	3	28	DUBIRAPHIA	470623050002	2	0	0
YWC-BIO-R1		D	3	28	PROGOMPHUS	470605003003	1	0	0
YWC-BIO-R1		D	3	28	CYRNELLUS FRATERNUS	470628018005001	1	0	0
YWC-BIO-R1		D	3	28	CERATOPOGONIDAE	470630010	1	0	0
YWC-BIO-R1		D	3	28	POLYPEDILUM SCALAENUM	470630014036038	1	0	0
YWC-BIO-R1		D	3	28	HEMERODROMIA	470630041004	1	0	0
YWC-BIO-R1		D	3	28	ELMIDAE	470623050	0	0	21
YWC-BIO-R1		D	3	28	STENONEMA	470604001004	6	0	0
YWC-BIO-R1		D	3	28	ANCYRONYX VARIEGATA	470623050009001	0	0	2
YWC-BIO-R1		D	3	28	PHYSELLA	460108013003	1	0	0
YWC-BIO-R1		D	3	28	STENELMIS	470623050001	18	0	0
YWC-BIO-R1		D	3	28	ANCYLIDAE	460108011	26	0	0
YWC-BIO-R1		D	3	28	CLADOTANYTARSUS	470630014041	2	0	0
YWC-BIO-R1		D	3	28	DUBIRAPHIA	470623050002	0	0	1
YWC-BIO-R1		D	3	28	STENELMIS	470623050001	0	0	20
YWC-BIO-R1		D	3	28	TANYTARSUS	470630014030	2	0	0
YWC-BIO-R1		D	3	28	STENOCHIRONOMUS	470630014029	1	0	0
YWC-BIO-R1		D	3	28	HYDROBIIDAE	460102013	4	0	0

ELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
BIO-R1		D	3	28	PLANORBIDAE	460108012	1	0	0
-BIO-R1		D	3	28	SPHAERIIDAE	460507046 A	2	0	0
C-BIO-R1		D	3	28	BOYERIA	470605001007	1	0	0
C-BIO-R1		D	3	28	CHEUMATOPSYCHE	470628004002	6	0	0
C-BIO-R1	A	H	1	1	PHAENOPSECTRA	470630014152	3	0	0
C-BIO-R1	A	H	1	1	ARGIA	470606003009	2	0	0
C-BIO-R1	A	H	1	1	TRICLADIDA	350109	7	0	0
C-BIO-R1	A	H	1	1	LYPE DIVERSA	470628003009001	14	0	0
C-BIO-R1	A	H	1	1	CHEUMATOPSYCHE	470628004002	1	0	0
C-BIO-R1	A	H	1	1	BAETIS	470604002006	1	0	0
C-BIO-R1	A	H	1	1	ANCYLIDAE	460108011	56	0	0
C-BIO-R1	A	H	1	1	SPHAERIIDAE	460507046 A	1	0	0
C-BIO-R1	A	H	1	1	PHYSELLA	460108013003	2	0	0
C-BIO-R1	A	H	1	1	TANYTARSUS	470630014030	17	0	0
C-BIO-R1	A	H	1	1	ABLABESMYIA	470630014042	4	0	0
C-BIO-R1	A	H	1	1	CLADOTANYTARSUS	470630014041	7	0	0
C-BIO-R1	A	H	1	1	CRYPTOCHIRONOMUS	470630014035	2	0	0
C-BIO-R1	A	H	1	1	PENTANEURA	470630014054	4	0	0
C-BIO-R1	A	H	1	1	POLYPEDILUM SCALAENUM	470630014036038	3	0	0
C-BIO-R1	A	H	1	1	BAETIS	470604002006	4	0	0
C-BIO-R1	A	H	1	1	ANCYRONYX VARIEGATA	470623050009001	2	0	0
C-BIO-R1	A	H	1	1	THIENEMANNIMYIA	470630014119	1	0	0
C-BIO-R1	A	H	1	1	DERO FURCATA	450203005006008	1	0	0
C-BIO-R1	A	H	1	1	DERO DERO	450203005006007	3	0	0
C-BIO-R1	A	H	1	1	STENELMIS	470623050001	6	0	0
C-BIO-R1	A	H	1	1	DUBIRAPHIA	470623050002	0	0	2
C-BIO-R1	A	H	1	1	ELMIDAE	470623050	0	0	1
-BIO-R1	A	H	1	1	STENELMIS	470623050001	0	0	14
BIO-R1	A	H	1	1	STENACRON	470604001017	6	0	0
C-BIO-R1	A	H	1	1	HEMERODROMIA	470630041004	11	0	0
C-BIO-R1	A	H	1	1	CERATOPOGONIDAE	470630010	1	0	0
C-BIO-R1	A	H	1	1	STENONEMA	470604001004	2	0	0
C-BIO-R1	B	H	1	1	CLADOTANYTARSUS	470630014041	3	0	0
C-BIO-R1	B	H	1	1	CERATOPOGONIDAE	470630010	1	0	0
C-BIO-R1	B	H	1	1	PLANORBIDAE	460108012	1	0	0
C-BIO-R1	B	H	1	1	HEMERODROMIA	470630041004	15	0	0
C-BID-R1	B	H	1	1	THIENEMANNIMYIA	470630014119	1	0	0
C-BIO-R1	B	H	1	1	LYPE DIVERSA	470628003009001	1	0	0
C-BIO-R1	B	H	1	1	STENONEMA	470604001004	13	0	0
C-BIO-R1	B	H	1	1	PHYSELLA	460108013003	1	0	0
C-BIO-R1	B	H	1	1	CHIRONOMIDAE	470630014	0	2	0
C-BIO-R1	B	H	1	1	ARGIA	470606003009	1	0	0
C-BIO-R1	B	H	1	1	LYPE DIVERSA	470628003009001	15	0	0
C-BIO-R1	B	H	1	1	CHIMARRA	470628002002	2	0	0
C-BIO-R1	B	H	1	1	ANCYRONYX VARIEGATA	470623050009001	2	0	0
C-BIO-R1	B	H	1	1	STENACRON	470604001017	5	0	0
C-BIO-R1	B	H	1	1	TRICLADIDA	350109	3	0	0
C-BIO-R1	B	H	1	1	DERO DERO	450203005006007	6	0	0
C-BIO-R1	B	H	1	1	STENELMIS	470623050001	10	0	0
C-BIO-R1	B	H	1	1	STENELMIS	470623050001	0	0	8
C-BIO-R1	B	H	1	1	CERATOPOGONIDAE	470630010	1	0	0
C-BIO-R1	B	H	1	1	ABLABESMYIA	470630014042	1	0	0
C-BIO-R1	B	H	1	1	TANYPODINAE	470630014 C	1	0	0
C-BIO-R1	B	H	1	1	PHAENOPSECTRA	470630014152	2	0	0
-BIO-R1	B	H	1	1	POLYPEDILUM FALLAX	470630014036003	1	0	0
BIO-R1	B	H	1	1	POLYPEDILUM SCALAENUM	470630014036038	6	0	0
C-BIO-R1	B	H	1	1	TANYTARSUS	470630014030	11	0	0
C-BIO-R1	B	H	1	1	ELMIDAE	470623050	0	0	2
C-BIO-R1	B	H	1	1	ANCYRONYX VARIEGATA	470623050009001	0	0	3
C-BIO-R1	B	H	1	1	ANCYLIDAE	460108011	50	0	0
C-BID-R1	C	H	1	1	PHAENOPSECTRA	470630014152	1	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
YWC-BIO-R1	C	H	1	1	CHIRONOMUS	470630014032	2	0	0
YWC-BIO-R1	C	H	1	1	SLAVINA APPENDICULATA	450203005001001	2	0	0
YWC-BIO-R1	C	H	1	1	THIENEMANNIMYIA	470630014119	2	0	0
YWC-BIO-R1	C	H	1	1	ANCYRONYX VARIEGATA	470623050009001	2	0	0
YWC-BIO-R1	C	H	1	1	CLADOTANYTARSUS	470630014041	5	0	0
YWC-BIO-R1	C	H	1	1	STENELMIS	470623050001	0	0	2
YWC-BIO-R1	C	H	1	1	POLYPEDILUM SCALAENUM	470630014036038	5	0	0
YWC-BIO-R1	C	H	1	1	ANCYRONYX VARIEGATA	470623050009001	0	0	2
YWC-BIO-R1	C	H	1	1	DICROTENDIPES	470630014043	2	0	0
YWC-BIO-R1	C	H	1	1	STENACRON	470604001017	2	0	0
YWC-BIO-R1	C	H	1	1	POLYPEDILUM FALLAX	470630014036003	3	0	0
YWC-BIO-R1	C	H	1	1	CERATOPOGONIDAE	470630010	37	0	0
YWC-BIO-R1	C	H	1	1	TANYTARSUS	470630014030	21	0	0
YWC-BIO-R1	C	H	1	1	TRICLADIDA	350109	5	0	0
YWC-BIO-R1	C	H	1	1	ABLABESMYIA	470630014042	2	0	0
YWC-BIO-R1	C	H	1	1	CHIRONOMIDAE	470630014	1	0	0
YWC-BIO-R1	C	H	1	1	PENTANEURA	470630014054	5	0	0
YWC-BIO-R1	C	H	1	1	STENELMIS	470623050001	4	0	0
YWC-BIO-R1	C	H	1	1	PLANORBIDAE	460108012	2	0	0
YWC-BIO-R1	C	H	1	1	TRICLADIDA	350109	1	0	0
YWC-BIO-R1	C	H	1	1	HYDROBIIDAE	460102013	3	0	0
YWC-BIO-R1	C	H	1	1	STENONEMA	470604001004	10	0	0
YWC-BIO-R1	C	H	1	1	PHYSELLA	460108013003	2	0	0
YWC-BIO-R1	C	H	1	1	CRYPTOCHIRONOMUS	470630014035	1	0	0
YWC-BIO-R1	C	H	1	1	ELMIDAE	470623050	0	0	1
YWC-BIO-R1	C	H	1	1	BAETIS	470604002006	3	0	0
YWC-BIO-R1	C	H	1	1	HEMERODROMIA	470630041004	16	0	0
YWC-BIO-R1	C	H	1	1	DERO	450203005006	2	0	0
YWC-BIO-R1	C	H	1	1	ANCYLIDAE	460108011	50	0	0
YWC-BIO-R1	C	H	1	1	BAETIS	470604002006	2	0	0
YWC-BIO-R1	C	H	1	1	STENONEMA	470604001004	1	0	0
YWC-BIO-R1	C	H	1	1	STENELMIS	470623050001	1	0	0
YWC-BIO-R1	C	H	1	1	LYPE DIVERSA	470628003009001	16	0	0
YWC-BIO-R1	A	P	1	1	PHAENOPSECTRA	470630014152	1	0	0
YWC-BIO-R1	A	P	1	1	CLADOTANYTARSUS	470630014041	5	0	0
YWC-BIO-R1	A	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	4	0	0
YWC-BIO-R1	A	P	1	1	TANYTARSUS	470630014030	2	0	0
YWC-BIO-R1	A	P	1	1	PENTANEURA	470630014054	2	0	0
YWC-BIO-R1	A	P	1	1	CERATOPOGONIDAE	470630010	8	0	0
YWC-BIO-R1	A	P	1	1	HEMERODROMIA	470630041004	1	0	0
YWC-BIO-R1	A	P	1	1	DUBIRAPHIA	470623050002	10	0	0
YWC-BIO-R1	A	P	1	1	STENELMIS	470623050001	33	0	0
YWC-BIO-R1	A	P	1	1	ABLABESMYIA	470630014042	3	0	0
YWC-BIO-R1	A	P	1	1	LUMBRICULIDAE	450201001	3	0	0
YWC-BIO-R1	A	P	1	1	GASTROPODA	4601	1	0	0
YWC-BIO-R1	A	P	1	1	ANCYLIDAE	460108011	4	0	0
YWC-BIO-R1	A	P	1	1	LIMNODRILUS HOFFMEISTERI	450203004005001	1	0	0
YWC-BIO-R1	A	P	1	1	SPHAERIIDAE	460507046 A	4	0	0
YWC-BIO-R1	A	P	1	1	GOMPHIDAE	470605003	5	0	0
YWC-BIO-R1	A	P	1	1	CORDULIIDAE	470605006	1	0	0
YWC-BIO-R1	A	P	1	1	CRYPTOCHIRONOMUS	470630014035	4	0	0
YWC-BIO-R1	A	P	1	1	CHEUMATOPSYCHE	470628004002	1	0	0
YWC-BIO-R1	A	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	7	0	0
YWC-BIO-R1	A	P	1	1	PHYLOCENTROPUS	470628018006	6	0	0
YWC-BIO-R1	A	P	1	1	ACARINA	47021100	1	0	0
YWC-BIO-R1	A	P	1	1	ELMIDAE	470623050	0	0	4
YWC-BIO-R1	A	P	1	1	ELMIDAE	470623050	0	0	1
YWC-BIO-R1	A	P	1	1	LUMBRICULIDAE	450201001	1	0	0
YWC-BIO-R1	A	P	1	1	DUBIRAPHIA	470623050002	0	0	4
YWC-BIO-R1	B	P	1	1	LUMBRICULIDAE	450201001	1	0	0
YWC-BIO-R1	B	P	1	1	ANCYLIDAE	460108011	3	0	0

FIELD NAME	REP	GEAR	DEN	NUM	SPECIES	SPECIES CODE	SPECIES COUNT	PUPAE COUNT	ADULT COUNT
'C-BIO-R1	B	P	1	1	SPHAERIIDAE	460507046 A	19	0	0
.-BIO-R1	B	P	1	1	HYDROBIIDAE	460102013	2	0	0
YWC-BIO-R1	B	P	1	1	PHYLOCENTROPUS	470628018006	5	0	0
YWC-BIO-R1	B	P	1	1	CHIRONOMIDAE	470630014	0	1	0
YWC-BIO-R1	B	P	1	1	CLADOTANYTARSUS	470630014041	8	0	0
YWC-BIO-R1	B	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	40	0	0
YWC-BIO-R1	B	P	1	1	PHAENOPSECTRA	470630014152	2	0	0
YWC-BIO-R1	B	P	1	1	LUMBRICULIDAE	450201001	2	0	0
YWC-BIO-R1	B	P	1	1	CRYPTOCHIRONOMUS	470630014035	2	0	0
YWC-BIO-R1	B	P	1	1	PARACLADOPELMA	470630014151	1	0	0
YWC-BIO-R1	B	P	1	1	TRICLADIDA	350109	2	0	0
YWC-BIO-R1	B	P	1	1	DUBIRAPHIA	470623050002	4	0	0
YWC-BIO-R1	B	P	1	1	STENELMIS	470623050001	45	0	0
YWC-BIO-R1	B	P	1	1	STENELMIS	470623050001	0	0	5
YWC-BIO-R1	B	P	1	1	ELMIDAE	470623050	0	0	7
YWC-BIO-R1	B	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	17	0	0
YWC-BIO-R1	B	P	1	1	PROGOMPHUS	470605003003	1	0	0
YWC-BIO-R1	B	P	1	1	CHEUMATOPSYCHE	470628004002	1	0	0
YWC-BIO-R1	B	P	1	1	PROCLADIUS	470630014004	1	0	0
YWC-BIO-R1	B	P	1	1	CERATOPOGONIDAE	470630010	2	0	0
YWC-BIO-R1	C	P	1	1	DUBIRAPHIA	470623050002	1	0	0
YWC-BIO-R1	C	P	1	1	LUMBRICULIDAE	450201001	1	0	0
YWC-BIO-R1	C	P	1	1	STENELMIS	470623050001	50	0	0
YWC-BIO-R1	C	P	1	1	PHYLOCENTROPUS	470628018006	4	0	0
YWC-BIO-R1	C	P	1	1	POLYPEDILUM SCALAENUM	470630014036038	31	0	0
YWC-BIO-R1	C	P	1	1	COENAGRIONIDAE	470606003	1	0	0
YWC-BIO-R1	C	P	1	1	CLADOTANYTARSUS	470630014041	8	0	0
YWC-BIO-R1	C	P	1	1	CHIRONOMIDAE	470630014	0	1	0
-BIO-R1	C	P	1	1	CRYPTOCHIRONOMUS	470630014035	2	0	0
.C-BIO-R1	C	P	1	1	SPHAERIIDAE	460507046 A	31	0	0
YWC-BIO-R1	C	P	1	1	CHIRONOMINI	47063001401	1	0	0
YWC-BIO-R1	C	P	1	1	CHEUMATOPSYCHE	470628004002	4	0	0
YWC-BIO-R1	C	P	1	1	DROMOGOMPHUS	470605003005	1	0	0
YWC-BIO-R1	C	P	1	1	ANCYLIDAE	460108011	7	0	0
YWC-BIO-R1	C	P	1	1	HYDROBIIDAE	460102013	2	0	0
YWC-BIO-R1	C	P	1	1	BAETIS	470604002006	1	0	0
YWC-BIO-R1	C	P	1	1	HEMERODROMIA	470630041004	3	0	0
YWC-BIO-R1	C	P	1	1	CERATOPOGONIDAE	470630010	1	0	0
YWC-BIO-R1	C	P	1	1	ACARINA	47021100	1	0	0
YWC-BIO-R1	C	P	1	1	STENELMIS	470623050001	0	0	2
YWC-BIO-R1	C	P	1	1	PROGOMPHUS	470605003003	1	0	0
YWC-BIO-R1	C	P	1	1	TUBIFICIDAE IMM. W/O	450203004 B	8	0	0
YWC-BIO-R1	C	P	1	1	ELMIDAE	470623050	0	0	4

APPENDIX J

APPENDIX J

PROTOCOLS AND RESULTS OF TOXICITY TESTING OF SOILS AND SEDIMENTS

TOXICITY EVALUATION OF THE SEDIMENT AND SOIL FROM THE CECIL FIELD NAVAL AIR STATION IN JACKSONVILLE, FLORIDA

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SLI Report #93-07-4874
SLI Study #13109-6104

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29 March 1994

FINAL REPORT

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1.0 INTRODUCTION

Decisions regarding the need for remediation and efficacy of remedial alternatives at sites containing waste materials often depend on information concerning the environmental risks posed by conditions at the site. As part of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) remedial alternatives or removal actions for hazardous waste sites should include an environmental impact studies. An essential part of the environmental impact studies is the assessment of the degree and spatial extent of contamination in sediments or/and soils at the site.

The hazards posed by a chemical when released to the environment are a function of the concentration achieved in water column, sediment and/or soil as a result of its use. The process of environmental assessment combines a knowledge of the properties which influence the behavior of a chemical in the environment with an understanding of the acute and chronic toxicity of the chemical and its potential for bioaccumulation.

The objective of this testing program was to evaluate toxicity of sediment samples to *Hyalella azteca* and *Ceriodaphnia dubia* and soil samples to *Eisenia foetida* and *Lactuca sativa*. All sediment and soil samples were collected from the Cecil Field Naval Air Station in Jacksonville, Florida.

All testing was conducted at Springborn Laboratories, Inc. (SLI), Environmental Sciences Division, Wareham, Massachusetts. All original raw data and the final report produced during this study are stored at Springborn.

2.0 MATERIALS AND METHODS

2.1 Sediment Testing

2.1.1 Test Samples - The 1 gallon sediment samples tested during the short-term chronic test with *Ceriodaphnia dubia* and the acute toxicity test with *Hyallela azteca* were

collected from the Cecil Field Naval Air Station, Jacksonville, Florida by ABB Environment Services, Inc. personnel. Sample IDs, the dates on which the samples were collected and the dates at which they were received at Springborn are as follows: samples STC-TOX-1, STC-TOX-2, STC-TOX-3, RC-TOX-R1 (reference control) and 2-TOX-2, collected on 22 June 1993, were received on 23 June 1993; sample LF-TOX-8 collected on 23 June 1993, and samples RC-TOX-9, RC-TOX-8, RC-TOX-8A, RC-TOX-7, RC-TOX-6 and 2-TOX-3 collected on 24 June 1993, were received on 25 June 1993; samples 5-TOX-2, 5-TOX-3, 5-TOX-4 and 5-TOX-5 collected on 25 June 1993, were received on 26 June 1993; and samples YWC-TOX-R1 (reference control) collected 28 June 1993 and samples 5-TOX-1 and STC-TOX-R1 (reference control) collected on 29 June 1993, were received on 30 June 1993. Samples 5-TOX-5 and STC-TOX-R1 recollected on 16 August 1993, and RC-TOX-R1 and 5-TOX-1 recollected on 17 August 1993, were received on 18 August 1993. Following receipt at Springborn, any samples that were not immediately tested were stored refrigerated at approximately 4 °C. Refrigerated samples were warmed to room temperature before use in the toxicity tests.

2.1.2 Short-Term Chronic Test with Daphnids

2.1.2.1 Study Protocol and Conduct - Procedures used in the short-term chronic test generally followed those described in the Springborn protocol entitled "Protocol for 7-day Static Renewal Effluent Toxicity Test With *Ceriodaphnia dubia* Following EPA Effluent Guidelines", Springborn Laboratories Protocol #: 030892/CD7D.HWS (Appendix I). The methods described in this protocol are based on method 1002.0 prescribed by the U.S. Environmental Protection Agency (1989).

The 7-day toxicity tests were conducted from 24 June to 1 July 1993 for test samples STC-TOX-1, STC-TOX-2, STC-TOX-3 and RC-TOX-R1; from 29 June to 6 July 1993 for test samples 2-TOX-2, 2-TOX-2 (pore water), RC-TOC-9 and RC-TOX-R1; from 1 to 8 July 1993 for test samples RC-TOX-6, RC-TOX-7, 2-TOX-3, 5-TOX-2, 5-TOX-3, 5-TOX-4, 5-TOX-5 and RC-TOX-R1; from 9 to 16 July 1993 for test samples LF-TOX-8, RC-TOX-8, RC-TOX-8A and RC-TOX-R1; from

2 to 9 July 1993 for test samples 5-TOX-1, STC-TOX-R1 and YWC-TOX-R1; and from 19 to 25 August 1993 for the second set of samples 5-TOX-5, STC-TOX-R1, 5-TOX-1 and RC-TOX-R1.

2.1.2.2 Test Organism - The test organism, *Ceriodaphnia dubia*, ≤ 9 hours old, was obtained from cultures maintained at Springborn. The culture system consisted of fifty to 100 30-mL plastic beakers, each of which contained 15 mL of culture medium and one adult daphnid. The culture beakers were placed on an insulated foam rack (2.5 cm thickness) which floated in a water bath designed to maintain the culture solutions at a temperature of 25 ± 1 °C. Daphnids for this test were cultured in well water with an initial total hardness of approximately 180 mg/L as $CaCO_3$. The total hardness of the culture water was gradually adjusted to a hardness of approximately 60 mg/L as $CaCO_3$ over several days. The total hardness was adjusted by addition of reagent grade chemicals according to the EPA method for hard water (EPA, 1989). *Ceriodaphnia dubia* cultures were fed suspensions of a unicellular green algae (*Selenastrum capricornutum*) and a mixture consisting of yeast, Trout Chow and Cerophyll (YCT) once daily. Nine hours before test initiation, all immature daphnids were removed from the culture beakers. Offspring produced over the first 7.5-hour interval were culled individually using a glass pipet to be used in the toxicity test.

2.1.2.3 Test Procedures - The water used during this study for the control solutions was Town of Wareham, Massachusetts well water which had been fortified based on the formula for soft water (ASTM, 1989) and filtered through an Amberlite XAD-7 resin column to remove any potential organic contaminants. This water was characterized as having total hardness and total alkalinity ranges as $CaCO_3$ of 48 mg/L and 29 to 33 mg/L, respectively, a pH range of 7.3 to 7.4 and a specific conductivity range of 170 to 220 µmhos/cm (Modified GFT Water Quality Log, Volume V). Representative samples of the source of the control water were analyzed monthly for total organic carbon (TOC) concentration. The TOC concentration of the control water source ranged from 1.0 mg/L to 1.1 mg/L for the months of June to August 1993 (TOC and TSS Master Log, Volume II). Several species of daphnids were maintained in water from the same source as the control water utilized in this study and have successfully survived

and reproduced over several generations. This, in combination with the previously mentioned analyses, confirms the acceptability of this water for bioassays.

The test vessels used during the *C. dubia* toxicity tests were 30-mL plastic beakers. Ten replicate test vessels, each containing 15 mL of test solution, were maintained for each elutriate sample. In addition, one set of control vessels was established for each set of samples tested and was maintained under the same exposure conditions as the test samples. The control solutions contained no elutriate.

The test was conducted in a temperature controlled water bath designed to maintain the temperature of the test solutions at 25 ± 1 °C. The test area had a photoperiod of 16 hours of light and 8 hours of darkness, and a light intensity within the range of 60 to 110 footcandles. Lighting was provided by Sylvania Growlux® and Cool White® fluorescent bulbs.

Prior to use in the toxicity test, an elutriate of each sample was prepared. Glassware used in the preparation of the elutriants was washed with detergent, rinsed 5 times with tap water placed in a clean 10% HCl acid bath for a minimum of 4 hours, rinsed 5 times with tap water and then thoroughly flushed with either distilled or deionized water. Elutriants were prepared in the following manner. Each sediment sample was passed through a 2.0 mm stainless steel sieve and then added to dilution water using a sediment to water ratio of 1:4. Each sediment-water mixture was then stirred continuously for 30 minutes with a Dayton laboratory mixer. Following stirring, each mixture was allowed to settle for 1 hour after which the supernatant was siphoned off and then centrifuged. The supernatant was then vacuum filtered using a Buchner funnel and a 0.45 μm filter to remove any remaining particulates. The resulting elutriant was then used as the exposure solutions. The remaining elutriant, which was used to renew the exposure solutions during the test, was stored refrigerated at an approximate temperature of 4 °C. The elutriants were heated to test temperature prior to use at each renewal period.

In addition to the elutriants prepared from the sediment samples, an additional elutriant sample was also prepared at the request of the Study Sponsor. This additional elutriant was prepared from the pore water removed from the 2-TOX-2 sediment sample. The overlying water layer present in the 2-TOX-2 sediment sample was first poured off of the sediment sample. The overlying water was then centrifuged and the supernatant was vacuum filtered using a Buchner funnel and a 0.45 μm filter to remove any remaining particulates. The resulting elutriant was then used to prepare exposure solutions.

The tests were initiated when one daphnid was added to each replicate test vessel. At each subsequent 24-hour interval, adult mortality, the number of offspring produced, biological observations and the physical characteristics of the test solutions were recorded. Surviving adult daphnids were carefully transferred to freshly prepared exposure solutions on a daily basis for all test samples with the exception of samples 2-TOX-2 and 2-TOX-2 pore water. Due to an inadequate amount of test sample, exposure solutions for these two samples were only renewed on test days 1, 2 and 5. Sample 2-TOX-3 was inadvertently not renewed on test day 6. Following transfer of the adult daphnids, offspring remaining in the old exposure solutions were counted. The old exposure solutions were discarded after counts of all offspring were completed. Daphnids were fed 100 μL of YCT suspension and 100 μL of a *S. capricornutum* suspension (3.0×10^7 cells/mL to 3.5×10^7 cells/mL) once daily following addition to the test vessels at test initiation and at each renewal period.

The dissolved oxygen concentration, pH, temperature and specific conductivity of each exposure solution was recorded daily. Dissolved oxygen and pH measurements were performed in both the new and old test solutions while temperature and specific conductivity measurements were performed in the new solutions only. Dissolved oxygen concentrations were measured using a Yellow Springs Instrument (YSI) Model #57 dissolved oxygen meter and probe; pH was measured with a Jenco Model 601A pH meter and combination electrode; daily temperature was measured with a Brooklyn alcohol thermometer; and specific conductivity was measured using a YSI Model 33 salinity-conductivity-temperature meter. In addition to daily temperature

measurements, the temperature of the surrounding water in the water bath was continuously monitored throughout the study using a Brooklyn Min/Max thermometer. Light intensity was measured with a General Electric type 214 light meter.

2.1.3 Acute Toxicity Test with Amphipods

2.1.3.1 Study Protocol and Conduct - Procedures used in the acute toxicity test followed those described in the Springborn protocol entitled "Protocol for Conduct of a Static-Renewal Toxicity Test with Amphipods *Hyallela azteca* to Meet U.S. EPA Guidelines for Bioassessment of Hazardous Water Site Sediment", Springborn Laboratories Protocol #: 030893/RCRA.Hyallela (Appendix I). The methods described in this protocol generally meet the standard procedures described in the ASTM Guideline for conducting Sediment Toxicity Tests with freshwater invertebrates (ASTM, 1991).

The 14-day toxicity tests were conducted from 23 June to 7 July 1993 for test samples STC-TOX-1, STC-TOX-2, STC-TOX-3 and RC-TOX-R1; from 28 June to 12 July 1993 for test samples RC-TOX-8, RC-TOX-8A, LF-TOX-8, 2-TOX-2, RC-TOX-9 and RC-TOX-R1; from 30 June to 14 July 1993 for test samples 2-TOX-3, 5-TOX-2, 5-TOX-3, 5-TOX-4, 5-TOX-5, RC-TOX-6, RC-TOX-7 and RC-TOX-R1; from 2 to 16 July 1993 for test samples 5-TOX-1, STC-TOX-R1 and YWC-TOX-R1; and from 23 August 1993 to 6 September 1993 for the second set of samples 5-TOX-5, STC-TOX-R1, RC-TOX-R1 and 5-TOX-1.

2.1.3.2 Test Organism - The test organism, *Hyallela azteca*, ≤ one week old, was obtained from cultures maintained at Springborn. The culture system was maintained under flow-through conditions and consisted of 5.5 gallon glass aquaria which contained approximately 10 L of culture water. The culture water was well water which had been supplemented with untreated water from the Town of Wareham, Massachusetts. The culture water had a total hardness within the range of 20 to 40 mg/L as $CaCO_3$, a pH range of 6.9 to 7.2, a specific conductivity within the range of 120 to 150 μmhos/cm and a temperature of 20 ± 2 °C. The culture area received a regulated photoperiod of 16 hours of light and 8 hours of darkness. Light at an intensity of 30

to 100 footcandles was provided at the culture solutions' surface by Durotest Vitalite® fluorescent bulbs.

The *H. azteca* cultures were fed a combination of Chocolate Food Suspension and Trout Chow Suspension, supplemented with Tetramin flake fish food for larger amphipods. The Chocolate Food Suspension was a mixture of Hartz® Dog Kisses (5 to 6 pieces) and distilled water (100 mL). The Trout Chow Suspension was a combination of Salmon Starter trout food (50 g) and dehydrated alfalfa (10 g) mixed with dilution water (2 L). Both suspensions were prepared at Springborn.

Seven to ten days before test initiation, adult amphipods were removed from the culture tanks and placed in 5.5-gallon glass aquaria containing 10 L of dilution water. Young produced were then removed daily from the aquaria using a glass pipet and transferred to 1-L glass beakers where they were held until test initiation.

2.1.3.3 Test Procedures - The overlying water used during this study was from the same source as the culture water. During the study period, this water was characterized as having total hardness and total alkalinity ranges as $CaCO_3$ of 25 to 26 mg/L and 21 to 22 mg/L, respectively, a pH range of 6.9 to 7.1 and a specific conductivity range of 110 to 120 μmhos/cm (Gravity Feed Tank Water Quality Analysis Logbook, Volume 8). Representative samples of the water source were analyzed monthly for total organic carbon (TOC) concentration. The TOC concentration of the water source for the month of July 1993 was 1.0 mg/L (TOC and TSS Master Log, Volume II). Several species of daphnids (a representative freshwater invertebrate generally recognized to be sensitive to chemical challenges) are maintained in water from the same source as the water utilized in this study and have successfully survived and reproduced over several generations. This, in combination with the previously mentioned analyses, confirms the acceptability of this water for bioassays.

The test vessels used during this test were 1000-mL beakers. Four replicate test vesse were maintained for each sediment sample. In addition, one set of washed sand control vessels was also established and maintained under the same exposure conditions as the sediment samples. The sand control vessels contained 200 mL of washed sand and 800 mL of overlying water. Results obtained on organisms exposed to the washed sand control were used to establish the health of the organisms used during the toxicity test and were not used for statistical analyses to establish significant effects.

The test was conducted in a temperature controlled water bath designed to maintain the temperature of the test solutions at 20 ± 1 °C. The test area had a photoperiod of 16 hours of light and 8 hours of darkness, with a light intensity range of 80 to 100 footcandles. Lighting was provided by Sylvania Growlux® and Cool White® fluorescent bulbs.

Prior to use in the toxicity tests all sediment samples were passed through a 2.0 mm stainless steel sieve to remove rocks, debris and large clumps of sediment. Each sediment sample was then divided between the replicate test vessels so that each test vessel container 200 mL of the respective sediment. The resultant sediment layer in each test vessel was 2 cm deep. Overlying water (800 mL) was then gently added to each replicate. The test was initiated when 20 amphipods were added to each replicate exposure vessel (80 amphipods per test sample and control). Test vessels were covered with plastic wrap and aeration was provided to each test vessel throughout the exposure period.

Renewal of the overlying water in each replicate test vessel was performed three times weekly by carefully siphoning off 75% (approximately 600 mL) of the existing overlying water and gently replacing it with fresh overlying water. Amphipods were fed a combination of Chocolate Food Suspension and Trout Chow Suspension daily at rates of 100 and 300 μL, respectively, per test vessel. Survival was determined at test termination by sieving the sediment from each replicate test vessel to remove the amphipods for observation.

At test initiation and at each subsequent 24-hour interval, biological observations and the physical characteristics of the test solutions were observed and recorded. The dissolved oxygen concentration, pH and temperature were measured in each replicate test vessel at test initiation (day 0), mid-term (day 7) and at test termination (day 14). On the remaining days of the exposure, these measurements were recorded in alternating test vessels of the test samples and the control. On renewal days, water quality measurements were made on old and new test sample solutions and the controls. At test initiation and termination, hardness, total alkalinity and specific conductivity were measured on composite samples of overlying water from each test sample and control. Dissolved oxygen concentrations were measured using a Yellow Springs Instrument (YSI) Model #57 dissolved oxygen meter and probe; pH was measured with a Jenco Model 601A pH meter and combination electrode; and daily temperature was measured with an Ertco alcohol thermometer. Total hardness concentration was measured by the EDTA titrimetric method. Total alkalinity concentration was determined by potentiometric titration to an endpoint of pH 4.5 (APHA *et. al.*, 1985). Specific conductance was measured using a YSI Model #33 conductivity meter. In addition, temperature of the test solutions was continuously monitored throughout the study using a Fisher Min/Max thermometer. Light intensity was measured with a General Electric type 214 light meter.

2.1.3.4 Statistical Analysis - At test termination, survival for each test sample was statistically compared to the performance of the reference control organisms to establish significant effects. Results were first analyzed using a t-test. If different variances were observed then Welch's t-test was used to establish significant differences. All statistical analyses were performed at the 95% level of certainty.

2.2 Terrestrial Testing

2.2.1 Test Samples - The soil samples tested during the subacute toxicity test with earthworms (*Eisenia foetida*) and the seed germination toxicity test with lettuce (*Lactuca sativa*) seeds were collected from the Cecil Field Naval Air Station, Jacksonville, Florida by ABB Environmental Services, Inc. personnel. Sample IDs, the dates on which the samples were

collected and the dates on which they were received at Springborn are as follows: sample E (reference control), collected 19 July 1993, and samples 1SS09, 1SS12, 1SS13, 1SS14, 2 1SS10, 1SS11 and 2SS10, collected on 22 July 1993 were received on 23 July 1993; sa 1SS08, 1SS06, 1SS03, 1SS02, 1SS01, 1SS04, 1SS05, 2SS06, 2SS05 and 2SS04 were col on 21 July 1993 and received on 22 July 1993; and samples 1SS07, 1SS15, 2SS07, 2 2SS01, 2SS02 and 2SS03 were collected on 23 July 1993 and received on 27 July 1993 samples CF17SS10, CF17SS11, CF17SS3, CF17SS6, CF17SS8, CF17SS9 and CF17SS1 collected on 12 February 1994 and received on 15 February 1994; samples CF5SS6, C CF5SS2, CF5SS8 and CF5SS9 were collected on 24 February 1994 and received on 1 1994; samples CF5SS13, CF5SS14, CF5SS15, CF5SS26, CF5SS20, CF5SS19, CF CF5SS23 and CF5SS24 were collected on 25 February 1994 and received on 1 Marc sample CF5SS31 was collected on 26 February 1994 and received on 1 March 1994. sample was received in two 1-gallon plastic bottles. Upon receipt at Springborn, all samples that were not tested immediately were stored refrigerated at approximately 5 °C. Refrigerated samples were warmed to test temperature before use in the toxicity tests. Samples 1SS03, 1SS12, CF17SS9, CF17SS12, CF5SS31, CF5SS20 and CF5SS22 were wet upon receipt and wer dried before use. These samples were air dried by first removing the overlying water present. Each sample was then spread out on a plastic tray and allowed to air dry for approximately 24 hours.

Prior to use in the toxicity tests, each test and reference control soil sample was pressed through a 64 mm stainless steel sieve to remove rock and debris. Large clumps of soil present in the samples were pressed through the sieve. The moisture fraction, water holding capacity (WHC) and pH were then determined for each soil sample. The moisture fraction was determined by drying 125 g of each soil sample in an oven at a temperature of 103 to 105 °C for 24 hours. To determine the WHC of each soil sample, a piece of filter paper (Whatman, 185 mm) was placed in a funnel and moistened with 9.0 mL of deionized water. The funnel containing the filter paper was then weighed. One hundred gram aliquots of each soil sample were weighed into individual 250 mL glass beakers to which 100 mL of deionized water was then added and mixed.

The resulting soil slurries were added to the funnels containing the filter paper and an initial weight was obtained. Each funnel was covered with aluminum foil and allowed to drip for three hours. After three hours, the funnel, filter paper and soil samples were again weighed to determined the amount of water retained by the soil sample. The amount of water retained in each soil sample was considered the 100% WHC. From the results obtained, the amount of water needed to be added to each soil sample to establish the desired WHC (75% for the earthworm toxicity test and 85% for the seed germination test) was calculated. Any soil sample which contained greater than the desired WHC was tested at the WHC at which it was received with the exception of samples air dried. To determine the pH of each soil sample, 25 mL of deionized water was added to a 25 g sample of each soil sample and stirred with a glass rod. The resultant slurry was allowed to settle for 5 minutes after which the pH was determined and recorded.

2.2.2 Subacute Toxicity Test with Earthworms

2.2.2.1 Study Protocol and Conduct - Procedures used in the 14-day subacute toxicity test with earthworms followed those described in the Springborn protocol entitled "Protocol for the Conduct of a 14-Day Earthworm Subacute Toxicity Test to Meet U.S. EPA Guidelines for Bioassessment of Hazardous Waste Site Soil", Springborn Laboratories Protocol #: 030893/RCRA.EW (Appendix I). The methods described in this protocol generally meet the standard procedures described in the protocol for short term toxicity screening of hazardous waste site soil (Greene *et.al.*, 1989) with the following exceptions:

1. The protocol states that 500 mL glass beakers are used for test vessels. However, during testing of all samples, 400 mL polypropylene disposable beakers were used.
2. The protocol states that the artificial control soil is moistened to 25-35 percent moisture. During testing, control soil was moistened to 75 percent water holding capacity, which is only equivalent to approximately 16 percent moisture.
3. The protocol states samples are sieved with a 1 mm sieve. All samples were sieved with a 1/4 inch (64 mm) stainless steel sieve, however.

4. The protocol states that adult earthworms, 250-500 mg wet weight, are used for testing. For samples received on 15 February 1994, earthworms weighed an average of 163 - 248 mg wet weight at test initiation.

5. Percent moisture for samples received on 15 February 1994 were inadvertently not determined on test days 7 and 14.

6. The protocol states that testing temperature is 20 ± 2°C. However, on day 7 for samples received on 1 March 1994, a temperature of 23°C was recorded for control 3 and CF5SS6. On day 14, the temperature in CF5SS2, CF5SS9 and CF5SS8 was 17°c.

It is our opinion that these deviations did not impact the outcome of the study.

2.2.2.2 Test Organism - The earthworms (*Eisenia foetida*) used to test samples received in July 1993, SLI Lot # 93A49, were approximately 2 months old and were originally obtained from the Carolina Biological Supply Company, Burlington, North Carolina on 15 June 1993. Species identification was verified at Springborn based on Reynolds (1977). Upon receipt at Springborn, the earthworms were added to four culture vessels, each consisting of 1.6 kg Magic Worm Bedding® peat moss (Magic Products, Inc.), 0.50 kg composted cattle manure (dry weight) and approximately three liters of NANOpure® water which provided a moisture content of approximately 75%. The pH of the medium was determined to be 6.2 after mixing the components in a Hobart® (Model A-200) mixer and was not adjusted. The culture medium was prepared on the day the earthworms were received. Culture vessels consisted of plastic containers (36 cm height X 24 cm length x 24 cm width) and lids. The earthworms were maintained in the four culture vessels for approximately five weeks before test initiation. The vessels were partially submerged in a temperature controlled water bath designed to maintain the cultures at a temperature of 20 ± 2 °C.

The earthworms (*Eisenia foetida*) used to test samples received on 15 February 1994, SLI Lot # 93A91, were approximately 2 months old and were originally obtained from the Carolina Biological Supply Company, Burlington, North Carolina on 14 November 1993. Species

identification was verified at Springborn based on Reynolds (1977). Upon receipt at Springborn, the earthworms were added to two culture vessels, each consisting of 1.6 kg Magic Worm Bedding® peat moss (Magic Products, Inc.), 0.50 kg composted cattle manure (dry weight) and approximately three liters of NANOpure® water which provided a moisture content of approximately 75%. The pH of the medium was determined to be 6.2 after mixing the components in a Hobart® (Model A-200) mixer and was not adjusted. The culture medium was prepared prior to receipt of the earthworms. Culture vessels consisted of plastic containers (36 cm height X 24 cm length x 24 cm width) and lids. The earthworms were maintained in the four culture vessels for approximately three months and were fed composted cattle manure throughout the maintenance period. Earthworms were acclimated to artificial control soil for 48 hours prior to test initiation. The vessels were partially submerged in a temperature controlled water bath designed to maintain the cultures at a temperature of 20 ± 2 °C.

The earthworms (*Eisenia foetida*) used to test samples received on 1 March 1994, SLI Lot # 94A23, were approximately 2 months old and were originally obtained from the Carolina Biological Supply Company, Burlington, North Carolina on 18 February 1994. Species identification was verified at Springborn based on Reynolds (1977). Upon receipt at Springborn, the earthworms were added to two culture vessels, each consisting of 9.6 kg Magic Worm Bedding® peat moss (Magic Products, Inc.) and approximately nine liters of NANOpure® water which provided a moisture content of approximately 75%. The pH of the medium was determined to be 6.9 after mixing the components in a Hobart® (Model A-200) mixer and was not adjusted. The culture medium was prepared the day before the earthworms were received. Culture vessels consisted of plastic containers (62 cm height X 42 cm length x 26 cm width) and lids. After six days, three kg of composted cattle manure (dry weight) was mixed into each culture. The earthworms were maintained in two culture vessels for approximately two weeks before test initiation. Earthworms were acclimated to artificial control soil for 24 hours prior to test initiation. The vessels were partially submerged in a temperature controlled water bath designed to maintain the cultures at a temperature of 20 ± 2 °C.

2.2.2.3 Reference Test - Reference toxicant (2-chloroacetamide) tests we conducted with earthworms at the same time as the toxicity tests with the soil samples. During the reference tests, earthworms were exposed to 2-chloroacetamide concentrations of 10, 20, 40 and 79 mg/kg. Three replicate vessels were established for each concentration with each replicate containing 10 earthworms (30 earthworms per concentration). Exposure conditions for the reference tests were the same as those established during the tests with the soil samples. At the termination of the reference tests, percent mortality ranged from 100% in the 79 mg/kg treatment level to 0% in the 10 mg/kg treatment level. The 14-day LC50 values for the reference tests were estimated by nonlinear interpolation to be 43, 36 and 56 mg/kg (95% confidence interval calculated by binomial probability to be 38 to 49 mg/kg, 31 to 41 mg/kg and 40 to 79 mg/kg, respectively).

2.2.2.4 Test Procedures - The artificial soil medium used for the controls during the earthworm toxicity tests consisted of 70% industrial sand, 20% Kaolin clay and 10% sphagnum peat (finely ground). The appropriate volume of each component was measured and the components were mixed together using a Hobart Model A-200 mixer. The artificial soil wa moistened to 75 % water holding capacity. The moisture content of the artificial soil medium wa measured to be approximately 16% following 24 hours of drying at 80 °C which was below the expected range (25 to 35%) for this medium. However, 16% is acceptable for earthworm survival.

The 14-day subacute toxicity tests were conducted from 28 July 1993 to 11 August 1993, from 17 February to 3 March 1994 and from 3 March to 17 march 1994. Test vessels were 400-mL polypropylene disposable beakers which were covered with lids. The lids were perforated to allow air exchange. Four replicate test vessels were established for each test sample and control. The control vessel contained artificial soil medium and was maintained under the same exposure conditions as the test samples.

The test was conducted in a temperature-controlled water bath designed to maintain the temperature of the test soil at 20 ± 2 °C. The test area had a photoperiod of 24 hours light and

0 hours darkness, with a light intensity within the range of 30 to 100 footcandles. Lighting was provided by Sylvania Inc. incandescent and Duro-Test Inc. Vita-Lite® fluorescent bulbs.

At test initiation, 250 g (dry weight) of each soil sample and the controls was added to the respective test vessels and wetted to 75% water holding capacity, except for samples already greater than 75% water holding capacity. The earthworms to be used in the test were first isolated from the culture. Ten earthworms at a time were then impartially removed, rinsed in distilled water, blotted dry and weighed. The average weight per individual was calculated from the group weight. Groups of ten earthworms were then randomly assigned to each vessel and placed on the soil surface. This procedure was repeated until each test vessel contained ten organisms. Earthworms were not fed during the exposure. The ratio of samples per control for samples received in July 1993, on 15 February 1994 and 1 March 1994 was nine to one, seven to one and seven and eight to one, respectively.

Earthworm mortality and health assessments were performed on test days 7 and 14. Mortality was assessed by emptying the test medium onto a tray, sorting the earthworms from the medium and then testing their reaction to a mechanical stimulus at the anterior end. Mortality is defined as a lack of visible movement after gentle mechanical stimulation is applied. The general health of the earthworms was assessed, and recorded, by observing color changes, lethargy, softness, coiling, shortening, lengthening, lesions and the presence of cocoons. At test termination, the average weight of the earthworms was determined on a per replicate basis for the surviving organisms.

Soil moisture content, pH and temperature were measured in each test vessel of the test samples and the controls on day 0 (test initiation), day 7 and day 14 (test termination). The pH of the soils was measured with a LaMotte Model HA pH meter and combination electrode, and daily temperature was measured with a Brooklyn alcohol thermometer. In addition to daily temperature measurements, the temperature of the surrounding water in the water bath was

continuously monitored throughout the study using a Fisher Min/Max thermometer. Light intensity was measured with a General Electric type 214 light meter.

At termination of the samples received on 15 February 1994 and 1 March 1994, live earthworms were frozen from each replicate test vessel with the exception of CF5SS4. On day 7, 100% of the earthworms in sample CF5SS4 were dead and were not able to be separated from the soil. Therefore, the entire contents of each CF5SS4 replicate vessel was frozen. These tissue samples will be sent to the Study Sponsor.

2.2.2.5 Statistical Analysis - At test termination, mortality and percent weight loss or gain data for earthworms exposed to each soil sample was determined. Mortality observed among earthworms exposed to the soil samples was compared to the mortality of the respective control sample using Fisher's Exact test. Mortality was only analyzed for those samples in which the mean sample mortality was less than the mean mortality of the respective control. Percent weight loss or gain of earthworms exposed to all soil samples was compared to the percent weight loss of earthworms exposed to the respective control using a t-test.

2.2.3 Seed Germination Toxicity Test with Lettuce

2.2.3.1 Study Protocol and Conduct - Procedures used in the seed germination toxicity test followed those described in the Springborn protocol entitled "Protocol for Conduct of a 120-Hour Seed Germination Toxicity Test Following U.S. EPA Guidelines for Bioassessment of Hazardous Water Site Soil", Springborn Laboratories Protocol #: 030893/RCRA SG (Appendix I). The procedures in this protocol generally follow those described by Greene *et. al.* (1989).

2.2.3.2 Test Species - The lettuce (*Lactuca sativa*, variety Buttercrunch) seeds used in testing program in July 1993 were obtained from the Park Seed Company (Lot # LA 06, packed 2 February 1993) on 10 June 1993. The seeds used for the testing program conducted in February and March were obtained from the same source (Lot #RA08 packed in January 1994) on9 February 1994. Upon receipt at Springborn the seeds were assigned SLI Lot # S-693-

2. Percent germination for lot LA 06 and RA 08 determined by the supplier was 95% and 91%, respectively.

2.2.3.3 Reference Test - A 120-hour reference toxicant (2-chloroacetamide) test was conducted concurrently with the soil sample toxicity tests. During the reference test, lettuce seeds were exposed to 2-chloroacetamide concentrations of 3.75, 7.5, 15, 30 and 60 mg/kg. Three replicate vessels were established for each concentration with each replicate containing 20 seeds (60 seeds per concentration). Exposure conditions for the reference test were the same as those established during the tests with the soil samples. At the termination of the reference test conducted on 29 July 1993, percent germination ranged from 100% in the 3.75 mg/kg treatment level to 0% in the 60 mg/kg treatment level. The 120-hour LC50 value for the reference test was calculated by moving average angle analysis to be 25 mg/kg (95% confidence interval of 22 to 28 mg/kg). The reference test conducted on 18 February 1994, resulted in 90% germination in the 3.75 mg/kg treatment level and 0% in the 60 mg/kg treatment level. The 120-hour LC50 value for the reference test was calculated by moving average angle analysis to be 17 mg/kg (95% confidence interval of 15 to 20 mg/kg).

2.2.3.4 Test Procedures - The 120-hour soil toxicity tests were conducted from 29 July to 3 August 1993, from 17 February to 22 February 1994 and from 4 March to 9 March 1994. The test vessels used during this study were Pyrex brand plastic Petri dishes (150 mm diameter, 15 mm height). Three replicate test vessels were maintained for each soil sample. In addition, sand control vessels were also established and maintained under the same exposure conditions as the soil samples. The control vessels contained washed silica sand only and no test soil. The washed silica sand was obtained from the Wedron Company (Lot # 10-2-92 ant #11-2-94). The silica sand had a mesh size of 200, a pH of 7.5 and 6.4 containing 0.169% and 0.1783% organic matter, respectively. One set of control vessels was established for every five soil samples with the exception of the fifth control set. The fifth control set was established in conjunction with the last seven soil samples. All comparisons to determine significant effects for the soil samples were made using the respective sand controls.

Each replicate test vessel contained the equivalent of 100 g (dry weight) of the respective soil sample or control sand. Forty seeds were then distributed to each replicate test vessel and pressed into the soil using the bottom of a glass beaker. The seeds in each replicate test vessel were then covered with 90 g of silica sand. The appropriate amount of distilled water was then added to each Petri dish to obtain a water holding capacity of 85% and the dish was placed inside a plastic bag. The plastic bag was expanded with air and securely sealed. This system provided a stable relative humidity throughout the exposure. The Petri dishes were then randomly positioned within an environmental growth chamber.

The test environment growth chamber was designed to maintain the temperature of the soils at 24 ± 2 °C. A photoperiod of 16 hours of light and 8 hours of darkness, with a light intensity range of 410 to 1000 footcandles was maintained within the test area. Lighting was provided by Sylvania Inc. clear 25 watt incandescent bulbs, and Duro-Test Inc. Vita-Lite® and Sylvania Daylight® fluorescent bulbs.

Temperature was measured in one replicate of each soil sample and the controls at test initiation and at each 24-hour interval until test termination. The pH was measured in one replicate of each soil sample and the controls at test initiation and termination. Temperature was measured with an Ertco alcohol thermometer; pH was measured with a LaMotte Model HA pH meter and combination electrode. Light intensity was measured with an IL 1350 Radiometer/Photometer.

2.2.3.5 Statistical Analysis - At test termination the percent germination for lettuce seeds exposed to each test sample and sand control was determined. For any test sample in which the resultant percent germination was less than the germination of the respective control, then that data was statistically compared to the control data using a t-test. Data for test samples for which the percent germination was equal to or greater than that of the respective control were not statistically analyzed.

3.0 RESULTS

3.1 Short-Term Chronic Test with Daphnids

A summary of the water quality characteristics conducted with the elutriate samples is presented in Table 1, while a summary of the biological results (percent survival and reproduction) from the short-term chronic tests with *Ceriodaphnia dubia* is presented in Tables 2 and Table 3, respectively.

In general, the majority of the elutriate samples from the sediments collected at the Cecil Field Naval Air Station were not toxic to *C. dubia*. Survival of daphnids was affected (<80) only in four samples (STC-TOX-3; 2-TOX-2; RC-TOX-7; 5-TOX-4), while daphnid reproduction, expressed as the mean number of offspring/female, was affected (<14) in eight samples (STC-TOX-2; STC-TOX-3; 2-TOX-2; RC-TOX-7; 5-TOX-3; 5-TOX-4; 5-TOX-5; 5-TOX-1). It is important to note that the response of *C. dubia* to the samples collected and tested twice during this program (i.e., 5-TOX-1; 5-TOX5; STC-TOX-R1 and RC-TOX-R1) was similar. Summaries of the tests conducted with *C. dubia* are presented in Appendix II.

3.2 Acute Toxicity Test with Amphipods

A summary of the water quality characteristics conducted with the sediment samples is presented in Table 4, while a summary of the biological results from the acute tests with *Hyallela azteca* is presented in Table 5.

In general, the majority of the sediment samples collected at the Cecil Field Naval Air Station were not toxic to *H. azteca*. Survival of amphipods was affected only in six samples (STC-TOX-1; STC-TOX-3; 2-TOX-2; 5-TOX-3; 5-TOX-4; 5-TOX-1). It is important to note that the response of *H. azteca* to the samples collected and tested twice during this program (i.e., 5-TOX-1; 5-TOX5; STC-TOX-R1 and RC-TOX-R1) was identical. Summaries of the tests conducted with *H. azteca* are presented in Appendix III.

3.3 Subacute Toxicity Test with Earthworms

A summary of the soil quality characteristics conducted with the soil samples is presented in Table 6, while a summary of the biological results (mortality and percent weight change) from the tests with *Eisenia foetida* is presented in Tables 7 and 8, respectively.

The soil samples collected at the Cecil Field Naval Air Station were not toxic to *E. foetida* with one exception. After 14-days of exposure 100% mortality was recorded in sample CF5SS4. The earthworms exposed to the soil samples produced cocoons in several test chambers and generally gained more weight then the earthworms in the control soil, indicating good health. Summaries of the tests conducted with *Eisenia foetida* are presented in Appendix IV.

3.4 Seed Germination Toxicity Test with Lettuce

A summary of the soil quality characteristics conducted with the soil samples is presented in Table 9, while a summary of the biological results from the tests with *Lactuca sativa* is presented in Table 10.

In general, all of the soil samples collected at the Cecil Field Naval Air Station were not toxic to *L. sativa*, with the exception of BSS01 and CF5SS4. Although germination of lettuce was statistically different in five samples (BSS01, 1SS06, 2SS04, CF5SS4 and CF5SS13) compared to the respective control samples, only two samples BSS01 and CF5SS4 substantially affected germination of the lettuce. The germination in two samples 1SS06 and 2SS04 samples exceeded 80 percent, while in sample CF5SS13 was 79 percent, therefore it is believed that germination of lettuce was not affected by the exposure to these samples. Summaries of the tests conducted with *L. sativa* are presented in Appendix V.

4.0 DISCUSSION

The results generated from the short-term chronic test with the elutriate and the acute sediment test with amphipods were similar. Daphnids and amphipods were not affected in twelve samples. In samples STC-TOX-3 and 5-TOX-4 both species were affected equally. In samples STC-TOX-2, 5-TOX-1, and 5-TOX-3, daphnid reproduction and amphipod survival were affected. In one sediment sample, STC-TOX-1, amphipods only were affected (Table 11).

The soil samples (with the exception of BSS01 and CF5SS4) were not toxic to either the earthworm or the lettuce (Table 12).

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TABLES

Table 1. **Water quality parameters (dissolved oxygen, pH, temperature and specific conductivity) measured in the exposure solutions during the short-term static renewal toxicity tests with *Ceriodaphnia dubia*.**

Test Sample	Dissolved Oxygen Concentration (mg/L)	pH	Temperature (°C)	Specific Conductivity (µmhos/cm)
Test Dates: 24 June to 1 July 1993				
Control	7.4 - 8.8	7.1 - 7.8	24 - 26	190 - 210
RC-TOX-R1	7.3 - 9.6	6.7 - 7.1	24 - 26	150 - 170
STC-TOX-1	6.8 - 9.3	6.4 - 7.0	24 - 26	130 - 150
STC-TOX-2	7.1 - 9.4	5.5 - 7.0	24 - 26	130 - 150
STC-TOX-3	6.7 - 8.9	5.3 - 6.6	24 - 26	130 - 150
Test Dates: 29 June to 6 July 1993				
Control	7.3 - 9.2	7.4 - 7.6	24 - 26	190 - 200
RC-TOX-R1	7.7 - 12.4	6.5 - 6.9	24 - 26	150
2-TOX-2 (pore water)	8.1 - 10.6	7.0 - 7.8	24 - 26	110
2-TOX-2	8.1 - 10.8	6.3 - 6.9	24 - 26	130
RC-TOX-9	7.7 - 12.6	7.1 - 7.5	24 - 26	190 - 210
Test Dates: 1 to 8 July 1993				
Control	7.6 - 9.2	7.5 - 7.7	24 - 26	200
RC-TOX-R1	7.7 - 11.8	5.1 - 6.7	24 - 26	150
RC-TOX-6	4.4 - 12.2	6.7 - 7.1	24 - 26	150 - 160
RC-TOX-7	5.3 - 12.4	7.0 - 7.3	24 - 26	190
2-TOX-3	7.4 - 12.4	6.8 - 7.1	24 - 26	150
5-TOX-2	7.6 - 12.2	6.1 - 6.9	24 - 26	140 - 150
5-TOX-3	7.7 - 12.0	5.4 - 6.6	24 - 26	140
5-TOX-4	7.5 - 12.4	5.4 - 6.6	24 - 26	140
5-TOX-5	7.6 - 11.6	5.0 - 6.5	24 - 26	150

Table 1. **Continued. Water quality parameters (dissolved oxygen, pH, temperature and specific conductivity) measured in the exposure solutions during the short-term static renewal toxicity tests with *Ceriodaphnia dubia*.**

Test Sample	Dissolved Oxygen Concentration (mg/L)	pH	Temperature (°C)	Specific Conductivity (µmhos/cm)
Test Dates: 2 to 9 July 1993				
Control	7.6 - 9.3	7.3 - 7.6	24 - 26	190 - 200
STC-TOX-R1	5.3 - 11.6	7.3 - 7.8	24 - 26	200 - 210
YWC-TOX-R1	4.8 - 12	2.1 - 7.6	24 - 26	170 - 180
5-TOX-1	4.2 - 11.3	5.1 - 7.4	24 - 26	140 - 150
Test Dates: 9 to 16 July 1993				
Control	7.6 - 8.2	7.2 - 7.8	24 - 26	170 - 200
RC-TOX-R1	6.9 - 9.4	7.2 - 7.5	24 - 26	150 - 180
RC-TOX-8	6.8 - 9.3	7.0 - 7.4	24 - 26	150 - 170
RC-TOX-8A	6.9 - 8.7	7.0 - 7.4	24 - 26	140 - 170
LF-TOX-8	7.2 - 9.3	6.7 - 7.2	24 - 26	130 - 150
Test Dates: 19 to 25 August 1993				
Control	7.4 - 8.2	7.5 - 8.0	24 - 25	200 - 210
RC-TOX-R1	7.3 - 9.0	7.5 - 8.1	24 - 26	180 - 200
5-TOX-1	7.0 - 9.3	7.6 - 8.1	24 - 26	150 - 170
5-TOX-5	7.0 - 9.3	7.7 - 8.1	24 - 26	140 - 170
STC-TOX-R1	7.1 - 9.0	7.6 - 8.0	24 - 25	220 - 250

Table 2. **Continued. Percent survival observed for each elutriate and control sample at the termination of the short-term static renewal toxicity tests with *Ceriodaphnia dubia*.**

Test Sample	Percent Survival										
	A	B	C	D	E	F	G	H	I	J	Mean
Test Dates: 2 to 9 July 1993											
Control	100	100	100	100	100	—[a]	100	100	100	100	100
STC-TOX-R1	100	100	100	100	100	100	100	100	100	100	100
YWC-TOX-R1	100	100	0	100	100	100	100	0	100	100	80
NO 5-TOX-1	100	100	100	100	100	100	100	100	100	100	100
Test Dates: 9 to 16 July 1993											
Control	100	100	100	100	100	100	100	100	100	100	100
RC-TOX-R1	100	100	100	100	100	100	100	100	100	100	100
RC-TOX-8	100	100	100	100	100	100	100	100	100	100	100
RC-TOX-8A	100	100	100	100	100	100	100	100	100	100	100
LF-TOX-8	100	100	100	100	100	100	100	100	100	100	100
Test Dates: 19 to 25 August 1993											
Control	100	100	100	100	100	100	100	100	100	100	100
RC-TOX-R1	100	100	100	100	100	100	100	100	100	100	100
* 5-TOX-1	0	100	100	100	100	100	100	0	100	100	80
* 5-TOX-5	100	100	100	100	100	100	100	100	100	100	100
STC-TOX-R1	100	100	100	0	100	100	100	100	100	100	90

[a] Organism observed missing from this replicate on day 1 of the exposure. Therefore, mean calculation was based on a total of 9 females.

Table 2. **Percent survival observed for each elutriate and control sample at the termination of the short-term static renewal toxicity tests with *Ceriodaphnia dubia*.**

Test Sample	Percent Survival										
	A	B	C	D	E	F	G	H	I	J	Mean
Test Dates: 24 June to 1 July 1993											
Control	100	100	100	100	100	100	100	100	100	100	100
RC-TOX-R1	100	100	100	100	100	100	100	100	100	100	100
STC-TOX-1	100	100	0	100	100	100	100	100	100	100	90
STC-TOX-2	100	100	100	100	0	0	100	100	100	100	80
STC-TOX-3	0	100	100	0	100	0	100	0	100	0	50
Test Dates: 29 June to 6 July 1993											
Control	100	100	100	100	100	100	100	0	100	100	90
RC-TOX-R1	100	100	100	100	100	100	100	100	100	100	100
2-TOX-2 (pore water)	100	100	100	100	100	100	100	100	100	100	100
2-TOX-2	0	100	100	100	100	100	0	100	100	0	70
RC-TOX-9	100	100	100	100	100	100	100	100	100	100	100
Test Dates: 1 to 8 July 1993											
Control	100	100	100	100	100	100	100	100	100	0	90
RC-TOX-R1	100	100	100	100	100	100	100	100	100	0	90
RC-TOX-6	100	100	100	0	100	100	100	100	100	100	90
RC-TOX-7	0	0	0	100	0	100	0	100	0	0	30
2-TOX-3	100	100	100	0	100	100	100	100	100	100	90
5-TOX-2	100	100	100	100	100	100	100	100	100	100	100
5-TOX-3	100	100	100	0	100	100	100	100	100	0	80
5-TOX-4	100	0	0	100	100	100	100	0	100	0	60
5-TOX-5	100	100	100	0	100	100	100	100	100	100	90

Table 3. **Reproduction (offspring/female) observed for each elutriate and control sample at the termination of the short-term static renewal toxicity tests with *Ceriodaphnia dubia*.**

Test Sample	Number of Offspring/Female										
	A	B	C	D	E	F	G	H	I	J	Mean
Test Dates: 24 June to 1 July 1993											
Control	22	21	18	20	20	23	21	20	16	19	20
RC-TOX-R1	24	25	26	21	27	26	26	25	25	20	25
STC-TOX-1	19	16	0	18	18	13	15	11	17	20	15
STC-TOX-2	10	3	5	15	3	5	13	7	13	3	8
STC-TOX-3	7	14	10	0	15	0	11	0	6	2	7
Test Dates: 29 June to 6 July 1993											
Control	18	17	18	15	15	17	16	9	20	16	16
RC-TOX-R1	4	7	19	21	19	17	20	20	10	17	15
2-TOX-2 (pore water)	11	15	17	16	17	12	17	9	14	13	14
2-TOX-2	8	13	21	15	11	9	0	14	17	0	11
RC-TOX-9	14	14	12	22	22	18	22	16	17	16	17
Test Dates: 1 to 8 July 1993											
Control	17	16	8	14	10	10	20	14	16	9	13
RC-TOX-R1	21	15	12	21	18	15	17	17	15	0	15
RC-TOX-6	7	14	20	0	13	13	14	21	21	21	14
RC-TOX-7	0	0	0	17	0	14	0	18	0	0	5
2-TOX-3	18	21	15	0	18	20	18	20	19	17	17
5-TOX-2	21	16	18	18	17	15	17	16	11	16	17
5-TOX-3	8	11	12	0	18	10	11	12	7	0	9
5-TOX-4	11	0	2	2	13	12	7	17	11	4	8
5-TOX-5	6	13	14	0	10	14	12	10	10	15	10

Table 3. Continued. Reproduction (offspring/female) observed for each elutriate and control sample at the termination of the short-term static renewal toxicity tests with *Ceriodaphnia dubia*.

Test Sample	Number of Offspring/Female										
	A	B	C	D	E	F	G	H	I	J	Mean
Test Dates: 2 to 9 July 1993											
Control	21	19	20	6	23	0	25	24	18	28	20
STC-TOX-R1	22	20	13	15	11	13	15	12	15	17	15
YWC-TOX-R1	21	24	4	24	26	24	20	0	21	21	19
5-TOX-1	13	17	9	11	9	3	19	11	10	10	11
Test Dates: 9 to 16 July 1993											
Control	25	22	17	17	24	17	24	12	19	22	20
RC-TOX-R1	29	23	38	0	24	16	23	20	23	27	22
RC-TOX-8	33	35	30	19	35	22	27	29	15	26	27
RC-TOX-8A	30	20	14	24	22	20	20	26	21	26	22
LF-TOX-8	12	15	12	16	22	29	29	19	24	29	21
Test Dates: 19 to 25 August 1993											
Control	13	18	15	19	22	22	22	28	25	22	21
RC-TOX-R1	15	20	14	16	18	12	23	8	19	16	16
5-TOX-1	3	9	5	12	16	15	18	4	15	18	12
5-TOX-5	11	9	9	8	17	15	14	10	0	15	11
STC-TOX-R1	11	12	14	0	12	22	13	23	18	22	15

Table 4. Water quality parameters (dissolved oxygen, pH, temperature, total alkalinity, total hardness, specific conductivity) measured in the exposure solutions during the 14-day static acute renewal toxicity tests with *Hyallela azteca*.

Test Sample	Dissolved Oxygen Concentration (mg/L)	pH	Temperature (°C)	Total Hardness (mg/L as $CaCO_3$)	Total Alkalinity (mg/L as $CaCO_3$)	Specific Conductivity (µmhos/cm)
Test Dates: 23 June to 7 July 1993						
STC-TOX-1	7.0 - 8.9	6.7 - 7.4	19 - 21	28 - 32	18	100 - 110
STC-TOX-2	7.3 - 8.8	6.8 - 7.3	19 - 21	24 - 28	16 - 18	110
STC-TOX-3	7.3 - 8.7	6.5 - 7.2	19 - 21	24 - 28	16 - 18	100 - 110
RC-TOX-R1	7.5 - 9.4	6.8 - 7.6	19 - 21	28 - 32	18 - 22	100 - 130
Test Dates: 28 June to 12 July 1993						
RC-TOX-8	7.8 - 9.0	6.8 - 7.4	20 - 21	28 - 32	18	120 - 150
RC-TOX-8A	6.8 - 9.0	6.8 - 7.4	20 - 21	28 - 32	18 - 20	120 - 150
LF-TOX-8	7.6 - 9.0	6.7 - 7.4	20 - 21	24 - 32	18	120 - 150
2-TOX-2	7.5 - 9.0	6.8 - 7.4	20 - 21	32 - 36	18	120 - 150
RC-TOX-9	7.2 - 8.8	6.8 - 7.4	20 - 21	36	20 - 24	120 - 150
RC-TOX-R1	7.8 - 9.0	6.9 - 7.3	20 - 21	28 - 32	18	120 - 150
Sand Control	7.4 - 8.9	6.7 - 7.5	20 - 21	32 - 36	18 - 30	130 - 150

Table 4. **Continued. Water quality parameters (dissolved oxygen, pH, temperature, total alkalinity, total hardness, specific conductivity) measured in the exposure solutions during the 14-day static acute renewal toxicity tests with *Hyallela azteca*.**

Test Sample	Dissolved Oxygen Concentration (mg/L)	pH	Temperature (°C)	Total Hardness (mg/L as $CaCO_3$)	Total Alkalinity (mg/L as $CaCO_3$)	Specific Conductivity (µmhos/cm)
Test Dates: 30 June to 14 July 1993						
2-TOX-3	5.5 - 9.1	6.8 - 7.5	19 - 20	28 - 32	18 - 20	100 - 130
5-TOX-2	8.2 - 9.0	6.7 - 7.5	19 - 20	16 - 20	24 - 32	100 - 120
5-TOX-3	8.1 - 9.0	6.6 - 7.4	19 - 20	24 - 28	16	100 - 120
5-TOX-4	7.4 - 9.1	6.6 - 7.4	19 - 20	24 - 28	14 - 18	100 - 110
5-TOX-5	7.6 - 9.0	6.5 - 7.4	19 - 20	24 - 28	14	100 - 120
RC-TOX-6	7.5 - 9.0	6.6 - 7.4	19 - 20	28 - 32	18	100 - 130
RC-TOX-7	7.4 - 9.2	6.8 - 7.4	19 - 20	28 - 32	18	100 - 130
RC-TOX-R1	7.5 - 9.1	6.8 - 7.4	19 - 20	28	18 - 20	100 - 130
Test Dates: 2 to 16 July 1993						
STC-TOX-R1	7.8 - 9.4	6.8 - 7.7	19 - 20	36	20 - 26	130 - 150
YWC-TOX-R1	5.8 - 9.3	6.8 - 7.7	19 - 20	32 - 36	20 - 30	120 - 130
5-TOX-1	7.5 - 9.4	6.9 - 7.7	19 - 20	32 - 44	18 - 20	120 - 130
Test Dates: 23 August to 6 September 1993						
5-TOX-1	7.0 - 8.9	7.3 - 8.1	19 - 20	28	20 - 22	100 - 110
5-TOX-5	6.5 - 9.0	7.3 - 8.1	19 - 20	28 - 32	18 - 20	100
STC-TOX-R1	6.5 - 9.0	7.3 - 8.0	19 - 20	32 - 36	20 - 22	100
RC-TOX-R1	6.6 - 8.9	7.2 - 8.1	19 - 20	28	20	100

Table 5. **Percent mortality observed for each sediment sample at the termination the 14-day static acute renewal toxicity tests with *Hyallela azteca*.**

Test Sample	Percent Mortality				
	Rep A	Rep B	Rep C	Rep D	Mean
Test Dates: 23 June to 7 July 1993					
STC-TOX-1	100	100	100	100	100[a]
STC-TOX-2	20	0	25	50	24
STC-TOX-3	85	70	85	80	80[a]
RC-TOX-R1	0	5	0	0	1
Test Dates: 28 June to 12 July 1993					
RC-TOX-8	0	0	5	0	1
RC-TOX-8A	5	0	0	5	3
LF-TOX-8	10	0	0	0	3
2-TOX-2	20	35	5	10	18[b]
RC-TOX-9	10	5	0	0	4
RC-TOX-R1	0	0	0	0	0
Sand control	0	0	5	10	4
Test Dates: 30 June to 14 July 1993					
2-TOX-3	10	10	0	5	6
5-TOX-2	0	0	0	0	0
5-TOX-3	60	70	45	80	64[c]
5-TOX-4	20	25	45	25	29[c]
5-TOX-5	0	0	0	0	0
RC-TOX-6	10	0	0	0	3
RC-TOX-7	0	0	0	5	1
RC-TOX-R1	0	20	5	15	10

Table 5. **Continued. Percent mortality observed for each sediment sample at the termination the 14-day static acute renewal toxicity tests with *Hyallela azteca*.**

Test Sample	Percent Mortality				
	Rep A	Rep B	Rep C	Rep D	Mean
Test Dates: 2 to 16 July 1993					
STC-TOX-R1	0	5	0	0	1
YWC-TOX-R1	0	0	0	0	0
5-TOX-1	70	90	90	85	84[d]
Test Dates: 23 August to 6 September 1993					
5-TOX-1	60	100	65	80	76[e]
5-TOX-5	20	15	0	5	10
STC-TOX-R1	0	0	5	0	1
RC-TOX-R1	10	10	0	0	5

[a] Statistically different as compared to the reference control (RC-TOX-R1, test dates 23 June to 7 July 1993).
[b] Statistically different as compared to the reference control (RC-TOX-R1, test dtes 28 June 1993 to 12 July 1993).
[c] Statistically different as compared to the reference control (RC-TOX-R1, test dates 30 June to 14 July 1993).
[d] Statistically different as compared to the reference control (STC-TOX-R1, test dates 2 to 16 July 1993).
[e] Statistically different as compared to the reference control (RC-TOX-R1, test dates 23 August to 6 September 1993).

Table 6. **Soil quality parameters (pH, temperature and percent moisture) measured in the exposure soils during the 14-day toxicity tests with earthworms *Eisenia foetida*.**

Test Sample	pH	Temperature (°C)	Moisture (%)
Control #1	5.9 - 6.4[a]	20 - 21	15 - 19
1SS01	4.8 - 5.7	20 - 21	10 - 13
1SS02	5.1 - 5.7	19 - 21	18 - 20
1SS03	5.2 - 5.3	20 - 21	21
1SS04	5.4 - 5.8	20 - 21	8.8 - 11
1SS05	5.8 - 6.4	20 - 21	12 - 13
1SS06	5.1 - 5.6	19 - 21	11 - 14
1SS08	5.6 - 6.4	19 - 21	20 - 22
2SS05	5.7 - 5.8	20 - 21	11 - 12
2SS06	5.5 - 6.2	19 - 21	8.3 - 15
Control #2	6.0 - 6.5	19 - 21	16 - 17
BSS01 (Test #1)	4.8 - 5.7	20 - 21	7.2 - 7.8
BSS01 (Test #2)	4.5 - 4.9	20 - 21	8.2 - 8.7
1SS09	4.8 - 5.5	20 - 21	16 - 18
1SS10	5.5 - 6.2	20 - 22	12 - 17
1SS12	5.0 - 5.7	20 - 21	15 - 24
1SS13	4.8 - 5.9	20 - 21	16 - 18
1SS14	4.2 - 4.5	21	14 - 15
2SS04	5.6 - 5.7	20 - 22	7.2 - 7.3

Table 6. **Continued. Soil quality parameters (pH, temperature and percent moisture) measured in the exposure soils during the 14-day toxicity tests with earthworms *Eisenia foetida*.**

Test Sample	pH	Temperature (°C)	Moisture (%)
2SS09	5.3 - 6.0	20 - 22	22 - 23
Control #3	6.0 - 6.6	18 - 22	14 - 15
1SS07	5.3 - 5.8	21	15 - 17
1SS11	5.4 - 6.0	20 - 21	10 - 12
1SS15	5.1 - 5.5	20 - 21	8 - 10
2SS01	5.8 - 6.5	20 - 21	11 - 12
2SS02	6.2 - 6.4	20 - 21	6 - 8
2SS03	5.8 - 6.2	19 - 21	8 - 10
2SS07	4.7 - 5.1	21 - 22	9 - 12
2SS08[a]	5.7 - 5.8	20 - 21	7 - 8
2SS10	5.1 - 5.4	21	6 - 10
CF17SS10	5.4 - 7.2	19 - 21	16
CF17SS3	4.5 - 5.5	19 - 21	22
CF17SS6	6.7 - 7.1	19 - 21	17
CF17SS8	5.7 - 6.1	20 - 21	25
CF17SS9	4.3 - 5.0	19 - 21	14
CF17SS10	5.4 - 7.2	19 - 21	16
CF17SS11	4.4 - 4.6	20 - 21	30
CF17SS12	4.6 - 4.7	20 - 21	16

Table 6. **Continued. Soil quality parameters (pH, temperature and percent moisture) measured in the exposure soils during the 14-day toxicity tests with earthworms *Eisenia foetida*.**

Test Sample	pH	Temperature (°C)	Moisture (%)
Control 1	6.6 - 7.1	19 - 21	NA
Control 2	6.2 - 7.7	20 - 22	15 - 23
Control 3	6.4 - 7.7	18 - 23	16 - 19
CF5SS6 [b]	5.4 - 7.4	18 - 23	16 - 18
CF5SS4	4.5 - 6.5	21 - 22	33 - NA
CF5SS2	6.3 - 7.3	17 - 22	12 - 13
CF5SS9	4.7 - 5.7	17 - 22	13 - 14
CF5SS8	6.1 - 7.4	17 - 22	10 - 12
CF5SS13	5.3 - 5.6	18 - 22	11 - 14
CF5SS14	5.0 - 5.7	18 - 22	13 - 15
CF5SS15	6.5 - 7.7	18 - 22	10 - 20
CF5SS31	6.5 - 7.1	18 - 22	26 - 29
CF5SS26	6.8 - 7.7	18 - 22	18 - 21
CF5SS20	7.1 - 7.8	18 - 22	16 - 18
CF5SS19	6.9 - 7.9	19 - 22	11 - 13
CF5SS21	5.1 - 5.5	18 - 22	16 - 17
CF5SS23	7.0 - 7.6	19 - 22	12 - 14
CF5SS24	6.8 - 7.3	18 - 22	7 - 12

[a] The pH of this sample was adjusted from 5.7 to 6.5 with calcium carbonate prior to test initiation.
[b] The pH of this sample was adjusted from 3.3 to 5.4 with calcium carbonate prior to test initiation.

Table 7. **Percent mortality observed for each soil sample at the termination of the 14-day toxicity tests with earthworms *Eisenia foetida*.**

Test Sample	Percent Mortality Rep A	Rep B	Rep C	Rep D	Mean
Control #1	0	0	0	0	0
1SS01	0	0	0	0	0
1SS02	50[a]	0	10[a]	0	15[b]
1SS03	10[a]	0	0	0	2.5
1SS04	0	0	10[a]	0	2.5
1SS05	0	0	0	0	0
1SS06	20[a]	0	0	0	5
1SS08	0	0	0	0	0
2SS05	0	0	0	0	0
2SS06	10[a]	0	10[a]	10[a]	7.5
Control #2	0	10[a]	0	10[a]	5.0
BSS01 (Test #1)	0	0	0	10[a]	2.5
BSS01 (Test #2)	10[a]	10[a]	10[a]	0	7.5
1SS09	0	0	0	0	0
1SS10	0	20[a]	0	10[a]	7.5
1SS12	0	0	0	0	0
1SS13	0	0	0	0	0
1SS14	10[a]	0	0	0	2.5
2SS04	0	30[a]	10[c]	0	10
2SS09	0	40[a]	0	30[a]	17.5

Table 7. Continued. Percent mortality observed for each soil sample at the termination of the 14-day toxicity tests with earthworms *Eisenia foetida*.

Test Sample	Percent Mortality Rep A	Rep B	Rep C	Rep D	Mean
Control #3	0	0	0	0	0
1SS07	0	0	0	0	0
1SS11	0	0	10[a]	0	2.5
1SS15	0	0	10[a]	0	2.5
2SS01	0	0	0	10[a]	2.5
2SS02	10[a]	0	0	0[d]	2.5
2SS03	10[a]	0	0	0	2.5
2SS07	0	0	0	0	0
2SS08	0	0	0	0	0
2SS10	10[a]	0	0	0	2.5
Control 1	0	0	0	0	0
CF17SS10	0	0	0	0	0
CF17SS3	0	0	0	0	0
CF17SS6	0	0	0	0	0
CF17SS8	0	10	0	0	2.5
CF17SS9	0	0	0	0	0
CF17SS10	0	0	0	0	0
CF17SS11	0	0	10	0	2.5
CF17SS12	0	0	0	0	0

Table 7. Continued. Percent mortality observed for each soil sample at the termination of the 14-day toxicity tests with earthworms *Eisenia foetida*.

Test Sample	Rep A	Rep B	Rep C	Rep D	Mean
Control 2	0	0	0	0	0
CF5SS6	0	0	0	0	0
CF5SS4	100	100	100	100	100 *
CF5SS2	0	0	0	0	0
CF5SS9	0	0	0	0	0
CF5SS8	0	0	0	0	0
CF5SS13	0	0	0	0	0
CF5SS14	10	0	0	0	2.5
CF5SS15	0	0	0	0	0
Control 3	0	0	0	0	0
CF5SS31	0	0	0	0	0
CF5SS26	0	0	0	0	0
CF5SS20	0	0	0	0	0
CF5SS19	0	0	0	0	0
CF5SS21	0	10	0	0	0
CF5SS23	0	0	0	0	0
CF5SS24	0	0	0	0	0

a Value presented represents the number of earthworms missing from test vessels at termination. Missing earthworms were recovered alive in the waterbath.

b Statistically different from the control. However, this difference is not considered to be biologically significant since several of the earthworms were missing from this test vessel at test termination and the observed mortality cannot be attributed to exposure to the soil sample.

c Dead earthworm found on outside of test vessel.

d 11 earthworms recovered.

* Statistically different from the respective control.

Table 8. **Initial and final weights and the percent weight change for earthworms *Eisenia foetida* exposed to the soil samples during the 14-day toxicity tests.**

Test Sample	Mean Initial Weight (g)	Mean Final Weight (g)	Weight Change (%)
Control #1	0.3482	0.3109	-10
1SS01	0.2952	0.3390	15[a]
1SS02	0.3062	0.3265	6.2
1SS03	0.3230	0.3313	3.3
1SS04	0.3101	0.3354	7.6
1SS05	0.2997	0.3079	2.3
1SS06	0.3185	0.3347	5.3[a]
1SS08	0.3133	0.3423	9.8[a]
2SS05	0.3216	0.3286	2.6[a]
2SS06	0.2950	0.2922	-1.2
Control #2	0.3089	0.3004	-2.7
BSS01 (Test #1)	0.3071	0.3017	-1.9
BSS01 (Test #2)	0.2989	0.2953	1.4
1SS09	0.3084	0.3365	9.1
1SS10	0.3019	0.2922	-3.0
1SS12	0.2986	0.3012	0.88
1SS13	0.2907	0.2974	3.2
1SS14	0.3071	0.3170	3.3
2SS04	0.2976	0.3373	14

Table 8. Continued. Initial and final weights and the percent weight change for earthworms *Eisenia foetida* exposed to the soil samples during the 14-day toxicity tests.

Test Sample	Mean Initial Weight (g)	Mean Final Weight (g)	Weight Change (%)
2SS09	0.3091	0.3263	5.8
Control #3	0.3243	0.3035	-6.3
1SS07	0.3123	0.3269	6.3
1SS11	0.3439	0.3496	2.5
1SS15	0.3075	0.3276	6.8[a]
2SS01	0.3367	0.2888	-14
2SS02	0.3207[b]	0.2998[b]	-6.5
2SS03	0.3141	0.2946	-5.6
2SS07	0.3250	0.3396	4.1
2SS08	0.2988	0.2908	-2.4
2SS10	0.3292	0.3126	-4.6
Control 1	0.1939	0.1709	-11.88
CF17SS10	0.1785	0.1893	5.96
CF17SS11	0.1910	0.2459	28.1
CF17SS3	0.2019	0.2255	11.67
CF17SS6	0.1842	0.1890	2.79
CF17SS8	0.2115	0.2754	30.9
CF17SS9	0.2000	0.2015	0.77
CF17SS12	0.2074	0.1988	-4.19

Table 8. Continued. Initial and final weights and the percent weight change for earthworms *Eisenia foetida* exposed to the soil samples during the 14-day toxicity tests.

Test Sample	Mean Initial Weight (g)	Mean Final Weight (g)	Weight Change (%)
Control 2	0.4452	0.3897	-11.64
CF5SS6	0.3642	0.3712	1.98
CF5SS4	0.3806	NA	
CF5SS2	0.3743	0.3502	-6.21
CF5SS9	0.3588	0.3979	10.83
CF5SS8	0.3638	0.3358	-6.77
CF5SS13	0.3675	0.3605	-1.58
CF5SS14	0.3863	0.4079	6.25
CF5SS15	0.3283	0.3169	-3.31
Control 3	0.3880	0.3543	-7.91
CF5SS31	0.3550	0.3906	11.05
CF5SS26	0.3504	0.3639	3.85
CF5SS20	0.3380	0.3426	0.57
CF5SS19	0.3365	0.3167	-5.67
CF5SS21	0.3069	0.3319	8.13
CF5SS23	0.3018	0.2964	-1.77
CF5SS24	0.2815	0.2894	3.46

[a] Statistically different from the respective control. Since a positive growth response was observed, the statistical difference observed is not considered to be biologically significant.

[b] 11 earthworms were recovered in Replicate D of this soil sample. Mean weights were based on 11 earthworms.

Table 9. **Soil quality parameters (pH and temperature) measured in the exposure soils during the 120-hour toxicity tests with lettuce, *Lactuca sativa*.**

Test Sample	pH	Temperature (°C)
Control #1	6.2 - 7.0	21 - 23
1SS08	5.2 - 6.2	21 - 23
1SS06	4.1 - 6.0	21 - 23
1SS03	5.1 - 5.2	21 - 23
1SS02	4.9 - 5.2	21 - 23
1SS01	4.8 - 5.2	21 - 23
Control #2	6.2	21 - 23
1SS04	4.1 - 4.8	21 - 23
1SS05	5.4 - 5.6	21 - 23
2SS06	5.8 - 6.1	21 - 23
2SS05	5.6 - 5.8	20 - 23
2SS04	5.0 - 5.6	21 - 23
Control #3	6.2 - 6.4	20 - 23
BSS01 (Test #1)	4.1 - 4.6	20 - 23
BSS01 (Test #2)	4.1 - 4.6	21 - 23
1SS09	4.3 - 4.5	21 - 23

Table 9. Continued. Soil quality parameters (pH and temperature) measured in the exposure soils during the 120-hour toxicity tests with lettuce, *Lactuca sativa*.

Test Sample	pH	Temperature (°C)
1SS12	4.8 - 4.9	21 - 23
1SS13	5.0 - 5.5	21 - 23
Control #4	6.2	20 - 23
1SS14	3.6 - 4.5	21 - 23
2SS09	4.6 - 5.8	21 - 23
1SS10	4.6 - 5.0	20 - 23
1SS11	4.9 - 5.2	20 - 23
2SS10	4.5 - 5.0	21 - 23
Control #5	6.2 - 6.4	20 - 23
1SS07	5.0 - 5.4	21 - 23
1SS15	4.7 - 5.2	21 - 23
2SS07	4.2 - 4.8	21 - 23
2SS08	4.7 - 5.4	21 - 23
2SS01	5.4 - 5.6	21 - 23
2SS02	5.6 - 5.7	21 - 23
2SS03	5.6 - 5.8	21 - 23
Control 1	6.6	24 - 27

Table 9. Continued. Soil quality parameters (pH and temperature) measured in the exposure soils during the 120-hour toxicity tests with lettuce, *Lactuca sativa*.

Test Sample	pH	Temperature (°C)
CF17SS3	5.1 - 5.6	22 - 26
CF17SS6	6.7 - 6.9	23 - 27
CF17SS8	6.1 - 6.4	22 - 27
CF17SS9	4.1 - 4.3	23 - 26
CF17SS10	7.2 - 7.5	22 - 27
CF17SS11	4.2 - 4.4	22 - 27
CF17SS12	4.3 - 4.4	22 - 28
CF5SS6[a]	5.7-5.8	21-25
CF5SS4	4.3-4.5	21-25
CF5SS2	6.5-7.2	21-25
CF5SS9	4.2	20-24
CF5SS8	6.5-7.2	20-24
CF5SS13	4.7-5.0	20-24
CF5SS14	4.2-4.3	20-24
CF5SS15	7.5-7.6	21-24
CF5SS31	6.8	21-25
CF5SS26	7.4-7.6	22-26
CF5SS20	7.5-7.8	22-25

Table 9. Continued. Soil quality parameters (pH and temperature) measured in the exposu soils during the 120-hour toxicity tests with lettuce, *Lactuca sativa*.

Test Sample	pH	Temperature (°C)
CF5SS19	7.4-7.8	21-25
CF5SS21	4.4-5.7	20-25
CF5SS23	7.2-7.7	20-25
CF5SS24	6.7	20-24

[a] The pH of this sample was adjusted from 3.3 to 5.7 with calcium carbonate prior to test initiation.

Table 10. **Percent germination determined for each soil and control sample at the termination of the 120-hour toxicity tests with lettuce, *Lactuca sativa*.**

Test Sample	Percent Germination			
	Rep A	Rep B	Rep C	Mean
Control #1	95	93	93	93
1SS08	98	98	100	98
1SS06	80	85	85	83[a]
1SS03	93	95	90	93
1SS02	93	98	100	97
1SS01	83	90	98	90
Control #2	95	100	93	96
1SS04	93	60	83	78
1SS05	80	95	98	91
2SS06	93	98	100	97
2SS05	95	100	95	97
2SS04	88	85	88	87[a]
Control #3	95	95	93	94
BSS01 (Test #1)	2.5	15	7.5	8.3[a]
BSS01 (Test #2)	0	0	0	0.0[a]
1SS09	80	85	98	88
1SS12	90	88	80	86
1SS13	100	100	98	99
Control #4	100	100	98	99
1SS14	98	93	98	96

Table 10. Continued. Percent germination determined for each soil and control sample at the termination of the 120-hour toxicity tests with lettuce, *Lactuca sativa*.

Test Sample	Percent Germination			
	Rep A	Rep B	Rep C	Mean
2SS09	93	95	100	96
1SS10	88	98	83	89
1SS11	95	90	83	89
2SS10	95	95	95	95
Control #5	100	100	90	97
1SS07	98	95	95	96
1SS15	90	88	95	91
2SS07	93	98	90	93
2SS08	98	100	95	98
2SS01	80	95	90	88
2SS02	100	100	98	99
2SS03	93	98	100	97
CF17SS3	88	88	85	87
CF17SS6	95	98	88	93
CF17SS8	68	58	53	59 [a]
CF17SS9	70	65	73	69 [a]
CF17SS10	93	95	95	94
CF17SS11	93	85	85	88
CF17SS12	95	93	90	93

Table 10. Continued. Percent germination determined for each soil and control sample at the termination of the 120-hour toxicity tests with lettuce, *Lactuca sativa*.

Test Sample	Percent Germination			
	Rep A	Rep B	Rep C	Mean
Control 1	90	93	90	91
CF5SS6	93	93	90	92
CF5SS4	13	30	23	22 [a]
CF5SS2	98	70	95	88
CF5SS9	88	88	95	90
CF5SS8	88	90	90	89
Control 2	98	98	95	97
CF5SS13	83	75	80	79 [a]
CF5SS14	93	93	88	91
CF5SS15	93	95	88	92
CF5SS31	68	88	95	83
CF5SS26	98	85	90	91
Control 3	90	93	95	93
CF5SS20	98	90	95	94
CF5SS19	93	80	78	83
CF5SS21	90	90	98	93
CF5SS23	80	93	80	84
CF5SS24	90	95	90	92

[a] Statistically different from the respective control.

Table 11. Comparison of the biological endpoints generated during the short-term chronic test with *Ceriodaphnia dubia* and the acute toxicity test with *Hyallela azteca*.

Test Sample ID	Ceriodaphnia		Hyallela
	Survival (%)	Reproduction (offspring/adult)	Survival (%)
STC-Tox-1	90	15	0.0
STC-Tox-2	80	8	76
STC-Tox-3	50	7	20
2-Tox-2	70	11	83
2-Tox-2 (pore)	100	14	NA
LF-Tox-8	100	21	98
RC-Tox-8	100	27	99
RC-Tox-8A	100	22	98
RC-Tox-9	100	17	96
RC-Tox-6	90	14	98
RC-Tox-7	30	5	99
2-Tox-3	90	17	94
5-Tox-2	100	17	100
5-Tox-3	80	9	36
5-Tox-4	60	8	71
5-Tox-5	90	10	100
STC-Tox-R1	100	15	99
YWC-Tox-R1	80	19	100
5-Tox-1	100	11	16
STC-Tox-R1	90	15	99
5-Tox-1	80	12	24
5-Tox-5	100	11	90

Table 12. Comparison of the biological endpoints generated during the toxicity tests with *Eisenia foetida* and the acute toxicity tests with *Lactuca sativa*.

Test Sample ID	Earthworm Mean Mortality (%)	Lettuce Germination (%)
1SS01	0	90
1SS02	15	97
1SS03	2.5	93
1SS04	2.5	78
1SS05	0	91
1SS06	5	83
1SS08	0	98
2SS05	0	97
2SS06	7.5	97
BSS01 (Test #1)	2.5	8.3
BSS01 (Test #2)	7.5	0.0
1SS09	0	88
1SS12	0	86
1SS13	0	99
1SS14	2.5	96
2SS04	10	87
2SS09	17.5	96
1SS10	7.5	89
1SS11	2.5	89
2SS10	2.5	95
1SS07	0	96
1SS15	2.5	91
2SS01	2.5	88

Table 12. Continued. **Comparison of the biological endpoints generated during the toxicity tests with *Eisenia foetida* and the acute toxicity tests with *Lactuca sativa*.**

Test Sample ID	Earthworm Mean Mortality (%)	Lettuce Germination (%)
2SS02	2.5	99
2SS03	2.5	97
2SS07	0	93
2SS08	0	98
CF17SS10	0	94
CF17SS3	0	88
CF17SS6	0	93
CF17SS8	2.5	59
CF17SS9	0	69
CF17SS10	0	94
CF17SS11	2.5	88
CF17SS12	0	93
CF5SS6	0	92
CF5SS4	100	22
CF5SS2	0	88
CF5SS9	0	90
CF5SS8	0	89
CF5SS13	0	79
CF5SS14	2.5	91
CF5SS15	0	92
CF5SS31	0	83
CF5SS26	0	91
CF5SS20	0	94
CF5SS19	0	83
CF5SS21	2.5	93
CF5SS23	0	84
CF5SS24	0	92

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5.0 APPENDIX II - DAPHNID TEST RESULTS SUMMARIES

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-R1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	24 June to 1 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival 25 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	24 June to 1 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	90% survival
	15 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-2
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	24 June to 1 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	80% survival 8 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-3
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	24 June to 1 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	50% survival
	7 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-R1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	29 June to 6 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival 15 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2-TOX-2 (pore water)
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Pore Water
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	29 June to 6 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival 14 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2-TOX-2
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	29 June to 6 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	70% survival
	11 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-9
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	29 June to 6 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 4 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival 17 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-R1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	1 to 8 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	90% survival 15 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-6
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	1 to 8 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	90% survival 14 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-7
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	1 to 8 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	30% survival 5 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2-TOX-3
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	1 to 8 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 40 - 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	90% survival
	17 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-2
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	25 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	1 to 8 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival 17 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-3
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	25 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	1 to 8 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	80% survival
	9 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-4
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	25 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	1 to 8 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	60% survival 8 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-5
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	25 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	1 to 8 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	90% survival 10 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-R1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	29 June 1993
DATE TEST SAMPLE RECEIVED:	30 June 1993
TEST DATES:	2 to 9 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival
	15 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	YWC-TOX-R1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	28 June 1993
DATE TEST SAMPLE RECEIVED:	30 June 1993
TEST DATES:	2 to 9 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	80% survival 19 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	29 June 1993
DATE TEST SAMPLE RECEIVED:	30 June 1993
TEST DATES:	2 to 9 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 100 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival
	11 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-R1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	9 to 16 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 110 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival 22 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-8
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	9 to 16 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 110 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival 27 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-8A
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	9 to 16 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 110 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival 22 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	LF-TOX-8
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	23 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	9 to 16 July 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	7-day duration, solution temperature of 25 ± 1 °C, light intensity of 60 to 110 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival 21 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-R1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	17 August 1993
DATE TEST SAMPLE RECEIVED:	18 August 1993
TEST DATES:	19 to 25 August 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	6-day duration, solution temperature of 25 ± 1 °C, light intensity of 80 to 110 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival
	16 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-R1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	16 August 1993
DATE TEST SAMPLE RECEIVED:	18 August 1993
TEST DATES:	19 to 25 August 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	6-day duration, solution temperature of 25 ± 1 °C, light intensity of 80 to 110 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	90% survival 15 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-1
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	17 August 1993
DATE TEST SAMPLE RECEIVED:	18 August 1993
TEST DATES:	19 to 25 August 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	6-day duration, solution temperature of 25 ± 1 °C, light intensity of 80 to 110 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	80% survival 12 offspring/adult

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-5
SLI STUDY TITLE:	7-Day Static Renewal Toxicity Test With *Ceriodaphnia dubia*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	16 August 1993
DATE TEST SAMPLE RECEIVED:	18 August 1993
TEST DATES:	19 to 25 August 1993
TEST SPECIES:	*Ceriodaphnia dubia*; ≤ 9 hours old, hatched within the same 7.5-hour period source: SLI culture facility
DILUTION WATER:	Fortified well water adjusted to a total hardness of 48 mg/L as $CaCO_3$
TEST VESSELS:	Ten replicate 30-mL plastic beakers each containing 15 mL of test solution
TEST CONDITIONS:	6-day duration, solution temperature of 25 ± 1 °C, light intensity of 80 to 110 footcandles
NUMBER EXPOSED:	Ten; one *C. dubia* per replicate
RESULTS:	100% survival
	11 offspring/adult

6.0 APPENDIX III - AMPHIPOD TEST SUMMARIES

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-R1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	23 June 1993 to 7 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	99% survival

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	23 June 1993 to 7 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 µmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	0% survival, statistically different from the control (RC-TOX-R1; test dates 23 June to 7 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-2
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	23 June 1993 to 7 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	76% survival, not statistically different from the control (RC-TOX-R1; test dates 23 June to 7 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-3
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	23 June 1993 to 7 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	20% survival, statistically different from the control (RC-TOX-R1; test dates 23 June to 7 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-R1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	28 June 1993 to 12 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	100% survival

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-8
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	28 June 1993 to 12 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	99% survival, not statistically different from the control (RC-TOX-R1; test dates 28 June to 12 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-8A
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	28 June 1993 to 12 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	98% survival, not statistically different from the control (RC-TOX-R1; test dates 28 June to 12 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	LF-TOX-8
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	23 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	28 June 1993 to 12 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 µmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	98% survival, not statistically different from the control (RC-TOX-R1; test dates 28 June to 12 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2-TOX-2
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	28 June 1993 to 12 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 µmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	83% survival, statistically different from the control (RC-TOX-R1; test dates 28 June to 12 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-9
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	28 June 1993 to 12 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	96% survival, not statistically different from the control (RC-TOX-R1; test dates 28 June to 12 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-R1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	22 June 1993
DATE TEST SAMPLE RECEIVED:	23 June 1993
TEST DATES:	30 June 1993 to 14 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	90% survival

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2-TOX-3
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	25 June 1993
TEST DATES:	30 June 1993 to 14 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	94% survival, not statistically different from the control (RC-TOX-R1; test dates 30 June to 14 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-2
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	25 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	30 June 1993 to 14 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	100% survival, not statistically different from the control (RC-TOX-R1; test dates 30 June to 14 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-3
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	25 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	30 June 1993 to 14 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	36% survival, statistically different from the control (RC-TOX-R1; test dates 30 June to 14 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-4
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	25 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	30 June 1993 to 14 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	71% survival, statistically different from the control (RC-TOX-R1; test dates 30 June to 14 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-5
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	25 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	30 June 1993 to 14 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	100% survival, not statistically different from the control (RC-TOX-R1; test dates 30 June to 14 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-6
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	30 June 1993 to 14 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	98% survival, not statistically different from the control (RC-TOX-R1; test dates 30 June to 14 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-7
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	24 June 1993
DATE TEST SAMPLE RECEIVED:	26 June 1993
TEST DATES:	30 June 1993 to 14 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	99% survival, not statistically different from the control (RC-TOX-R1; test dates 30 June to 14 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-R1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	29 June 1993
DATE TEST SAMPLE RECEIVED:	30 June 1993
TEST DATES:	2 to 16 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	99% survival

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	YWC-TOX-R1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	28 June 1993
DATE TEST SAMPLE RECEIVED:	30 June 1993
TEST DATES:	2 to 16 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	100% survival, not statistically different from the control (STC-TOX-R1; test dates 30 July to 16 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	29 June 1993
DATE TEST SAMPLE RECEIVED:	30 June 1993
TEST DATES:	2 to 16 July 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	16% survival, statistically different from the control (STC-TOX-R1; test dates 30 July to 16 July 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	RC-TOX-R1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	17 August 1993
DATE TEST SAMPLE RECEIVED:	18 August 1993
TEST DATES:	23 August 1993 to 6 September 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	95% survival, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	STC-TOX-R1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	16 August 1993
DATE TEST SAMPLE RECEIVED:	18 August 1993
TEST DATES:	23 August 1993 to 6 September 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	99% survival, not statistically different from the control (RC-TOX-R1; test dates 23 August to 6 Sptember 1993).

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-1
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	17 August 1993
DATE TEST SAMPLE RECEIVED:	18 August 1993
TEST DATES:	23 August 1993 to 6 September 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	24% survival, statistically different from the control (RC-TOX-R1; test dates 23 August to 6 September 1993)

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	5-TOX-5
SLI STUDY TITLE:	14-Day Static Renewal Acute Toxicity Test With *Hyallela azteca*
SAMPLE TYPE:	Sediment
DATE TEST SAMPLE COLLECTED:	16 August 1993
DATE TEST SAMPLE RECEIVED:	18 August 1993
TEST DATES:	23 August 1993 to 6 September 1993
TEST SPECIES:	*Hyallela azteca*; ≤ 7 days old source: SLI culture facility
OVERLYING WATER:	Laboratory well water pH: 6.9 - 7.5 total hardness: 20 - 40 mg/L (as $CaCO_3$) specific conductance: 80 - 150 μmhos/cm
TEST VESSELS:	Four replicate 1000-mL glass beakers each containing 200 mL of sediment and 800 mL of overlying water
TEST CONDITIONS:	14-day duration, solution temperature of 20 ± 1 °C, light intensity of 30 to 100 footcandles
NUMBER OF ORGANISMS EXPOSED:	Eighty; twenty *H. azteca* per replicate
RESULTS:	90% survival, not statistically different from the control (RC-TOX-R1; test dates 23 August to 6 Sptember 1993).

7.0 APPENDIX IV - EARTHWORM TEST SUMMARIES

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	BSS01 (Test #1)
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	19 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.088 moisture fraction, 16.6 mL/100 g dry soil water holding capacity, pH 4.9
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #2**
INITIAL MEAN E.W. WEIGHT (g)	0.3071	0.3089
FINAL MEAN E.W. WEIGHT (g)	0.3017	0.3004
WEIGHT CHANGE (%)	-1.9	-2.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	3	5

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	BSS01 (Test #2)
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	19 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.088 moisture fraction, 16.6 mL/100 g dry soil water holding capacity, pH 4.9
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #2**
INITIAL MEAN E.W. WEIGHT (g)	0.2989	0.3089
FINAL MEAN E.W. WEIGHT (g)	0.2953	0.3004
WEIGHT CHANGE (%)	-1.4	-2.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	8	5

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS01
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.072 moisture fraction, 38.5 mL/100 g dry soil water holding capacity, pH 4.8
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #1**
INITIAL MEAN E.W. WEIGHT (g)	0.2952	0.3482
FINAL MEAN E.W. WEIGHT (g)	0.3390	0.3109
WEIGHT CHANGE (%)	15	-10
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

15 - Statistically but not biologically significant.

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS02
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.198 moisture fraction, 14 mL/100 g dry soil water holding capacity, pH 4.9
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #1**
INITIAL MEAN E.W. WEIGHT (g)	0.3062	0.3482
FINAL MEAN E.W. WEIGHT (g)	0.3265	0.3109
WEIGHT CHANGE (%)	6.2	-10
MORTALITY DAY 7 (%)	2.5	0
MORTALITY DAY 14 (%)	15	0

15 - Statistically different from the control. However, this difference is not considered to be biologically significant since several of the earthworms were missing from this test vessel at test termination and the observed mortality cannot be attributed to exposure to the soil sample. Missing earthworms were recovered alive in the waterbath.

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS03
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.216 moisture fraction, 12.1 mL/100 g dry soil water holding capacity, pH 5.1
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #1**
INITIAL MEAN E.W. WEIGHT (g)	0.3230	0.3482
FINAL MEAN E.W. WEIGHT (g)	0.3313	0.3109
WEIGHT CHANGE (%)	3.3	-10
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS04
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.107 moisture fraction, 19.1 mL/100 g dry soil water holding capacity, pH 4.1
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #1**
INITIAL MEAN E.W. WEIGHT (g)	0.3101	0.3482
FINAL MEAN E.W. WEIGHT (g)	0.3354	0.3109
WEIGHT CHANGE (%)	7.6	-10
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS05
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.132 moisture fraction, 12.2 mL/100 g dry soil water holding capacity, pH 5.6
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #1**
INITIAL MEAN E.W. WEIGHT (g)	0.2997	0.3482
FINAL MEAN E.W. WEIGHT (g)	0.3079	0.3109
WEIGHT CHANGE (%)	2.3	-10
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS06
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.122 moisture fraction, 14.1 mL/100 g dry soil water holding capacity, pH 4.1
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #1**
INITIAL MEAN E.W. WEIGHT (g)	0.3185	0.3482
FINAL MEAN E.W. WEIGHT (g)	0.3347	0.3109
WEIGHT CHANGE (%)	5.3	-10
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	5	0

5.3 - Statistically but not biologically significant.

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS08
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.224 moisture fraction, 9.7 mL/100 g dry soil water holding capacity, pH 5.2
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #1**
INITIAL MEAN E.W. WEIGHT (g)	0.3133	0.3482
FINAL MEAN E.W. WEIGHT (g)	0.3423	0.3109
WEIGHT CHANGE (%)	9.8	-10
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

9.8 - Statistically but not biologically significant.

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: 2SS04

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 21 July 1993

DATE TEST SAMPLE RECEIVED: 22 July 1993

TEST DATES: 28 July 1993 to 11 August 1993

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.038 moisture fraction, 19.9 mL/100 g dry soil water holding capacity, pH 5.0

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #2**
INITIAL MEAN E.W. WEIGHT (g)	0.2976	0.3089
FINAL MEAN E.W. WEIGHT (g)	0.3373	0.3004
WEIGHT CHANGE (%)	14	-2.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	10	5

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: 2SS05

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 21 July 1993

DATE TEST SAMPLE RECEIVED: 22 July 1993

TEST DATES: 28 July 1993 to 11 August 1993

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.071 moisture fraction, 26.6 mL/100 g dry soil water holding capacity, pH 5.8

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #1**
INITIAL MEAN E.W. WEIGHT (g)	0.3216	0.3482
FINAL MEAN E.W. WEIGHT (g)	0.3286	0.3109
WEIGHT CHANGE (%)	26	-10
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

26 - Statistically but not biologically significant.

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: 2SS06

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 21 July 1993

DATE TEST SAMPLE RECEIVED: 22 July 1993

TEST DATES: 28 July 1993 to 11 August 1993

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.058 moisture fraction, 24.2 mL/100 g dry soil water holding capacity, pH 6.1

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #1**
INITIAL MEAN E.W. WEIGHT (g)	0.2950	0.3482
FINAL MEAN E.W. WEIGHT (g)	0.2922	0.3109
WEIGHT CHANGE (%)	-1.2	-10
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	8	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS09
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.169 moisture fraction, 16.3 mL/100 g dry soil water holding capacity, pH 4.3
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #2**
INITIAL MEAN E.W. WEIGHT (g)	0.3084	0.3089
FINAL MEAN E.W. WEIGHT (g)	0.3365	0.3004
WEIGHT CHANGE (%)	9.1	-2.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	5

9.1 - Statistically but not biologically significant.

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS10
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.152 moisture fraction, 19.8 mL/100 g dry soil water holding capacity, pH 5.0
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #2**
INITIAL MEAN E.W. WEIGHT (g)	0.3019	0.3089
FINAL MEAN E.W. WEIGHT (g)	0.2922	0.3004
WEIGHT CHANGE (%)	-3.0	-2.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	8	5

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS11
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.091 moisture fraction, 29.6 mL/100 g dry soil water holding capacity, pH 4.9
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #3**
INITIAL MEAN E.W. WEIGHT (g)	0.3439	0.3243
FINAL MEAN E.W. WEIGHT (g)	0.3496	0.3035
WEIGHT CHANGE (5)	2.5	-6.3
MORTALITY DAY 7 (%)	2.5	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS12
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.150 moisture fraction, 10.4 mL/100 g dry soil water holding capacity, pH 4.9
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #2**
INITIAL MEAN E.W. WEIGHT (g)	0.2986	0.3089
FINAL MEAN E.W. WEIGHT (g)	0.3012	0.3004
WEIGHT CHANGE (%)	0.88	-2.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	5

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS13
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.206 moisture fraction, 5.3 mL/100 g dry soil water holding capacity, pH 5.0
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #2**
INITIAL MEAN E.W. WEIGHT (g)	0.2907	0.3089
FINAL MEAN E.W. WEIGHT (g)	0.2974	0.3004
WEIGHT CHANGE (%)	3.2	-2.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	5

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: 1SS14

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 22 July 1993

DATE TEST SAMPLE RECEIVED: 23 July 1993

TEST DATES: 28 July 1993 to 11 August 1993

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.134 moisture fraction, 33 mL/100 g dry soil water holding capacity, pH 3.6

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #2**
INITIAL MEAN E.W. WEIGHT (g)	0.3071	0.3089
FINAL MEAN E.W. WEIGHT (g)	0.3170	0.3004
WEIGHT CHANGE (%)	3.3	-2.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	3	5

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS09
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.243 moisture fraction, 21.2 mL/100 g dry soil water holding capacity, pH 5.8
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #2**
INITIAL MEAN E.W. WEIGHT (g)	0.3091	0.3089
FINAL MEAN E.W. WEIGHT (g)	0.3263	0.3004
WEIGHT CHANGE (%)	5.8	-2.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	18	5

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS10
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.050 moisture fraction, 35.6 mL/100 g dry soil water holding capacity, pH 4.5
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #3**
INITIAL MEAN E.W. WEIGHT (g)	0.3292	0.3243
FINAL MEAN E.W. WEIGHT (g)	0.3126	0.3035
WEIGHT CHANGE (%)	-4.6	-6.3
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: 1SS07

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 23 July 1993

DATE TEST SAMPLE RECEIVED: 24 July 1993

TEST DATES: 28 July 1993 to 11 August 1993

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.134 moisture fraction, 26.5 mL/100 g dry soil water holding capacity, pH 5.4

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #3**
INITIAL MEAN E.W. WEIGHT (g)	0.3123	0.3243
FINAL MEAN E.W. WEIGHT (g)	0.3269	0.3035
WEIGHT CHANGE (%)	6.3	-6.3
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS15
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	24 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.090 moisture fraction, 27.5 mL/100 g dry soil water holding capacity, pH 4.7
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #3**
INITIAL MEAN E.W. WEIGHT (g)	0.3075	0.3243
FINAL MEAN E.W. WEIGHT (g)	0.3276	0.3035
WEIGHT CHANGE (%)	6.8	-6.3
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	3	0

6.8 - Statistically but not biologically significant.

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS01
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	24 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.061 moisture fraction, 36.6 mL/100 g dry soil water holding capacity, pH 5.6
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #3**
INITIAL MEAN E.W. WEIGHT (g)	0.3367	0.3243
FINAL MEAN E.W. WEIGHT (g)	0.2888	0.3035
WEIGHT CHANGE (%)	-14	-6.3
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS02
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	24 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.078 moisture fraction, 25.2 mL/100 g dry soil water holding capacity, pH 5.7
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #3**
INITIAL MEAN E.W. WEIGHT (g)	0.3207	0.3243
FINAL MEAN E.W. WEIGHT (g)	0.2998	0.3035
WEIGHT CHANGE (%)	-6.5	-6.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0[a]	0

[a] 11 adult earthworms were recovered in Replicate D at test termination. Initial and final mean weights for this replicate were based on 11 earthworms.

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS03
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	24 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.057 moisture fraction, 25.4 mL/100 g dry soil water holding capacity, pH 5.6
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #3**
INITIAL MEAN E.W. WEIGHT (g)	0.3141	0.3243
FINAL MEAN E.W. WEIGHT (g)	0.2946	0.3035
WEIGHT CHANGE (%)	-5.6	-6.3
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS07
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	24 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.085 moisture fraction, 33 mL/100 g dry soil water holding capacity, pH 4.2
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #3**
INITIAL MEAN E.W. WEIGHT (g)	0.3250	0.3243
FINAL MEAN E.W. WEIGHT (g)	0.3396	0.3035
WEIGHT CHANGE (%)	4.1	-6.7
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS08
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	24 July 1993
TEST DATES:	28 July 1993 to 11 August 1993
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.058 moisture fraction, 30.9 mL/100 g dry soil water holding capacity, pH 4.7
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control #3**
INITIAL MEAN E.W. WEIGHT (g)	0.2988	0.3243
FINAL MEAN E.W. WEIGHT (g)	0.2908	0.3035
WEIGHT CHANGE (%)	-2.4	-6.3
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF-17-SS10

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 12 February 1994

DATE TEST SAMPLE RECEIVED: 15 February 1994

TEST DATES: 17 February 1994 to 3 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.160 moisture fraction, 17.8 mL/100 g dry soil water holding capacity, pH 4.2

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control**
INITIAL MEAN E.W. WEIGHT (g)	0.1785	0.1939
FINAL MEAN E.W. WEIGHT (g)	0.1893	0.1709
WEIGHT CHANGE (%)	5.96	-11.88
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF-17-SS11
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	12 February 1994
DATE TEST SAMPLE RECEIVED:	15 February 1994
TEST DATES:	17 February 1994 to 3 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.298 moisture fraction, 14.9 mL/100 g dry soil water holding capacity, pH 4.2
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control**
INITIAL MEAN E.W. WEIGHT (g)	0.1910	0.1939
FINAL MEAN E.W. WEIGHT (g)	0.2459	0.1709
WEIGHT CHANGE (%)	28.1	-11.88
MORTALITY DAY 7 (%)	3	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF-17-SS3

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 12 February 1994

DATE TEST SAMPLE RECEIVED: 15 February 1994

TEST DATES: 17 February 1994 to 3 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.219 moisture fraction, 4.3 mL/100 g dry soil water holding capacity, pH 5.1

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control**
INITIAL MEAN E.W. WEIGHT (g)	0.2019	0.1939
FINAL MEAN E.W. WEIGHT (g)	0.2255	0.1709
WEIGHT CHANGE (%)	11.67	-11.88
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF-17-SS6
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	12 February 1994
DATE TEST SAMPLE RECEIVED:	15 February 1994
TEST DATES:	17 February 1994 to 3 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.173 moisture fraction, 17.5 mL/100 g dry soil water holding capacity, pH 6.7
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control**
INITIAL MEAN E.W. WEIGHT (g)	0.1842	0.1939
FINAL MEAN E.W. WEIGHT (g)	0.1890	0.1709
WEIGHT CHANGE (%)	2.79	-11.88
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF-17-SS8

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 12 February 1994

DATE TEST SAMPLE RECEIVED: 15 February 1994

TEST DATES: 17 February 1994 to 3 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.254 moisture fraction, 11.5 mL/100 g dry soil water holding capacity, pH 6.1

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:

	Soil Sample	Control
INITIAL MEAN E.W. WEIGHT (g)	0.2115	0.1939
FINAL MEAN E.W. WEIGHT (g)	0.2754	0.1709
WEIGHT CHANGE (%)	30.9	-11.88
MORTALITY DAY 7 (%)	3	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF-17-SS9
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	12 February 1994
DATE TEST SAMPLE RECEIVED:	15 February 1994
TEST DATES:	17 February 1994 to 3 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.138 moisture fraction, 28.2 mL/100 g dry soil water holding capacity, pH 4.1
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control**
INITIAL MEAN E.W. WEIGHT (g)	0.2000	0.1939
FINAL MEAN E.W. WEIGHT (g)	0.2015	0.1709
WEIGHT CHANGE (%)	0.77	-11.88
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF-17-SS12

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 12 February 1994

DATE TEST SAMPLE RECEIVED: 15 February 1994

TEST DATES: 17 February 1994 to 3 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.155 moisture fraction, 13.8 mL/100 g dry soil water holding capacity, pH 4.3

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control**
INITIAL MEAN E.W. WEIGHT (g)	0.2074	0.1939
FINAL MEAN E.W. WEIGHT (g)	0.1988	0.1709
WEIGHT CHANGE (%)	-4.19	-11.88
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF5SS-6

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 24 February 1994

DATE TEST SAMPLE RECEIVED: 1 March 1994

TEST DATES: 3 March to 17 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.127 moisture fraction, 23.9 mL/100 g dry soil water holding capacity, pH 3.3 adjusted to 5.4

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 2**
INITIAL MEAN E.W. WEIGHT (g)	0.3642	0.4452
FINAL MEAN E.W. WEIGHT (g)	0.3712	0.3897
WEIGHT CHANGE (%)	1.98	-11.64
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-4
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	24 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	3 March to 17 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.147 moisture fraction, 39.0 mL/100 g dry soil water holding capacity, pH 4.5
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 2**
INITIAL MEAN E.W. WEIGHT (g)	0.3806	0.4452
FINAL MEAN E.W. WEIGHT (g)	ALL DEAD	0.3897
WEIGHT CHANGE (%)	NOT APPLICABLE	-11.64
MORTALITY DAY 7 (%)	100	0
MORTALITY DAY 14 (%)	100	0

100 - Statistically different from the control.

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF5SS-2

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 24 February 1994

DATE TEST SAMPLE RECEIVED: 1 March 1994

TEST DATES: 3 March to 17 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.152 moisture fraction, 15.5 mL/100 g dry soil water holding capacity, pH 6.3

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 2**
INITIAL MEAN E.W. WEIGHT (g)	0.3743	0.4452
FINAL MEAN E.W. WEIGHT (g)	0.3502	0.3897
WEIGHT CHANGE (%)	-6.21	-11.64
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF5SS-9

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 24 February 1994

DATE TEST SAMPLE RECEIVED: 1 March 1994

TEST DATES: 3 March to 17 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.147 moisture fraction, 11.1 mL/100 g dry soil water holding capacity, pH 4.7

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:

	Soil Sample	Control 2
INITIAL MEAN E.W. WEIGHT (g)	0.3588	0.4452
FINAL MEAN E.W. WEIGHT (g)	0.3979	0.3897
WEIGHT CHANGE (%)	10.83	-11.64
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-8
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	24 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	3 March to 17 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.124 moisture fraction, 14.6 mL/100 g dry soil water holding capacity, pH 6.1
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 2**
INITIAL MEAN E.W. WEIGHT (g)	0.3638	0.4452
FINAL MEAN E.W. WEIGHT (g)	0.3358	0.3897
WEIGHT CHANGE (%)	-6.77	-11.64
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF5SS-13

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 25 February 1994

DATE TEST SAMPLE RECEIVED: 1 March 1994

TEST DATES: 3 March to 17 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.111 moisture fraction, 18.5 mL/100 g dry soil water holding capacity, pH 5.6

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:

	Soil Sample	Control 2
INITIAL MEAN E.W. WEIGHT (g)	0.3675	0.4452
FINAL MEAN E.W. WEIGHT (g)	0.3605	0.3897
WEIGHT CHANGE (%)	-1.58	-11.64
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-14
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	25 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	3 March to 17 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.096 moisture fraction, 27.0 mL/100 g dry soil water holding capacity, pH 5.7
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 2**
INITIAL MEAN E.W. WEIGHT (g)	0.3863	0.4452
FINAL MEAN E.W. WEIGHT (g)	0.4079	0.3897
WEIGHT CHANGE (%)	6.25	-11.64
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF5SS-15

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 25 February 1994

DATE TEST SAMPLE RECEIVED: 1 March 1994

TEST DATES: 3 March to 17 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.115 moisture fraction, 25.2 mL/100 g dry soil water holding capacity, pH 7.3

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 2**
INITIAL MEAN E.W. WEIGHT (g)	0.3283	0.4452
FINAL MEAN E.W. WEIGHT (g)	0.3169	0.3897
WEIGHT CHANGE (%)	-3.31	-11.64
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-31
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	26 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	3 March to 17 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.373 moisture fraction, 26.5 mL/100 g dry soil water holding capacity, pH 6.5
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 3**
INITIAL MEAN E.W. WEIGHT (g)	0.3550	0.3880
FINAL MEAN E.W. WEIGHT (g)	0.3906	0.3543
WEIGHT CHANGE (%)	11.05	-7.91
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF5SS-26

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 25 February 1994

DATE TEST SAMPLE RECEIVED: 1 March 1994

TEST DATES: 3 March to 17 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.104 moisture fraction, 22.5 mL/100 g dry soil water holding capacity, pH 6.8

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 3**
INITIAL MEAN E.W. WEIGHT (g)	0.3504	0.3880
FINAL MEAN E.W. WEIGHT (g)	0.3639	0.3543
WEIGHT CHANGE (%)	3.85	-7.91
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF5SS-20

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 25 February 1994

DATE TEST SAMPLE RECEIVED: 1 March 1994

TEST DATES: 3 March to 17 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.097 moisture fraction, 15.3 mL/100 g dry soil water holding capacity, pH 7.1

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 3**
INITIAL MEAN E.W. WEIGHT (g)	0.3380	0.3880
FINAL MEAN E.W. WEIGHT (g)	0.3426	0.3543
WEIGHT CHANGE (%)	0.57	-7.91
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-19
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	25 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	3 March to 17 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.117 moisture fraction, 20.5 mL/100 g dry soil water holding capacity, pH 6.9
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 3**
INITIAL MEAN E.W. WEIGHT (g)	0.3365	0.3880
FINAL MEAN E.W. WEIGHT (g)	0.3167	0.3543
WEIGHT CHANGE (%)	-5.67	-7.91
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF5SS-21

SLI STUDY TITLE: 14-Day Earthworm Subacute Toxicity Test

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 25 February 1994

DATE TEST SAMPLE RECEIVED: 1 March 1994

TEST DATES: 3 March to 17 March 1994

TEST SPECIES: Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977)
source: Carolina Biological Supply Company

TEST SOIL CHARACTERIZATION: Initial: 0.134 moisture fraction, 54.5 mL/100 g dry soil water holding capacity, pH 5.5

TEST VESSELS: 400-mL polypropylene beakers containing 250 g soil (dry weight)

TEST CONDITIONS: 14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity

NUMBER EXPOSED: Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 3**
INITIAL MEAN E.W. WEIGHT (g)	0.3069	0.3880
FINAL MEAN E.W. WEIGHT (g)	0.3319	0.3543
WEIGHT CHANGE (%)	8.13	-7.91
MORTALITY DAY 7 (%)	3	0
MORTALITY DAY 14 (%)	3	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-23
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	25 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	3 March to 17 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.136 moisture fraction, 18.6 mL/100 g dry soil water holding capacity, pH 7.5
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 3**
INITIAL MEAN E.W. WEIGHT (g)	0.3018	0.3880
FINAL MEAN E.W. WEIGHT (g)	0.2964	0.3543
WEIGHT CHANGE (%)	-1.17	-7.91
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-24
SLI STUDY TITLE:	14-Day Earthworm Subacute Toxicity Test
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	25 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	3 March to 17 March 1994
TEST SPECIES:	Earthworm (*Eisenia foetida*), species verified with Reynolds key (Reynolds, 1977) source: Carolina Biological Supply Company
TEST SOIL CHARACTERIZATION:	Initial: 0.175 moisture fraction, 24.5 mL/100 g dry soil water holding capacity, pH 6.8
TEST VESSELS:	400-mL polypropylene beakers containing 250 g soil (dry weight)
TEST CONDITIONS:	14-day duration, soil temperature of 20 ± 2 °C, continuous lighting at 30 to 100 footcandles, ≥ 75% water holding capacity
NUMBER EXPOSED:	Ten earthworms per replicate; four replicates per test sample and control

RESULTS:	**Soil Sample**	**Control 3**
INITIAL MEAN E.W. WEIGHT (g)	0.2815	0.3880
FINAL MEAN E.W. WEIGHT (g)	0.2894	0.3543
WEIGHT CHANGE (%)	3.46	-7.91
MORTALITY DAY 7 (%)	0	0
MORTALITY DAY 14 (%)	0	0

8.0 APPENDIX V - LETTUCE TEST SUMMARIES

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	BSS01 (Test #1)
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	19 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.088 moisture fraction, 16.6 mL/100 g dry soil water holding capacity, initial pH: 4.1, termination pH: 4.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #3 - 94% germination
	Test Sample - 8.3% germination, statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	BSS01 (Reference Control, Test #2)
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	19 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.088 moisture fraction, 16.6 mL/100 g dry soil water holdin capacity, initial pH: 4.1, termination pH: 4.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #3 - 94% germination Test Sample - 0% germination, statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS01
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.072 moisture fraction, 38.5 mL/100 g dry soil water holding capacity, initial pH: 4.8, termination pH: 5.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 93% germination Test Sample - 90% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS02
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.198 moisture fraction, 14 mL/100 g dry soil water holding capacity initial pH: 4.9, termination pH: 5.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 93% germination Test Sample - 97% germination

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS03
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.216 moisture fraction, 12.1 mL/100 g dry soil water holding capacity, initial pH: 5.1, termination pH: 5.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 93% germination Test Sample - 93% germination

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS04
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.107 moisture fraction, 19.1 mL/100 g dry soil water holding capacity, initial pH: 4.1, termination pH: 4.8
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 96% germination
	Test Sample - 78% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS05
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.132 moisture fraction, 12.2 mL/100 g dry soil water holding capacity, initial pH: 5.6, termination pH: 5.4
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 96% germination Test Sample - 91% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS06
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.122 moisture fraction, 14.1 mL/100 g dry soil water holding capacity, initial pH: 4.1, termination pH: 6.0
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 93% germination Test Sample - 83% germination, statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS08
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.224 moisture fraction, 9.7 mL/100 g dry soil water holding capacity, initial pH: 5.2, termination pH: 6.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 93% germination Test Sample - 98% germination

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS04
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.038 moisture fraction, 19.9 mL/100 g dry soil water holding capacity, initial pH: 5.0, termination pH: 5.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 96% germination Test Sample - 87% germination, statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS05
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.071 moisture fraction, 26.6 mL/100 g dry soil water holding capacity, initial pH: 5.8, termination pH: 5.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 96% germination Test Sample - 97% germination

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS06
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	21 July 1993
DATE TEST SAMPLE RECEIVED:	22 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.058 moisture fraction, 24.2 mL/100 g dry soil water holding capacity, initial pH: 6.1, termination pH: 5.8
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 96% germination
	Test Sample - 97% germination

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS09
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.169 moisture fraction, 16.3 mL/100 g dry soil water holding capacity, initial pH: 4.3, termination pH: 4.5
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #3 - 94% germination Test Sample - 88% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS10
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.152 moisture fraction, 19.8 mL/100 g dry soil water holding capacity, initial pH: 5.0, termination pH: 4.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #4 - 99% germination Test Sample - 89% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS11
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.091 moisture fraction, 29.6 mL/100 g dry soil water holding capacity, initial pH: 4.9, termination pH: 5.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #4 - 99% germination Test Sample - 89% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS12
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.150 moisture fraction, 10.4 mL/100 g dry soil water holding capacity, initial pH: 4.9, termination pH: 4.8
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #3 - 94% germination Test Sample - 86% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS13
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.206 moisture fraction, 5.3 mL/100 g dry soil water holding capacity, initial pH: 5.0, termination pH: 5.5
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #3 - 94% germination Test Sample - 99% germination

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS14
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.134 moisture fraction, 33 mL/100 g dry soil water holding capacity initial pH: 4.2, termination pH: 4.5
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #4 - 99% germination Test Sample - 96% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS09
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.243 moisture fraction, 21.2 mL/100 g dry soil water holding capacity, initial pH: 5.8, termination pH: 4.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #4 - 99% germination
	Test Sample - 96% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS10
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	22 July 1993
DATE TEST SAMPLE RECEIVED:	23 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.050 moisture fraction, 35.6 mL/100 g dry soil water holding capacity, initial pH: 4.5, termination pH: 5.0
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #4 - 99% germination
	Test Sample - 95% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS07
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	27 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.134 moisture fraction, 26.5 mL/100 g dry soil water holding capacity, initial pH: 5.4, termination pH: 5.0
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #5 - 97% germination Test Sample - 96% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	1SS15
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	27 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.090 moisture fraction, 27.5 mL/100 g dry soil water holding capacity, initial pH: 4.7, termination pH: 5.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #5 - 97% germination
	Test Sample - 91% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS01
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	27 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.061 moisture fraction, 36.6 mL/100 g dry soil water holding capacity, initial pH: 5.6, termination pH: 5.4
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #5 - 97% germination Test Sample - 88% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS02
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	27 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.078 moisture fraction, 25.2 mL/100 g dry soil water holding capacity, initial pH: 5.7, termination pH: 5.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #5 - 97% germination Test Sample - 99% germination

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS03
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	27 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.057 moisture fraction, 25.4 mL/100 g dry soil water holding capacity, initial pH: 5.6, termination pH: 5.8
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #5 - 97% germination Test Sample - 97% germination

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS07
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	27 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.085 moisture fraction, 33 mL/100 g dry soil water holding capacity, initial pH: 4.2, termination pH: 4.8
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #5 - 97% germination Test Sample - 93% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	2SS08
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	23 July 1993
DATE TEST SAMPLE RECEIVED:	27 July 1993
TEST DATES:	29 July 1993 to 3 August 1993
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 7.5, 0.169% organic matter
TEST SOIL CHARACTERIZATION:	0.058 moisture fraction, 30.9 mL/100 g dry soil water holding capacity, initial pH: 4.7, termination pH: 5.4
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 23 °C, humidity ≥ 60% light intensity of 410 to 620 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #5 - 97% germination Test Sample - 98% germination

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF17SS3
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	12 February 1994
DATE TEST SAMPLE RECEIVED:	15 February 1994
TEST DATES:	17 February 1994 to 22 February 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.4, 0.1783% organic matter
TEST SOIL CHARACTERIZATION:	0.219 moisture fraction, 4.3 mL/100 g dry soil water holding capacity, initial pH: 5.1, termination pH: 5.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 22 - 26 °C, humidity ≥ 47 % light intensity of 740 to 840 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 86% germination Test Sample - 87% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF17SS6
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	12 February 1994
DATE TEST SAMPLE RECEIVED:	15 February 1994
TEST DATES:	17 February 1994 to 22 February 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.4, 0.1783% organic matter
TEST SOIL CHARACTERIZATION:	0.173 moisture fraction, 17.5 mL/100 g dry soil water holding capacity, initial pH: 6.7, termination pH: 6.9
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 23 - 27 °C, humidity ≥ 47 % light intensity of 740 to 840 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 86% germination Test Sample - 93% germination, not statistically different from the control

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF17SS8

TEST SAMPLE SITE: Cecil Field Naval Air Station
Jacksonville, Florida

TEST SAMPLE I.D.: CF17SS10

SLI STUDY TITLE: 120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)

SAMPLE TYPE: Soil

DATE TEST SAMPLE COLLECTED: 12 February 1994

DATE TEST SAMPLE RECEIVED: 15 February 1994

TEST DATES: 17 February 1994 to 22 February 1994

TEST SPECIES: *Lactuca sativa*; variety Buttercrunch
source: Park Seed Company

OVERLYING SAND: Washed silica sand, 200 mesh, pH 6.4, 0.1783% organic matter

TEST SOIL CHARACTERIZATION: 0.160 moisture fraction, 17.8 mL/100 g dry soil water holding capacity, initial pH: 7.2, termination pH: 7.5

TEST VESSELS: Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height

TEST CONDITIONS: 120 hour duration, temperature of 22 - 27 °C, humidity ≥ 47 % light intensity of 740 to 840 footcandles, ≥ 85% water holding capacity

NUMBER EXPOSED: 120; 40 seeds per replicate

RESULTS: Control #1 - 86% germination

Test Sample - 94% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF17SS11
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	12 February 1994
DATE TEST SAMPLE RECEIVED:	15 February 1994
TEST DATES:	17 February 1994 to 22 February 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.4, 0.1783% organic matter
TEST SOIL CHARACTERIZATION:	0.298 moisture fraction, 14.9 mL/100 g dry soil water holding capacity, initial pH: 4.2, termination pH: 4.4
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 22 - 27 °C, humidity ≥ 47 % light intensity of 740 to 840 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 86% germination
	Test Sample - 88% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF17SS12

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-4
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	24 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.147 moisture fraction, 39.0 mL/100 g dry soil water holding capacity, initial pH: 4.5, termination pH: 4.3
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 25 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 91% germination
	Test Sample - 22% germination, statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-2
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	24 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.152 moisture fraction, 15.5 mL/100 g dry soil water holding capacity, initial pH: 6.5, termination pH: 7.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 25 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 91% germination Test Sample - 88% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-9
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	24 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.147 moisture fraction, 11.1 mL/100 g dry soil water holding capacity, initial pH: 4.2, termination pH: 4.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 24 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 91% germination Test Sample - 90% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-8
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	24 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.124 moisture fraction, 14.6 mL/100 g dry soil water holding capacity, initial pH: 6.5, termination pH: 7.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 24 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #1 - 91% germination Test Sample - 89% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-13
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	25 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.111 moisture fraction, 18.5 mL/100 g dry soil water holding capacity, initial pH: 5.0, termination pH: 4.7
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 24 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 97% germination Test Sample - 79% germination, statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-14
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	25 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.096 moisture fraction, 27.0 mL/100 g dry soil water holding capacity, initial pH: 4.3, termination pH: 4.2
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 20 - 24 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 97% germination Test Sample - 91% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-15
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	25 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.115 moisture fraction, 25.2 mL/100 g dry soil water holding capacity, initial pH: 7.5, termination pH: 7.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 24 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 97% germination Test Sample - 92% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-31
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	26 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.373 moisture fraction, 26.5 mL/100 g dry soil water holding capacity, initial pH: 6.8, termination pH: 6.8
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 21 - 25 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 97% germination
	Test Sample - 83% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-26
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	25 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.104 moisture fraction, 22.5 mL/100 g dry soil water holdin capacity, initial pH: 7.4, termination pH: 7.6
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 22 - 26 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #2 - 97% germination Test Sample - 91% germination, not statistically different from the control

TEST SAMPLE SITE:	Cecil Field Naval Air Station Jacksonville, Florida
TEST SAMPLE I.D.:	CF5SS-20
SLI STUDY TITLE:	120-Hour Seed Germination Test With Lettuce (*Lactuca sativa*)
SAMPLE TYPE:	Soil
DATE TEST SAMPLE COLLECTED:	25 February 1994
DATE TEST SAMPLE RECEIVED:	1 March 1994
TEST DATES:	4 March 1994 to 9 March 1994
TEST SPECIES:	*Lactuca sativa*; variety Buttercrunch source: Park Seed Company
OVERLYING SAND:	Washed silica sand, 200 mesh, pH 6.5, 0.17% organic matter
TEST SOIL CHARACTERIZATION:	0.097 moisture fraction, 15.3 mL/100 g dry soil water holding capacity, initial pH: 7.5, termination pH: 7.8
TEST VESSELS:	Three replicate Pyrex plastic petri dishes, 150 mm, 15 mm height
TEST CONDITIONS:	120 hour duration, temperature of 22 - 25 °C, humidity ≥ 39 % light intensity of 720 to 1000 footcandles, ≥ 85% water holding capacity
NUMBER EXPOSED:	120; 40 seeds per replicate
RESULTS:	Control #3 - 93% germination Test Sample - 94% germination, not statistically different from the control

APPENDIX K

APPENDIX K

BIOACCUMULATION, BIOCONCENTRATION, AND TOXICITY DATA

Table K.1-1
Bioaccumulation Data

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	log K_{ow}	[b]	Bioaccumulation Factor [a] Plant	Site 5 Invertebrate [c]	Site 17 Invertebrate [c]	Mammal	Bird
SEMIVOLATILES							
Acenaphthene	3.9	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Acenaphthylene	4.1	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Anthracene	4.5	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Benzo(a)anthracene	5.7	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Benzo(a)pyrene	6	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Benzo(b)fluoranthene	6.1	5.1	8.7E-03 [d]	5.0E-02 [e]	5.0E-02 [e]	1.9E-01 [f]	NA
Benzo(g,h,i)perylene	6.6	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Benzo(k)fluoranthene	6.1	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Carbazole	3.76	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Chrysene	5.7	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Dibenz(a,h)anthracene	6.5	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Dibenzofuran	4.1	4.1	3.3E-02 [d]	NA		NC [f]	NA
Diethylphthalate	3.2	5.5	5.1E-03 [d]	NA		4.8E-01 [f]	NA
bis(2-Ethylhexyl)phthalate	5.1	5.5	5.1E-03 [d]	NA	NA	4.8E-01 [f]	NA
Fluoranthene	4.95 [g]	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Fluorene	4.2	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Indeno(1,2,3-cd)pyrene	6.6	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
2-Methylnaphthalene	3.86 [h]	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
4-Methylphenol	1.9	1.7	8.1E-01 [d]		NA	NC [f]	NA
Naphthalene	3.6	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Phenanthrene	4.5	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
Phenol	1.5	1.7	8.1E-01 [d]		NA	NC [f]	NA
Pyrene	5.3	5.1	8.7E-03 [d]	5.0E-02 [e]		1.9E-01 [f]	NA
PESTICIDES/PCBs							
4,4'-DDD	6		1.0E-02 [i]	3.0E+00		1.2E+00 [j]	2.9E+00 [k]
4,4'-DDE	5.7		1.0E-02 [i]	1.9E+01	1.7E+00 [l]	1.2E+00 [j]	2.9E+00 [k]
4,4'-DDT	6.4		1.0E-02 [i]	1.2E+00		1.2E+00 [j]	2.9E+00 [k]
Aroclor-1260	7.1 [m]		1.2E-01 [n]	3.3E+00		3.8E+00 [o]	3.2E-01 [p]
alpha-Chlordane	5.5		5.1E-03 [d]	1.6E+00 [q]		5.5E-01 [r]	1.8E+00 [s]
gamma-Chlordane	5.5		5.1E-03 [d]	1.6E+00 [t]		5.5E-01 [r]	1.8E+00 [s]
Dieldrin	4.6		1.7E-02 [d]	5.5E+00 [u]		1.5E+00 [v]	4.4E-01 [w]
INORGANICS							
Barium	NA		3.0E-02 [x]	1.4E-01		7.5E-03 [y]	NA
Beryllium	NA		2.0E-03 [x]	9.4E-02		5.0E-02 [y]	NA
Cadmium	NA		3.3E+01 [z]	1.2E+00		2.1E+00 [aa]	3.8E-01 [ab]
Cobalt	NA		4.0E-03 [x]	5.5E-01		1.0E+00 [y]	NA
Copper	NA		7.8E-01 [ac]	6.8E-01		6.0E-01 [z]	NA
Lead	NA		NC [z]	9.7E-02	1.8E-01	2.8E-01 [y]	NA
Manganese	NA		5.0E-02 [x]	4.2E-01	1.8E-01	2.8E-01 [y]	NA
Mercury	NA		1.8E-01 [x]	6.8E-02 [ad]		1.0E-02 [ae]	2.3E+00 [ae]
Nickel	NA		1.2E-02 [x]	1.8E-01		3.0E-01 [y]	NA
Selenium	NA		9.0E-03 [af]	7.6E-01 [ag]		7.5E-01 [y]	5.1E-01 [ah]
Thallium	NA		1.1E-03 [x]		NA	1.5E+00 [y]	NA
Zinc	NA		6.1E-01 [ac]	2.8E+00		2.1E+00 [ai]	NA

NOTES:

[a] Units for bioaccumulation factors (BAFs) are (mg/kg fresh wt tissue over mg/kg dry wt soil) for invertebrates and plants, and (mg/kg fresh wt tissue over mg/kg fresh wt. food) for small mammals and small birds. No BAFs were calculated for VOAs since available evidence suggests that these analytes do not bioaccumulate.

[b] From Superfund Chemical Data Matrix (USEPA, 1993a) unless otherwise noted. Log K_{ow}s for classes of semivolatile compounds were averaged to provide an average BAF value. Compounds were grouped accordingly: PAHs (5.1), phthalates (5.5), phenols (1.7), and dibenzofuran (4.1).

[c] When available, site-specific earthworm and soil data were used to calculate an earthworm BAF. When no site-specific data were available, literature values were used. Where there are no values, that analyte is not a CPC for that medium.

[d] Hansch & Leo (1979)

[d] Calculated using the following equation in Travis and Arms (1988): log(Plant Uptake Factor) = 1.588-0.578 log K_{ow}. Converted from dry weight to wet weight plant concentration assuming 80% water content.

[e] Average of values presented in Beyer (1990), converted from dry weight to fresh weight uusing a factor of 0.2 to represent 80% water content of earthworms.

Table K.1-1
Bioaccumulation Data

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	log K_{ow} [b]	Bioaccumulation Factor [a]				
		Plant	Site 5 Invertebrate [c]	Site 17 Invertebrate [c]	Mammal	Bird

[f] Calculated using the following equation in Travis and Arms (1988) for semivolatile organic analytes with log K_{ow}s > 5: log BTF (biotransfer factor) = log K_{ow} − 7.6; result multiplied by average ingestion rates for non-lactating and lactating test animals to convert from BTFs to BAFs, divided by a factor of 0.2 to convert from dry feed to fresh feed. There is an uncertainty involved in using this equation for PAHs because this study did not use any PAHs in the regression analysis. BAFs were calculated for all pesticides and PCBs, regardless of the log K_{ow} due to the nature of lipophyllic compounds. No BAFs were calculated for analytes with log K_{ow}s < 5 because they are unlikely to bioaccumulate in animal tissue (Maughan, 1992).

[g] USEPA (1992), Dermal Exposure Assessment.

[h] ATSDR, 1993a (Toxicological Profile for Naphthalene).

[i] Geometric mean of DDT_R (4,4'-DDT, 4,4'-DDD, and 4,4'-DDE) BAFs (fresh wt/dry wt) reported for roots (carrot, potato, sugar beet), grains (corn, oats), and legumes (alfalfa) derived from USEPA (1985a) converted from dry weight to wet-weight per values provided by Suter (1993).

[l] Geometric means of earthworm BAFs for 4,4'-DDT [Davis (1968), Davis & Harrison (1966), Wheatley & Hardman (1968), Bailey et al. (1970), Cramp & Olney (1967), and Beyer & Gish (1980)], 4,4'-DDE [Davis (1968), Davis & Harrison (1966), Cramp & Olney (1967), Collett & Harrison (1968), Hunt & Sacho (1969), and Gish (1970)], and 4,4-DDD [Barker (1958), Davis (1968), Davis & Harrison (1966), Cramp & Olney (1967), Collett & Harrison (1968), Wheatley & Hardman (1968), Hunt & Sacho (1969), Bailey et al. (1970), Dimond et al. (1970), Gish (1970), and Beyer & Gish (1980)]. Wet soil concentrations converted as necessary to dry soil concentrations assuming 10% moisture content in sandy-loam soils (Donahue et al., 1977).

[j] BAF for shrews and voles calculated using measured concentrations of DDT_R in stomach content and in whole body (Forsyth & Petrie, 1984).

[k] Whole body pheasant BAF for DDT_R presented in USEPA (1985a), derived from Kenaga (1973).

[m] USEPA (1990a), Basics of Pump-and-Treat Groundwater Remediation Technology

[n] Arithmetic mean BAF for corn, leaves, carrots, beets, sugarbeets, radishes, and soybeans (tops, roots, and whole plants) from USEPA (1985b) and Webber et al. (1983).

[o] BAF calculated from discussion in Eisler (1986) stating that Aroclor 1254 residues in subcutaneous fat of adult minks were up to 38 times dietary levels. Converted to whole body concentrations assuming 10% lipid content.

[p] BAF calculated from data presented in Eisler, 1986. Kestrels fed 33 mg PCB/kg diet for 62-69 days accumulated 107 mg PCB/kg lipid weight in muscle. Assuming muscle is 10% lipid content, the muscle concentration is about 10.7 mg/kg.

[q] Value for gamma-chlordane used as a surrogate

[r] BAF calculated from data presented in Eisler, 1990. Rats fed 20 mg/kg diet technical chlordane (equivalent to 3.6 mg/kg diet cis- and trans-chlordane) for 350 days accumulated 20 mg/kg in lipids. Assuming 10% lipid content, the whole body concentration is about 2 mg/kg.

[s] BAF calculated from data presented in Eisler, 1990. Red-winged blackbirds fed 10 mg/kg diet technical chlordane (equivalent to 1.8 mg/kg diet cis- and trans- chlordane) for 84 days accumulated 1.8 mg/kg wet weight whole body residue.

[t] Geometric mean of reported BAFs for earthworms (Gish, 1970) converted from dry weight to wet weight assuming 80% water content.

[u] Geometric mean of reported BAFs for earthworms (Edwards & Thompson, 1973). Values provided by Gish (1970) were converted from dry weight to wet weight by multiplying by a conversion factor of 0.2 assuming 80% water composition of earthworms.

[v] BAF calculated from data presented by Potter et al (1974). Based on an average dieldrin concentration in cow muscle and fat of 0.17 mg/kg (dry weight) and a dieldrin concentration of 0.11 mg/kg in the diet (dry weight).

[w] Jeffries and Davis (1968).

[x] Value from Baes et al. (1984) multiplied by 0.2 to represent 80% water composition of plants.

[y] Value derived from biotransfer factors (BTFs), presented in Baes et al. (1984) for uptake into cattle. BTF converted to BAF by multiplying by food ingestion rate of 50 kg/day wet weight.

[z] Mammal value for copper and plant value for cadmium from Levine et al., 1989. Lead does not accumulate in plant tissue, therefore, a BAF of zero was assigned.

[aa] Mean of values reported for *Sorex araneus* in MacFadyen (1980).

[ab] Based on accumulation of cadmium in kidneys of European quail in Pimentel et al. (1984).

[ac] Median of values reported from Levine et al. (1989).

[ad] Uptake value (fresh wt./dry wt.) for earthworms from USEPA (1985c) sludge document. Fresh weight tissue concentrations calculated assuming 80% body water content.

[ae] USEPA, 1985c.

[af] Based on reported ratio of selenium in plant tissue and iron fly ash amended soil (Stoewsand et al., 1978).

[ag] Average of values for industrial soils from Beyer and Cromartie (1987) multiplied by 0.2 to represent 80% water composition in earthworms.

[ah] Based on average of reported ratio of selenium in diet to liver, kidney, and breast tissue of chickens (Eisler, 1985a).

[ai] Mean of values for *Microtus agrestis* and *Apodemus sylvaticus* in MacFadyen (1980).

NA Not Available

Table K.1–2
Calculation of Earthworm Bioaccumulation Factors

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Soil Data					Earthworm Data			Bioaccumulation Factor [2]
SITE ID	ANALYTE	RESULT	RDL [1]	UNITS	RESULT	RDL [1]	UNITS	([Earthworm]/[Soil])
CF5SS13	Aluminum	2490		mg/kg	236		mg/kg	9.48E−02
	Aroclor−1260	410		µg/kg	1360		µg/kg	3.32E+00
	Barium	4		mg/kg	0.5		mg/kg	1.25E−01
	Cadmium	0.5	1	mg/kg	0.64		mg/kg	1.28E+00
	Chromium	2.8		mg/kg	0.46		mg/kg	1.64E−01
	Cobalt	0.7	1.4	mg/kg	1.1		mg/kg	1.57E+00
	Copper	2.5	5	mg/kg	1.5		mg/kg	6.00E−01
	Iron	451		mg/kg	93.2		mg/kg	2.07E−01
	Lead	88.9		mg/kg	9		mg/kg	1.01E−01
	Manganese	1.5	3	mg/kg	2.3		mg/kg	1.53E+00
	Vanadium	2.2		mg/kg	0.42		mg/kg	1.91E−01
	Zinc	2	4	mg/kg	20.7		mg/kg	1.04E+01
CF5SS15	4,4'−DDE	0.54		µg/kg	23	46	µg/kg	4.26E+01
	Aluminum	2780		mg/kg	232		mg/kg	8.35E−02
	Antimony	6	12	mg/kg	1.4		mg/kg	2.33E−01
	Arsenic	0.59		mg/kg	1.3		mg/kg	2.20E+00
	Barium	12.6		mg/kg	1.1		mg/kg	8.73E−02
	Cadmium	0.5	1	mg/kg	0.62		mg/kg	1.24E+00
	Chromium	14.4		mg/kg	1.2		mg/kg	8.33E−02
	Cobalt	2		mg/kg	0.77		mg/kg	3.85E−01
	Copper	2.5	5	mg/kg	2.1		mg/kg	8.40E−01
	Iron	1710		mg/kg	152		mg/kg	8.89E−02
	Lead	34.1		mg/kg	2.9		mg/kg	8.50E−02
	Manganese	29.9		mg/kg	3.4		mg/kg	1.14E−01
	Nickel	13.6		mg/kg	0.455	0.91	mg/kg	3.35E−02
	Vanadium	3.7		mg/kg	0.21		mg/kg	5.68E−02
	Zinc	76.4		mg/kg	23.9		mg/kg	3.13E−01
CF5SS19	4,4'−DDE	0.75		µg/kg	21.5	43	µg/kg	2.87E+01
	Aluminum	1360		mg/kg	160		mg/kg	1.18E−01
	Arsenic	0.73		mg/kg	0.55	1.1	mg/kg	7.53E−01
	Barium	6		mg/kg	0.71		mg/kg	1.18E−01
	Cadmium	0.81		mg/kg	0.36		mg/kg	4.44E−01
	Chromium	5.7		mg/kg	0.46		mg/kg	8.07E−02
	Cobalt	2.4		mg/kg	0.72		mg/kg	3.00E−01
	Copper	2.5	5	mg/kg	2		mg/kg	8.00E−01
	Iron	584		mg/kg	112		mg/kg	1.92E−01
	Lead	7.7		mg/kg	0.98		mg/kg	1.27E−01
	Manganese	19.6		mg/kg	3.5		mg/kg	1.79E−01
	Vanadium	5.6		mg/kg	0.38		mg/kg	6.79E−02
	Zinc	8.8		mg/kg	19.4		mg/kg	2.20E+00
CF5SS20	4,4'−DDE	5.1		µg/kg	18.5	37	µg/kg	3.63E+00
	Aluminum	3490		mg/kg	495		mg/kg	1.42E−01
	Antimony	6	12	mg/kg	1.5		mg/kg	2.50E−01
	Aroclor−1260	56		µg/kg	185	370	µg/kg	3.30E+00
	Arsenic	0.78		mg/kg	0.55	1.1	mg/kg	7.05E−01
	Barium	27		mg/kg	5.8		mg/kg	2.15E−01
	Beryllium	0.27		mg/kg	0.04		mg/kg	1.48E−01
	Chromium	6.6		mg/kg	1.1		mg/kg	1.67E−01
	Cobalt	2.5		mg/kg	0.74		mg/kg	2.96E−01
	Copper	11.5		mg/kg	3.9		mg/kg	3.39E−01
	Iron	2660		mg/kg	303		mg/kg	1.14E−01
	Lead	111		mg/kg	7.3		mg/kg	6.58E−02
	Manganese	75.3		mg/kg	11.7		mg/kg	1.55E−01
	Nickel	4	8	mg/kg	1.3		mg/kg	3.25E−01
	Vanadium	7.8		mg/kg	0.94		mg/kg	1.21E−01
	Zinc	98.2		mg/kg	28.2		mg/kg	2.87E−01

Table K.1–2
Calculation of Earthworm Bioaccumulation Factors

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Soil Data					Earthworm Data			Bioaccumulation Factor [2]
SITE ID	ANALYTE	RESULT	RDL [1]	UNITS	RESULT	RDL [1]	UNITS	([Earthworm]/[Soil])
CF5SS26	4,4'–DDD	6.1		µg/kg	18.5	37	µg/kg	3.03E+00
	4,4'–DDE	20		µg/kg	18.5	37	µg/kg	9.25E–01
	4,4'–DDT	15		µg/kg	18.5	37	µg/kg	1.23E+00
	Aluminum	1850		mg/kg	209		mg/kg	1.13E–01
	Arsenic	1	2	mg/kg	1.6		mg/kg	1.60E+00
	Barium	8.4		mg/kg	1.1		mg/kg	1.31E–01
	Beryllium	0.5	1	mg/kg	0.02		mg/kg	4.00E–02
	Cadmium	0.5	1	mg/kg	1		mg/kg	2.00E+00
	Chromium	4.6		mg/kg	0.63		mg/kg	1.37E–01
	Cobalt	5	10	mg/kg	1		mg/kg	2.00E–01
	Copper	2.5	5	mg/kg	2.1		mg/kg	8.40E–01
	Iron	817		mg/kg	123		mg/kg	1.51E–01
	Lead	40.7		mg/kg	4.2		mg/kg	1.03E–01
	Manganese	28.4		mg/kg	4		mg/kg	1.41E–01
	Vanadium	3.9		mg/kg	0.32		mg/kg	8.21E–02
	Zinc	27.3		mg/kg	20		mg/kg	7.33E–01
CF17SS8	Aluminum	1120		mg/kg	244		mg/kg	2.18E–01
	Arsenic	0.73		mg/kg	2.4		mg/kg	3.29E+00
	Barium	6		mg/kg	1.6		mg/kg	2.67E–01
	Beryllium	0.5	1	mg/kg	0.03		mg/kg	6.00E–02
	Cadmium	0.5	1	mg/kg	0.45		mg/kg	9.00E–01
	Chromium	4.2		mg/kg	1.2		mg/kg	2.86E–01
	Cobalt	5	10	mg/kg	0.54		mg/kg	1.08E–01
	Copper	2.5	5	mg/kg	1.9		mg/kg	7.60E–01
	Iron	613		mg/kg	167		mg/kg	2.72E–01
	Lead	6.4		mg/kg	1.7		mg/kg	2.66E–01
	Manganese	30.7		mg/kg	5.4		mg/kg	1.76E–01
	Vanadium	2.5		mg/kg	0.36		mg/kg	1.44E–01
	Zinc	2	4	mg/kg	16.2		mg/kg	8.10E+00
CF17SS10	Aluminum	952		mg/kg	49		mg/kg	5.15E–02
	Arsenic	1	2	mg/kg	3.1		mg/kg	3.10E+00
	Barium	3.8		mg/kg	0.38		mg/kg	1.00E–01
	Beryllium	0.5	1	mg/kg	0.04		mg/kg	8.00E–02
	Cadmium	0.5	1	mg/kg	1.1		mg/kg	2.20E+00
	Chromium	2.9		mg/kg	0.68		mg/kg	2.34E–01
	Cobalt	5	10	mg/kg	1.1		mg/kg	2.20E–01
	Copper	2.5	5	mg/kg	1.8		mg/kg	7.20E–01
	Iron	342		mg/kg	140		mg/kg	4.09E–01
	Lead	6.2		mg/kg	0.57		mg/kg	9.19E–02
	Manganese	6.9		mg/kg	1.3		mg/kg	1.88E–01
	Vanadium	1.8		mg/kg	0.2	0.4	mg/kg	1.11E–01
	Zinc	2	4	mg/kg	25		mg/kg	1.25E+01

NOTES:

[1] Reported detection limits (RDLs) are presented when an analyte was detected in only one of the two media evaluated. The value presented and used for calculation of the bioaccumulation factor corresponds to 1/2 the RDL.

[2] SVOA BAFs were not calculated because there were no detected concentrations in earthworm tissue. Literature values will be used instead.

= Analyte selected as an ECPC for either Site 5 or 17 surface soils.

Table K.1-3
Summary of Earthworm BAFs [1]

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

	SITE 5						SITE 17		
Compound	CF5SS13 BAF	CF5SS15 BAF	CF5SS19 BAF	CF5SS20 BAF	CF5SS26 BAF	Site 5 BAF [2]	CF17SS8 BAF	CF17SS10 BAF	Site 17 BAF [2]
Aroclor-1260	3.32E+00			3.30E+00		3.31E+00			
4,4'-DDD					3.03E+00	3.03E+00			
4,4'-DDE		4.26E+01	2.87E+01	3.63E+00	9.25E-01	1.90E+01			
4,4'-DDT					1.23E+00	1.23E+00			
Barium	1.25E-01	8.73E-02	1.18E-01	2.15E-01	1.31E-01	1.35E-01			
Beryllium				1.48E-01	4.00E-02	9.41E-02			
Cadmium	1.28E+00	1.24E+00	4.44E-01		2.00E+00	1.24E+00			
Cobalt	1.57E+00	3.85E-01	3.00E-01	2.96E-01	2.00E-01	5.50E-01			
Copper	6.00E-01	8.40E-01	8.00E-01	3.39E-01	8.40E-01	6.84E-01			
Lead	1.01E-01	8.50E-02	1.27E-01	6.58E-02	1.03E-01	9.65E-02	2.66E-01	9.19E-02	1.79E-01
Manganese	1.53E+00	1.14E-01	1.79E-01	1.55E-01	1.41E-01	4.24E-01	1.76E-01	1.88E-01	1.82E-01
Nickel		3.35E-02		3.25E-01		1.79E-01			
Zinc	1.04E+01	3.13E-01	2.20E+00	2.87E-01	7.33E-01	2.78E+00			

NOTES:

[1] BAFs are presented for only the analytes selected as ECPCs in Site 5 or 17 surface soils. Analytes detected in earthworms that were not detected in Site 5 or 17 surface soils are assumed to be not site related.

[2] Sample location-specific BAFs from Table K.1-2. Site-specific BAFs are equal to the arithmetic average of all sample location-specific BAFs.

Table K.1–4
Derivation of Sediment BAFs[1]

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Compound	Value	Source	Rationale
4,4'–DDT	21.0	Evans et al., 1991	Amphipod to sediment mean biomagnification factor for total DDT in Lake Michigan and Lake Ontario.
PCBs	12.2	Evans et al., 1991	Amphipod to sediment mean biomagnification factor for total PCBs in Lake Michigan and Lake Ontario.
Mercury	16.7	Lindquist et al., 1991	Based on the ranges of mercury concentrations in sediment and macro–invertebrates in an eight lake ecosystem in Sweden. Sediment concentra–tions ranged from 0.05 – 0.3 μg/g dry weight (mid point = 0.18 μg/g) and macroinvertebrate concentrations ranged from 0.02 – 6 μg/g dry weight (mid point = 3.01). Based on these midpoints, a bioaccumulation factor of 16.7 was obtained.

NOTES:
[1] No bioaccumulation factors were obtained for any other ECPCs in sediment as insufficient literature exists.

Table K.2 – 1
AQUIRE Bioconcentration Information [1]

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Concentration (µg/L)	BCF	AQUIRE (1994) Reference Number	Year of Publication
Aluminum	Salvelinus fontinalis; Brook trout	0.2 grams, 30 days	56 days	268	36	213592	91
Aluminum chloride	Unio pictorum; Mussel;	9.4 (7.7–10.18) cm	3 weeks	166.8 to 414.3	250	210076	90
Cadmium	Spirulina platensis; Blue – green algae	NR	12 hours	100	14.61	312317	86
	Spirulina platensis; Blue – green algae	NR	24 hours	100	18.30	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	100	18.00	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	100	16.10	312317	86
	Spirulina platensis; Blue – green algae	NR	12 hours	500	7.81	312317	86
	Spirulina platensis; Blue – green algae	NR	24 hours	500	8.77	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	500	8.56	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	500	7.42	312317	86
	Spirulina platensis; Blue – green algae	NR	12 hours	1000	6.22	312317	86
	Spirulina platensis; Blue – green algae	NR	24 hours	1000	7.04	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	1000	7.14	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	1000	6.77	312317	86
	Spirulina platensis; Blue – green algae	NR	12 hours	5000	3.06	312317	86
	Spirulina platensis; Blue – green algae	NR	24 hours	5000	2.79	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	5000	2.63	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	5000	2.10	312317	86
	Spirulina platensis; Blue – green algae	NR	12 hours	10000	2.42	312317	86
	Spirulina platensis; Blue – green algae	NR	24 hours	10000	1.85	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	10000	1.69	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	10000	1.55	312317	86
	Spirulina platensis; Blue – green algae	NR	12 hours	100	16.76	312317	86
	Spirulina platensis; Blue – green algae	NR	24 hours	100	14.02	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	100	13.04	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	100	13.41	312317	86
	Spirulina platensis; Blue – green algae	NR	12 hours	500	8.56	312317	86
	Spirulina platensis; Blue – green algae	NR	24 hours	500	7.64	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	500	7.36	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	500	6.50	312317	86
	Spirulina platensis; Blue – green algae	NR	12 hours	1000	6.13	312317	86
	Spirulina platensis, Blue – green algae	NR	24 hours	1000	6.00	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	1000	6.16	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	1000	4.13	312317	86
	Spirulina platensis; Blue – green algae	NR	12 hours	5000	3.38	312317	86
	Spirulina platensis; Blue – green algae	NR	24 hours	5000	3.08	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	5000	3.03	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	5000	2.63	312317	86

Table K.2 – 1
AQUIRE Bioconcentration Information [1]

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Concentration (µg/L)	BCF	AQUIRE (1994) Reference Number	Year of Publication
Cadmium (cont.)	Spirulina platensis; Blue – green algae	NR	12 hours	10000	2.63	312317	86
	Spirulina platensis; Blue – green algae	NR	24 hours	10000	2.31	312317	86
	Spirulina platensis; Blue – green algae	NR	36 hours	10000	2.21	312317	86
	Spirulina platensis; Blue – green algae	NR	48 hours	10000	2.20	312317	86
	Oncorhynchus mykiss; Rainbow trout, donaldson trout	46.21 grams	72 days	0.00127	55.0	210688	89
	Coregonus clupeaformis; Lake whitefish	26.63 grams	72 days	0.00125	42.1	210688	89
Lead	Salvelinus fontinalis; Brook trout	FINGERLING, 7.3 – 10 cm	3 weeks	4.1 to 88	66 to 1400	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7.3 – 10 cm	3 weeks	135	41.9	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7.3 – 10 cm	3 weeks	135	7.78	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7 – 10 cm	3 weeks	4.3	160	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7 – 10 cm	3 weeks	5.7	140	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7 – 10 cm	3 weeks	12.5	73	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7 – 10 cm	3 weeks	12.5	32	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7 – 10 cm	3 weeks	12.5	24	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7 – 10 cm	3 weeks	12.5	48	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7 – 10 cm	3 weeks	12.5	160	315675	75
	Salvelinus fontinalis; Brook trout	FINGERLING, 7 – 10 cm	3 weeks	12.5	16	315675	75
	Colisa fasciata; Giant gourami	NR	8 hours	902	2.9	213784	91
	Colisa fasciata; Giant gourami	NR	8 hours	902	0.8	213784	91
	Colisa fasciata; Giant gourami	NR	16 hours	0.860	3.4	213784	91
	Colisa fasciata; Giant gourami	NR	16 hours	0.860	0.4	213784	91
	Colisa fasciata; Giant gourami	NR	16 hours	0.860	1.0	213784	91
	Colisa fasciata; Giant gourami	NR	24 hours	801	3.4	213784	91
	Colisa fasciata; Giant gourami	NR	24 hours	801	0.3	213784	91
	Colisa fasciata; Giant gourami	NR	24 hours	801	1.1	213784	91
	Colisa fasciata; Giant gourami	NR	5 days	1000	5.0	213784	91
	Colisa fasciata; Giant gourami	NR	5 days	1000	0.5	213784	91
	Colisa fasciata; Giant gourami	NR	5 days	1000	3.9	213784	91
	Colisa fasciata; Giant gourami	NR	10 days	701	6.9	213784	91
	Colisa fasciata; Giant gourami	NR	10 days	701	0.7	213784	91
	Colisa fasciata; Giant gourami	NR	10 days	701	6.1	213784	91
	Colisa fasciata; Giant gourami	NR	15 days	586	5.3	213784	91
	Colisa fasciata; Giant gourami	NR	15 days	586	0.8	213784	91
	Colisa fasciata; Giant gourami	NR	15 days	586	5.7	213784	91
	Colisa fasciata; Giant gourami	NR	20 days	621	7.2	213784	91
	Colisa fasciata; Giant gourami	NR	20 days	621	0.7	213784	91
	Colisa fasciata; Giant gourami	NR	20 days	621	6.5	213784	91
	Colisa fasciata; Giant gourami	NR	25 days	601	8.0	213784	91

Table K.2 – 1
AQUIRE Bioconcentration Information [1]

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Concentration (µg/L)	BCF	AQUIRE (1994) Reference Number	Year of Publication
Lead (cont.)	Colisa fasciata; Giant gourami	NR	25 days	601	0.9	213784	91
	Colisa fasciata; Giant gourami	NR	25 days	601	7.1	213784	91
	Colisa fasciata; Giant gourami	NR	8 hours	1799	0.9	213784	91
	Colisa fasciata; Giant gourami	NR	8 hours	1799	0.6	213784	91
	Colisa fasciata; Giant gourami	NR	8 hours	1799	0.8	213784	91
	Colisa fasciata; Giant gourami	NR	16 hours	1602	1.8	213784	91
	Colisa fasciata; Giant gourami	NR	16 hours	1602	0.8	213784	91
	Colisa fasciata; Giant gourami	NR	16 hours	1602	1.8	213784	91
	Colisa fasciata; Giant gourami	NR	24 hours	1523	1.7	213784	91
	Colisa fasciata; Giant gourami	NR	24 hours	1523	0.8	213784	91
	Colisa fasciata; Giant gourami	NR	24 hours	1523	2.1	213784	91
	Colisa fasciata; Giant gourami	NR	5 days	1544	3.1	213784	91
	Colisa fasciata; Giant gourami	NR	5 days	1544	1.2	213784	91
	Colisa fasciata; Giant gourami	NR	5 days	1544	3.2	213784	91
	Colisa fasciata; Giant gourami	NR	10 days	1368	2.8	213784	91
	Colisa fasciata; Giant gourami	NR	10 days	1368	2.1	213784	91
	Colisa fasciata; Giant gourami	NR	10 days	1368	4.2	213784	91
	Colisa fasciata; Giant gourami	NR	15 days	1402	4.5	213784	91
	Colisa fasciata; Giant gourami	NR	15 days	1402	1.5	213784	91
	Colisa fasciata; Giant gourami	NR	15 days	1402	3.7	213784	91
	Colisa fasciata; Giant gourami	NR	20 days	1301	6.8	213784	91
	Colisa fasciata; Giant gourami	NR	20 days	1301	1.9	213784	91
	Colisa fasciata; Giant gourami	NR	20 days	1301	4.9	213784	91
	Colisa fasciata; Giant gourami	NR	25 days	1300	4.9	213784	91
	Colisa fasciata; Giant gourami	NR	25 days	1300	1.8	213784	91
	Colisa fasciata; Giant gourami	NR	25 days	1300	5.0	213784	91
	Colisa fasciata; Giant gourami	NR	8 hours	4324	0.8	213784	91
	Colisa fasciata; Giant gourami	NR	8 hours	4324	0.4	213784	91
	Colisa fasciata; Giant gourami	NR	8 hours	4324	1.0	213784	91
	Colisa fasciata; Giant gourami	NR	16 hours	4300	1.7	213784	91
	Colisa fasciata; Giant gourami	NR	16 hours	4300	0.6	213784	91
	Colisa fasciata; Giant gourami	NR	16 hours	4300	1.0	213784	91
	Colisa fasciata; Giant gourami	NR	24 hours	4285	1.4	213784	91
	Colisa fasciata; Giant gourami	NR	24 hours	4285	0.5	213784	91
	Colisa fasciata; Giant gourami	NR	24 hours	4285	1.6	213784	91
	Colisa fasciata; Giant gourami	NR	5 days	4188	4.2	213784	91
	Colisa fasciata; Giant gourami	NR	5 days	4188	0.9	213784	91
	Colisa fasciata; Giant gourami	NR	5 days	4188	2.2	213784	91
	Colisa fasciata; Giant gourami	NR	10 days	4180	4.2	213784	91

Table K.2-1
AQUIRE Bioconcentration Information [1]

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Concentration (µg/L)	BCF	AQUIRE (1994) Reference Number	Year of Publication
Lead (cont.)	Colisa fasciata; Giant gourami	NR	10 days	4180	1.0	213784	91
	Colisa fasciata; Giant gourami	NR	10 days	4180	3.8	213784	91
	Colisa fasciata; Giant gourami	NR	15 days	4060	4.5	213784	91
	Colisa fasciata; Giant gourami	NR	15 days	4060	1.1	213784	91
	Colisa fasciata; Giant gourami	NR	15 days	4060	3.9	213784	91
	Colisa fasciata; Giant gourami	NR	20 days	4000	4.9	213784	91
	Colisa fasciata; Giant gourami	NR	20 days	4000	1.4	213784	91
	Colisa fasciata; Giant gourami	NR	20 days	4000	4.4	213784	91
	Colisa fasciata; Giant gourami	NR	25 days	4000	4.5	213784	91
	Colisa fasciata; Giant gourami	NR	25 days	4000	1.4	213784	91
	Colisa fasciata; Giant gourami	NR	25 days	4000	4.3	213784	91
Manganese	Physa sp; Pouch snail;	NR	NR	165.1	1300	212745	77
	Physa sp; Pouch snail;	NR	NR	142.9	800	212745	77
	Corbicula fluminea; Asiatic clam	NR	NR	60	470	218433	80
	Corbicula fluminea; Asiatic clam	NR	NR	60	1800	218433	80
	Corbicula fluminea; Asiatic clam	NR	NR	70	470	218433	80
	Corbicula fluminea; Asiatic clam	NR	NR	70	2100	218433	80
	Plankton; Plankton;	NR	NR	32	690	212830	78
	Oligochaeta; Annelid worm class	NR	NR	32	88	212830	78
	Insecta; Insect class;	NR	NR	32	28	212830	78
	Osteichthyes; Class - bony fishes	661-824 grams	NR	32	84	212830	78
	Lemna minor; Duckweed;	NR	NR	148.5	10900	218581	75
	Chironomidae; Midge family;	LARVAE	NR	< 30	3900	315437	82
	Crustacea; Crustacean class;	NR	NR	< 30	1100	315437	82
	Unio pictorum; Mussel;	12.5 grams	NR	< 30	160000	315437	82
	Anodonta cygnea; Swan mussel;	28.5 grams	NR	< 30	350000	315437	82
	Abramis brama; Bream;	350 grams	NR	< 30	600	315437	82
	Abramis brama; Bream;	350 grams	NR	< 30	240	315437	82
	Abramis brama; Bream;	550 grams	NR	< 30	170	315437	82
	Stizostedion lucioperca; Pikeperch	500 grams	NR	< 30	260	315437	82
	Stizostedion lucioperca; Pikeperch	500 grams	NR	< 30	210	315437	82
	Stizostedion lucioperca; Pikeperch	500 grams	NR	< 30	70	315437	82
	Melosira varians; Diatom;	NR	NR	16.66 to 23.23	59052	215512	80
	Elodea sp; Waterweed;	NR	NR	16.66 to 23.23	12465	215512	80
	Lemna sp; Duckweed;	NR	NR	16.66 to 23.23	46647	215512	80
	Planaria sp; Planarian, flatworm	NR	NR	16.66 to 23.23	2255	215512	80
	Tubifex sp; Tubificid worm;	NR	NR	16.66 to 23.23	14583	215512	80

NOTES:

NR = Not Reported
cm = centimeters
[1] = No BCF data exist for acetone, 4-methyl-2-pentanone, toluene, barium, iron, and vanadium.
= Fish data were presented for informational purposes only. No fish are expected to occur in Site 5 drainage ditch surface waters, therefore, bioconcentration in fish was not evaluated.

Table K.2–2
Freshwater BCFs for Cadmium and Manganese [1]

Organism	Cadmium [a] (BCF)	(ln)
Cladoceran [a]	320	5.77
Crayfish [a]	184	5.21
Stonefly [a]	373	5.92
Mayfly [a]	1630	7.40
Mayfly [a]	3520	8.17
Dragonfly [a]	736	6.60
Dragonfly [a]	680	6.5
Dragonfly [a]	1300	7.2
Dragonfly [a]	928	6.83
Caddisfly [a]	4190	8.34
Beetle [a]	164	5.10
Beetle [a]	260	5.6
Midge [a]	2220	7.71
Midge [a]	1830	7.51
Biting midge [a]	936	6.84
Biting midge [a]	662	6.50
Snail [a]	1750	7.47
Geom. Mean	847	

Sources:
[a] USEPA, 1980a

Organism	Manganese (BCF)	(ln)
Pouch snail [b]	1300	7.2
Pouch snail [b]	800	6.7
Asiatic clam [b]	470	6.2
Asiatic clam [b]	1800	7.5
Asiatic clam [b]	470	6.2
Asiatic clam [b]	2100	7.6
Plankton [b]	690	6.5
Annelid worm [b]	88	4.5
Insect [b]	28	3.3
Midge [b]	3900	8.3
Crustacean [b]	1100	7.0
Mussel [b]	160000	12
Swan mussel [b]	350000	13
Diatom [b]	59052	10.99
Flatworm [b]	2255	7.72
Tubificid worm [b]	14583	9.59
Geom. Mean	2,317	

Source:
[b] AQUIRE, 1994

[1] Based on a review of the data provided in Table K 2–1, only cadmium and manganese have BCFs greater than 300.

Table K.3-1
Ingestion Toxicity Information for Terrestrial and Semi-Aquatic Wildlife

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kgBW-day Oral LD50	Lethal RTV mg/kgBW-day LOAEL	Sublethal RTV mg/kgBW-day LOAEL	Sublethal RTV mg/kgBW-day NOAEL	Reference
VOLATILE ORGANIC COMPOUNDS									
Acetone	Rat	Oral	NR	Reproductive effects			273000		RTECS, 1993
	Rat	Oral LD_{50}	NR	Mortality	5800				RTECS, 1993
	Rat	Oral LD_{50}		Mortality	9750				Sax, 1984
	Mouse	Oral LD_{50}	NR	Mortality	3000				RTECS, 1993
	Rabbit	Oral LD_{50}	NR	Mortality	5340				RTECS, 1993
2-Butanone (surrogate for 2-hexanone)	Rat	Oral LD_{50}	NR	Mortality	2737				RTECS, 1994
	Mouse	Oral LD_{50}	NR	Mortality	4050				RTECS, 1994
	Rat	Oral (subchronic)	13 weeks	NOAEL for neurological effects				173	ATSDR, 1991a
Ethylbenzene	Rat	Oral (subchronic)	182 days	Liver and kidney toxicity			291	97.1	IRIS, 1991
	Rat	Oral LD_{50}		Mortality	3500				NIOSH, 1985
Methylene chloride	Rat	Oral LD_{50}	NR	Mortality	1600				RTECS, 1994
	Dog	Oral LD_{50}	NR	Mortality	3000				RTECS, 1994
	Rabbit	Oral LD_{50}	NR	Mortality	1900				RTECS, 1994
	Rat	Oral (chronic)	2 years	Liver toxicity			52.6	5.9	IRIS,1991
	Rat	Oral (subchronic)	5 months	Mortality, blood chemistry, histopathology				12.5	USEPA, 1984a
4-Methyl-2-pentanone (methylisobutylketone)	Rat	Oral LD_{50}		Mortality	2080				NIOSH, 1985
	Rat	Oral (chronic)	90 days	Increased liver weight			250	50	IRIS, 1991
	Rat	Oral (subchronic)	13 weeks	NOAEL for neurological effects				173 [d]	ATSDR, 1991a
Toluene	Rat	Oral (subchronic)	13 weeks	Increased liver and kidney weight			446		IRIS, 1991
	Rat	Oral LD_{50}		Mortality	5000				NIOSH, 1985
	Mouse	Oral (subchronic)	76 days	Decreased open field activity			76		ATSDR, 1992a
Xylenes (total)	Rat	Oral LD_{50}		Mortality	4300				NIOSH, 1985
	Rat	Oral (chronic)	103 weeks	Hyperactivity, decreased BW, mortality			500	250	IRIS, 1991
	Japanese quail	Oral (acute)	5 days	Mortality	20000	2014			Hill and Camardese, 1986
SEMIVOLATILE ORGANIC COMPOUNDS									
Acenaphthene	Mouse	Oral (chronic)	90 days	Liver weight increase				175	IRIS, 1990
	Rat	Oral (chronic)	32 days	Physiological changes			2000		USEPA, 1984b
Acenaphthylene	Rat	Oral (chronic)	40 days	Physiological changes			600		USEPA, 1984b
Anthracene	Mouse	Oral LD_{50}	NR	Mortality	17000				RTECS, 1993
	Rodents	Oral (chronic)	NS	Carcinogenicity			3300		Eisler, 1987a
	Mouse	Oral (chronic)	90 days	Clinical and pathological effects				1000	IRIS, 1990
Benzo(a)anthracene	Rodents	Oral (chronic)	NS	Carcinogenicity			2		Eisler, 1987a
Benzo(a)pyrene (surrogate for Dibenz(a,h)anthracene)	Rat	Oral (chronic)	Pregnancy	Sterility in offspring			40		USEPA, 1984c
	Rat	Oral (chronic)	3.5 months	Reproductive			50		USEPA, 1984c
	Mouse	Oral	Multi-generational	Decreased fertility of F1 progeny; decreased F2 litter size.			10 [b]		MacKenzie and Angevine, 1981
	Mouse	Oral (subchronic)	6 months	Mortality	120				ATSDR, 1993b
Benzo(b)fluoranthene and Benzo(k)fluoranthene	Rodents	Oral (chronic)	NS	Carcinogenicity			40		Eisler, 1987a
Benzo(g,h,i)perylene	Rodents	Oral (chronic)	NS	Carcinogenicity			99		Eisler, 1987a
Carbazole	Rat	Oral LD_{50}		Mortality	500				USEPA, 1986
Chrysene	Rodents	Oral (chronic)	NS	Carcinogenicity			99		Eisler, 1987a
Dibenzofuran	Rodents	Single oral dose		LC20		500			ATSDR, 1990a
	Rodents	Oral (chronic)	13 weeks	LC10			125		ATSDR, 1990a
	Mouse	Oral (chronic)	103 weeks	Multinuclear hepatocytes				60	ATSDR, 1990a
Diethylphthalate	Mouse	Oral (subchronic)	Multi-generational	Decrease in F1 litter size			3250		ATSDR, 1993c
	Rat	Oral LD_{50}		Mortality	8600				NIOSH, 1985
Di-n-octylphthalate	Rat	Oral (chronic)	7-12 months	Increased kidney weight			175		IRIS, 1992
	Rat	Oral	NR	Reproductive effects			35 [c]		RTECS, 1993
	Mouse	Oral LD_{50}		Mortality	6513				Sax, 1984

Table K.3-1
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Chemical	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kgBW-day Oral LD50	Lethal RTV mg/kgBW-day LOAEL	Sublethal RTV mg/kgBW-day LOAEL	Sublethal RTV mg/kgBW-day NOAEL	Reference
bis(2-Ethylhexyl)phthalate	Rat	Oral LD_{50}	NR	Mortality	30600				RTECS, 1993
	Rat	Oral	NR	Reproductive effects			7140		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			35		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			6000		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			17200		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			10000		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			9766		RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	30000				RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			78880		RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			4200		RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			50		RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			1000		RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			2040		RTECS, 1993
	Rabbit	Oral LD_{50}	NR	Mortality	34000				RTECS, 1993
	Guinea pig	Oral LD_{50}	NR	Mortality	26000				RTECS, 1993
	Guinea pig	Oral	NR	Reproductive effects			20000		RTECS, 1993
	Mammal	Oral	NR	Reproductive effects			20000		RTECS, 1993
	Mammal	Oral	NR	Reproductive effects			509000		RTECS, 1993
	Mouse	Oral LD_{50}		Mortality	800				RTECS, 1993 and NIOSH, 1985
	Mouse	Oral (subchronic)	13 weeks	Renal effects			125		RTECS, 1993
Fluoranthene	Rat	Oral LD_{50}	NR	Mortality	2000				RTECS, 1994
	Mouse	Oral (subchronic)	90 days	Nephropathy; clinical and pathological effects			250	125	IRIS, 1990
Fluorene	Mouse	Oral (chronic)	13 weeks	Hematological changes			250	125	IRIS, 1990
Indeno(1,2,3-cd)pyrene	Rodents	Oral (chronic)	NS	Carcinogenicity			72		Eulex, 1987a
2-Methylnaphthalene	Rat	Oral LD_{50}		Mortality	1630				NIOSH, 1985
4-Methylphenol (m-Cresol)	Rat	Oral LD_{50}		Mortality	1800				Verschueren, 1983
	Rat	Oral		Decreased RBC counts			175		ATSDR, 1990b
	Rabbit	Oral LD_{50}		Mortality	1100				Verschueren, 1983
	Rat	Oral (subchronic)	13 weeks	CNS stimulation			50		ATSDR, 1990b
	Rat	Single oral dose	90 days	Loss in body weight/neurotoxicity				50	IRIS, 1991
Naphthalene	Rat	Oral (chronic)	100 weeks	Ocular lesions			41		USEPA, 1990b
	Rat	Oral (subchronic)	13 weeks	Decreased body weight gain			35.7		USEPA, 1990b
	Mouse	Oral LD_{50}		Mortality	533				ATSDR, 1990c
Phenanthrene	Mouse	Oral LD_{50}	NR	Mortality	700				RTECS, 1994
	Mouse	Oral (subchronic)	6 months	Increased liver weight			120		ATSDR, 1989a
Phenol	Rat	Oral LD_{50}	NR	Mortality	530				USEPA, 1980b
	Rat	Oral LD_{50}	NR	Mortality	414				TDB, 1984
	Rat	Oral LD_{50}	NR	Mortality	340				USEPA, 1980b
	Rabbit	Oral LD_{50}	NR	Mortality	600				USEPA, 1980b
	Rabbit	Oral LD_{50}	NR	Mortality	400				USEPA, 1980b
	Dog	Oral LD_{50}	NR	Mortality	500				USEPA, 1980b
	Cat	Oral LD_{50}	NR	Mortality	100				USEPA, 1980b
	Rat	Oral (subchronic)	Gestational	Reduced fetal body weights			120		IRIS, 1993
Pyrene	Rat	Oral LD_{50}	NR	Mortality	2700				RTECS, 1993 and NIOSH, 1985
	Mouse	Oral LD_{50}	NR	Mortality	800				RTECS, 1993 and NIOSH, 1985
	Mouse	Oral (chronic)	13 weeks	Renal effects			125	75	IRIS, 1990
PESTICIDES/PCBs									
4,4'-DDD	Ring-necked pheasant	Oral LD_{50}	NR	Mortality	386				USFWS, 1984
	Mallard	Oral LD_{50}	NR	Mortality	2000				USFWS, 1984

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4,4'-DDE	Rat	Oral LD_{50}	NR	Mortality	800				RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	700				RTECS, 1993
	Hamster	Oral LD_{50}	NR	Mortality	>5000				RTECS, 1993
	Mallard	Oral	NR	Eggshell thinning			2.91		USEPA, 1993b
	Mallard	Oral	2 years	Reproductive: embryo mortality, cracked eggs			0.58		USEPA, 1993b
	Kestrel	Oral	NR	Eggshell thinning			0.39		USEPA, 1993b
4,4'-DDT (surrogate for 4,4'-DDD)	Rat	Oral LD_{50}	NR	Mortality	87				RTECS, 1993
	Rat	Oral LD_{50}		Mortality	100				USEPA, 1985a
	Rat	Oral	NR	Reproductive			112		RTECS, 1993
	Rat	Oral	NR	Reproductive			100		RTECS, 1993
	Rat	Oral	NR	Reproductive			430		RTECS, 1993
	Rat	Oral	NR	Reproductive			1890		RTECS, 1993
	Rat	Oral	NR	Reproductive			250		RTECS, 1993
	Rat	Oral	NR	Reproductive			50		RTECS, 1993
	Rat	Oral (chronic)	5 generations	Reproductive			0.2		IRIS, 1991
	Rat	Oral	2 years	Reproductive			2.5		USEPA, 1993b
	Mouse	Oral LD_{50}	NR	Mortality	135				RTECS, 1993
	Mouse	Oral LD_{50}		Mortality	200				USEPA, 1985a
	Mouse	Oral	NR	Reproductive			504		RTECS, 1993
	Mouse	Oral	NR	Reproductive			81		RTECS, 1993
	Mouse	Oral	NR	Reproductive			124		RTECS, 1993
	Mouse	Oral	NR	Reproductive			148		RTECS, 1993
	Rabbit	Oral LD_{50}	NR	Mortality	250				RTECS, 1993
	Rabbit	Oral	NR	Reproductive			150		RTECS, 1993
	Guinea pig	Oral LD_{50}	NR	Mortality	150				RTECS, 1993
	Hamster	Oral LD_{50}	NR	Mortality	>5000				RTECS, 1993
	Dog	Oral LD_{50}	NR	Mortality	150				RTECS, 1993
	Dog	Oral LD_{50}		Mortality	60				USEPA, 1985a
	Dog	Oral	NR	Reproductive			3540		RTECS, 1993
	Monkey	Oral LD_{50}	NR	Mortality	200				RTECS, 1993
	Chicken	Oral (subchronic)	10 weeks	Decreased reproductive success; toxic symptoms			91.4 [e]		USEPA, 1985a
	Rock dove	Oral LD_{50}		Mortality	4000				USFWS, 1984
	Black duck	Oral (chronic)	2 years	Reduced eggshell thickness			0.14 [e]		Longcore and Stendell, 1977
	Mallard	Oral LD_{50}		Mortality	2240				USFWS, 1984
	Mallard	Oral (subchronic)	96 days	Reduced eggshell thickness			2.8		Longcore and Stendell, 1977
	Mallard	Oral	NR	Eggshell thinning			1.16		USEPA, 1993b
	Mallard	Oral	NR	Eggshell thinning			2.91		USEPA, 1993b
	Mallard	Oral	2 years	Reproductive			1.45		USEPA, 1993b
	California quail	Oral LD_{50}		Mortality	595				USFWS, 1984
	Japanese quail	Oral LD_{50}		Mortality	841				USFWS, 1984
	Pheasant	Oral LD_{50}		Mortality	1334				USFWS, 1984
	Sandhill crane	Oral LD_{50}		Mortality	1200				USFWS, 1984
	Kestrel	Oral (chronic)	7 wk - 1 yr	Reduced eggshell thickness			0.56a		USEPA, 1985a
	Kestrel	Oral (chronic)	1 year	Reduced eggshell thickness			0.16a		Wiemeyer, et al., 1986
	Barn owl	Oral (chronic)	2 years	Reduced eggshell thickness			0.14 [e]		Longcore and Stendell, 1977
Aroclor 1260	Rat	Oral LD_{50}	NR	Mortality	1315				RTECS, 1993
	Rat	Oral LD_{50}	NR	Mortality	500				Eisler, 1986
	Rat	Oral LD_{50}	NR	Mortality	1300				Eisler, 1986
	Rat	Oral	NR	Reproductive effects			1674		RTECS, 1993
	Rat	Oral (chronic)	2 generations	Reduced litter size			7.6		USEPA, 1985b
	Rat	Oral (subchronic)	9 weeks	Fetal mortality; maternal toxicity			6.4		ATSDR, 1987a
	Mouse	Oral	NR	Reproductive effects			74		RTECS, 1993
	Mink	Oral LD_{50}		Mortality	4000				Eisler, 1986
	Mink	Oral LD_{50}		Mortality	3000				Eisler, 1986
	Mink	Oral LD_{50}		Mortality	750				Eisler, 1986
	Mink	Oral (subchronic)	4 months	Impaired reproduction			0.0075		Newell et al., 1987
	Chicken	Oral (chronic)	NR	Embryonic mortality			0.9		USEPA, 1976
	American kestrel	Oral (chronic)	69 days	Reduced sperm concentration			9		Eisler, 1986

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Aroclor 1260 (cont.)	Dog (beagle)	Oral (chronic)	2 years	LOAEL			0.37		USEPA, 1976
	Bobwhite	Oral LD_{50}	8 days	Mortality	80 [e]				Eisler, 1986
	Mallard	Oral LD_{50}	8 days	Mortality	111 [e]				Eisler, 1986
Chlordane (alpha and gamma)	Rat	Oral LD_{50}	NR	Mortality	283				RTECS, 1993
	Rat	Oral LD_{50}		Mortality	430				Allen et al., 1979
	Rat	Oral LD_{50}		Mortality	335				Allen et al., 1979
	Rabbit	Oral LD_{50}		Mortality	300				Allen et al., 1979
	Rabbit	Oral LD_{50}		Mortality	100				Allen et al., 1979
	Dog	Oral LD_{50}		Mortality	200				Allen et al., 1979
	Goat	Oral LD_{50}		Mortality	180				Allen et al., 1979
	Rat	Oral(subchronic)	Multi-generational	Decreased fertility			16		ATSDR, 1992b
	Japanese quail	Oral LD_{50}	5 days	Mortality	35				Hill et al., 1975
	Bobwhite	Oral LD_{50}	5 days	Mortality	29				Hill et al., 1975
	Mallard	Oral LD_{50}	5 days	Mortality	62				Hill et al., 1975
	Pheasant	Oral LD_{50}		Mortality	24				USFWS, 1984
	Mouse	Oral (chronic)	2 years	Hepatocellular hypertrophy and necrosis			0.47		ATSDR, 1992b
	Mouse	Oral (chronic)	30 months	Regional liver hypertrophy (females)			0.273	0.055	ATSDR, 1992b
	Dog	Oral (chronic)	2 years	Histologic changes			0.375		USEPA, 1988a
	Young chicken	Chronic	4 week	NOAEL for egg hatchability and growth				0.031 [e]	Eisler, 1990
Dieldrin	Mouse	Oral LD_{50}	NR	Mortality	38				Allen et al., 1979
	Mouse	Oral (chronic)	80 weeks	Body tremors			0.33		NCI, 1978
	Mouse	Oral (chronic)	2 year	Liver enlargement w/ histopathology			0.1		IRIS, 1991
	Mouse	Oral (chronic)	2 year	Hepatic cancer			1.3		ATSDR, 1991b
	Rat	Oral (chronic)	2 year	Histologic changes			2		ATSDR, 1987b
	Rat	Oral (chronic)	2 year	Liver lesions			0.05	0.005	IRIS, 1991
	Dog	Oral (chronic)	2 year	Increased liver weight, liver/body weight			0.05	0.005	IRIS, 1991
	Dog	Oral (chronic)	25 months	Hepatocyte degeneration			0.5		ATSDR, 1987b
	Monkey	Oral (chronic)	120 days	Tremors and Convulsions			0.1		Smith et al., 1976
	Mouse	Oral (subchronic)	4 wks	Decreased pup survival			0.65		Virgo & Bellward, 1975
	Rat	Oral (subchronic)	120 days	Operant behavior				0.025	Smith et al., 1976
	Rat	Oral LD_{50}	NR	Mortality	46				Allen et al., 1979
	Guinea pig	Oral LD_{50}	NR	Mortality	25				Allen et al., 1979
	Rabbit	Oral LD_{50}	NR	Mortality	45				Allen et al., 1979
	House sparrow	Oral LD_{50}	NR	Mortality	48				USFWS, 1984
	Chicken	Oral LD_{50}	NR	Mortality	20				Allen et al., 1979
	Rock dove	Oral LD_{50}	NR	Mortality	27				USFWS, 1984
	Gray partridge	Oral LD_{50}	NR	Mortality	9				USFWS, 1984
	Chukar	Oral LD_{50}	NR	Mortality	25				USFWS, 1984
	Japanese quail	Oral LD_{50}	5 days	Mortality	6 [e]				Hill et al., 1975
	Japanese quail	Oral LD_{50}	NR	Mortality	70				USFWS, 1984
	California quail	Oral LD_{50}	NR	Mortality	9				USFWS, 1984
	Bobwhite	Oral LD_{50}	5 days	Mortality	3 [e]				Hill et al., 1975
	Pheasant	Oral LD_{50}	NR	Mortality	79				USFWS, 1984
	Mallard	Oral LD_{50}	5 days	Mortality	12 [e]				Hill et al., 1975
	Mallard	Oral LD_{50}	5 days	Mortality	11 [e]				Hill et al., 1975
	Mallard	Oral LD_{50}	NR	Mortality	381				USFWS, 1984
	Whistling duck	Oral LD_{50}	NR	Mortality	100				USFWS, 1984
	Canada goose	Oral LD_{50}	NR	Mortality	141				USFWS, 1984
	Goat	Oral LD_{50}	NR	Mortality	100				Allen et al., 1979
	Sheep	Oral LD_{50}	NR	Mortality	50				Allen et al., 1979
	Cattle	Oral LD_{50}	NR	Mortality	60				Allen et al., 1979
	Mule deer	Oral LD_{50}	NR	Mortality	75				Allen et al., 1979
	Cat	Oral LD_{50}	NR	Mortality	300				Allen et al., 1979
	Dog	Oral LD_{50}	NR	Mortality	65				Allen et al., 1979

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INORGANIC COMPOUNDS									
Aluminum	Mouse	Oral (chronic)	2-3 generations	Reduced body weight gain of newborns			425		NIOSH, 1985
	Rat	Oral (subchronic)	15 days	Reduced growth			100		Bernuzzi, et al, 1989
	Rat	Oral LD_{50}	NR	Mortality	3700				Sax, 1984
Arsenic	Rat	Oral	NR	Reproductive effects			0.61		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			0.58		RTECS, 1993
	Rat	Oral LD_{50}	NR	Mortality	763				RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	145				RTECS, 1993
	Mallard	Oral LD_{50}	NR	Mortality	323				Eisler, 1988a
	Cowbird	Oral LD_{50}	11 days	Mortality	18.1 [e]				Eisler, 1988a
	Young chickens	Oral	56 days	NOAEL for egg production				1 [e]	Hermeyer, 1977
Barium	Mouse	Oral (chronic)	lifetime	NOEL				0.825	IRIS, 1990
	Rat	Oral (chronic)	16 months	NOEL				5.1	IRIS, 1990
	Rat	Oral (chronic)	lifetime	NOEL				0.25	IRIS, 1990
	Rat	Oral (chronic)	13 weeks	NOEL				31.5	IRIS, 1990
	Rat	Oral (chronic)	68 weeks	Renal ultrastructure changes			142		IRIS, 1993
	Rat	Oral (subchronic)	13 weeks	LOAEL for renal effects			91		Dietz et al, 1992
	Rat	Oral (acute)	10 days	Decreased ovarian weight			198		ATSDR, 1990d
	Rat	Oral (subchronic)	13 weeks	20% population mortality		430			Dietz et al, 1992
Beryllium	Rat	Oral LD_{50}	NR	Mortality	10				USEPA, 1985d
	Rat	Oral (chronic)	NS	Increase in lung sarcomas			0.22		USEPA, 1985d
	Rat	Oral (chronic)	3.2 years	NOAEL			0.85		ATSDR, 1987c
Cadmium	Rat	Oral	NR	Reproductive effects			155		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			220		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			21.5		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			23		RTECS, 1993
	Rat	Oral LD_{50}		Mortality	250				Eisler, 1985b
	Rat	Oral LD_{50}	NR	Mortality	225				RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	890				RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			448		RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			1700		RTECS, 1993
	Guinea pig	Oral LD_{50}	NR	Mortality	150				Eisler, 1985b
	Mallard	Oral (subchronic)	90 days	Egg production suppressed			10		Eisler, 1985b
Chromium	Japanese quail	Oral LD_{50}	5 days	Mortality	126				Hill and Camardese, 1986
	Rat	Oral (subchronic)	90 days	NOAEL for histopathologic and reproductive effects			1400		Ivankovic and Preussman, 1975
	Black Duck	Oral (subchronic)	5 months	NOAEL for reproductive effects			200		Outridge and Scheuhammer, 1993
	Rat	Oral LD_{50}		Mortality	200				ATSDR, 1991c
Cobalt	Rat	Oral LD_{50}		Mortality	91				ATSDR, 1991d
	Rat	Single oral dose		Hepatic/renal hyperemia					ATSDR, 1991d
	Rat	Oral (subchronic)	8 weeks	Decreased body weight gain			42		ATSDR, 1991d
	Rat	Oral (chronic)	98 days	Testicular degeneration			13		ATSDR, 1991d
	Rat	Oral (chronic)	69 days	Testicular atrophy			20		ATSDR, 1991d
	Guinea pig	Oral (subchronic)	5 week	Mortality					ATSDR, 1991d
	Dog	Oral (subchronic)	4 weeks	Increased red blood cell count			5		ATSDR, 1991d
Copper	Rat	Single oral dose		Reproductive effects			152		NIOSH, 1985 and RTECS, 1993
	Rat	Oral LD_{50}	NR	Mortality	940				Sax, 1984
	Mallard	Oral (subchronic)	29 days	NOAEL for survivorship				2.1	Demayo et al., 1982
	Rat	Single oral dose		TDlo for reproductive effects			152		NIOSH, 1985
	Mallard	Oral (acute)	29 days	No effect on survivorship					Demayo et al, 1982
	Mouse	Oral (chronic)	30 days	Decreased litter sizes with teratogenic effects			100		Lecyk, 1980
Iron	Guinea pig	Oral LD_{50}	NR	Mortality	1200				Sax, 1984
Lead	Rat	Oral	NR	Reproductive effects			790		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			1140		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			520		RTECS, 1993
	Rat	Oral	NR	Reproductive effects			1100		RTECS, 1993
	Calf	Oral LD_{50}	NR	Mortality	220				Eisler, 1988b
	Rat	Oral (subchronic)	12-14 days	Decreased fetal body weight			2.5		McClain and Becker, 1972

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Lead (cont.)	Mouse	Oral	NR	Reproductive effects			1120		RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			6300		RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			300		RTECS, 1993
	Mouse	Oral	NR	Reproductive effects			4800		RTECS, 1993
	Domestic animal	Oral	NR	Reproductive effects			662		RTECS, 1993
	Mammal	Oral	NR	Reproductive effects			2118		RTECS, 1993
	Kestrel	Diet	NR	Decreased egg laying fertility; decreased egg shell thickness				50	Eisler, 1988b
	Nestlings	Oral	NR	Reduced growth and brain weight; abnormal development			125		Eisler, 1988b
	Japanese quail	Oral LD_{50}	5 days	Mortality	24752				Hill and Camardese, 1986
	Rat	Oral (chronic)	2 generations	NOAEL for developmental effects				7	Kimmel et al, 1980 and Grant et al, 1980
	Guinea pig	Oral LD_{50}		Mortality	300				Sax, 1984
	Rock dove	Oral (chronic)	NS	Kidney pathology; learning deficiences			6.25		Auden et al, 1982 and Dietz et al, 1979
	Rock dove	Oral LD_{50}		Mortality	375				Kendall and Scanlon, 1985
Manganese	Mouse	Oral (subchronic)	90 days	Delayed growth of testes			140		ATSDR, 1990c
	Mouse	Oral (chronic)	103 weeks	Mortality			4050		ATSDR, 1990c
	Rat	Oral LD_{50}	NR	Mortality	410				ATSDR, 1990c
	Rat	Oral LD_{50}	20 days	Mortality	225				ATSDR, 1990c
	Rat	Oral (subchronic)	20 days	Decreased litter weight during gestation				620	ATSDR, 1990c
	Rat	Oral (chronic)	103 weeks	Mortality			930		ATSDR, 1990c
	Guinea pig	Oral LD_{50}	NR	Mortality	400				USEPA, 1984d
	Monkey	Oral (chronic)	18 months	Weakness, rigidity			25		ATSDR, 1990c
	Rodents/livestock	Oral (subchronic)	10 days - 2 months	Decreased growth rate			100		Cunningham et al., 1966
	Mouse	Oral (subchronic)	180 days	NOAEL for mortality		2300			Gianutsos and Murray, 1982
Mercury	Mouse	Oral LD_{50}		Mortality	22				NIOSH, 1985
	Mouse	Oral (subchronic)	Day 6-17 (gest)	Stillbirths and neonatal death			4		Suzuki, 1979
	Rat	Oral (subchronic)	Day 6-14 (gest)	Retarded fetus growth			4		Suzuki, 1979
organomercury	Rat	Oral (chronic)	NR	Reduced fertility			0.5		Eisler, 1987b
	Rat	Oral LD_{50}		Mortality	18				NIOSH, 1985
organomercury	Pig	Oral (subchronic)	Pregnancy	High incidence of stillbirths			0.5		Eisler, 1987b
organomercury	Mule deer	Oral LD_{50}		Mortality	17.9				Eisler, 1987b
organomercury	River otter	Oral LD_{50}		Mortality	2				Eisler, 1987b
organomercury	Mink	Oral LD_{50}		Mortality	1				Eisler, 1987b
organomercury	Dog	Oral (subchronic)	Pregnancy	High incidence of stillbirths			0.1		Eisler, 1987b
methylmercury	House sparrow	Oral LD_{50}		Mortality	12.6				Eisler, 1987b
ethylmercury	Rock dove	Oral LD_{50}		Mortality	22.8				Eisler, 1987b
	Chicken	Oral LD_{50}		Mortality	20				Fimreite, 1979
	Bantam chicken	Oral LD_{50}		Mortality	190				Fimreite, 1979
ethylmercury	Prairie chicken	Oral LD_{50}		Mortality	11.5				Eisler, 1987b
ethylmercury	Chukar	Oral LD_{50}		Mortality	26.9				Eisler, 1987b
methylmercury	Corturnix	Oral LD_{50}		Mortality	11				Eisler, 1987b
	Mallard	Oral	NR	Reproduction, behavior			0.064		USEPA, 1993b
methylmercury	Black duck	Oral (subchronic)	24 weeks	Reproduction inhibited			0.22 [e]		Eisler, 1987b
methylmercury	Fulvous whistling duck	Oral LD_{50}		Mortality	37.6				Eisler, 1987b
methylmercury	Northern bobwhite	Oral LD_{50}		Mortality	23.8				Eisler, 1987b
methylmercury	Bobwhite quail	Oral LD_{50}	5 days	Mortality	523				Hill et al, 1975
	Japanese quail	Oral LD_{50}		Mortality	14.4				Eisler, 1987b
ethylmercury	Gray partridge	Oral LD_{50}		Mortality	17.6				Eisler, 1987b
organomercury	Gray pheasant	Oral (subchronic)	30 days	Reduced reproductive ability			0.64		Eisler, 1987b
methylmercury	Ring-necked pheasant	Oral LD_{50}		Mortality	11.5				Eisler, 1987b
	Mouse	Oral (subchronic)	50 days	Embryotoxicity and teratogenicity			0.9		Suzuki, 1979
Nickel	Rat	Oral	NR	Reproductive effects			158		RTECS, 1994
	Rat	Oral LD_{50}	NR	Mortality	67				ATSDR, 1987d
	Rat	Oral (chronic)	2 years	Decreased body weight gain			50		ATSDR, 1987d
	Rat	Oral LD_{50}	NR	Mortality	350				Sax, 1984
	Japanese quail	Oral (acute)	5 days	Mortality	504				Hill and Camardese, 1986
	Dog	Oral (chronic)	2 years	Histological lesions in bone marrow			62.5		ATSDR, 1987d

Table K.3-1
Ingestion Toxicity Information for Terrestrial and Semi-Aquatic Wildlife

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kgBW-day Oral LD50	Lethal RTV mg/kgBW-day LOAEL	Sublethal RTV mg/kgBW-day LOAEL	Sublethal RTV mg/kgBW-day NOAEL	Reference
Selenium	Rat	Oral LD_{50}	NR	Mortality	6700				RTECS, 1993
	Rat	Oral LD_{50}	NR	Mortality	138				Sax, 1984
	Mouse	Oral	NR	Reproductive effects			134		RTECS, 1993
	Mallard	Oral (subchronic)	3 months	Reduced hatchability			1.75		Eisler, 1985a
	Rat	Oral (chronic)	2 years	Decrease in breeding			0.2		ATSDR, 1988
	Rat	Oral (chronic)	NS	Histological changes in heart and kidney			0.045		Eisler, 1985a
	Japanese quail	Oral (chronic)	NS	Reduced egg hatching			0.6		Eisler, 1985a
	Mallard	Oral (subchronic)	3 months	NOAEL for teratogenic effects			0.72	0.36	Eisler, 1985a
	Horse	Oral LD_{50}		MLD	3.3				Eisler, 1985a
	Mallard	Oral	6 weeks	Increased mortality		2.7 [e]			Heinz et al., 1988
	Black-capped night heron	Oral	NR	NOAEL for egg hatchability				0.61 [e]	Smith et al., 1988
Thallium	Rat	Oral LD_{50}	NR	Mortality	35				Sax, 1984
	Rat	Oral (subchronic)	30 to 60 days	Adverse testicular effects			0.7		IRIS, 1993
	Ring-necked pheasant	Oral LD_{50}	NR	Mortality	23.7				USFWS, 1984
	Golden eagle	Oral LD_{50}	NR	Mortality	90				USFWS, 1984
Vanadium	Japanese quail	Oral LD_{50}	5 days	Mortality	96				Hill and Camardese, 1986
	Japanese quail	Oral LD_{50}	5 days	Mortality	96				Hill and Camardese, 1986
	Rat	Oral (subchronic)	2 months	Hypertension			15		Susic and Kentera, 1986
	Rat	Oral (subchronic)	55 days	NOAEL for developmental effects			8.4		Domingo, et al, 1986
	Chicken	Oral (subchronic)	6 weeks	Decrease in egg-laying			11 [f]		Berg et al, 1963
Zinc	Rat	Oral LD_{50}		Mortality	2510				RTECS, 1993
	Rat	Oral	Gestation	Fetal resorptions in 4 to 20% of population			200		Shlicker and Cox, 1968
	Ferret	Oral	3-13 days	Mortality and gastrointestinal effects		390			Straube et al, 1980
	Rat	Oral (subchronic)	NR	Kidney toxicity			160		Llobet, et al., 1988

Notes:
LD50 = Dose resulting in 50% mortality in test population
BW = Body weight
LOAEL = Lowest Observed Adverse Effect Level
NR = Not reported

[a] Value is one-fifth the LD_{50}.
[b] Value of benzo(a)pyrene used as surrogate for acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, carbazole, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene.
[c] Value for bis(2-ethylhexyl)phthalate used as surrogate.
[d] Value for 2-butanone used as surrogate.
[e] Converted to dose per kilogram body weight by multiplying by ingestion and dividing by body weight. Body weights for birds obtained from Dunning, 1984.
Ingestion rates were calculated using the following regression equation (for all birds) from Nagy et al, 1987: Food Ingestion (kg/day) = 0.00582 * Body Weight$^{0.651}$ (kg). Ingestion rates for the chicken from NRC, 1984 (pg. 13).
[f] Converted from 30 ppm to 11 mg/kgBW-day using standard default parameters (USEPA, 1988b).

Table K.3-2
RTVs Selected for Ecological Risk Assessment
Units (mg/kgBW/day)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Compound	Cotton mouse		Short-tailed shrew		Rufous-sided towhee		American woodcock		Red fox		Great-horned owl		Raccoon		Great blue heron	
	Lethal (1/5 LD_{50})	Sublethal (LOAEL)	Lethal (1/5 LD_{50})	Sublethal (LOAEL)	Lethal (1/5 LD_{50})	Sublethal (LOAEL)	Lethal (1/5 LD_{50})	Sublethal (LOAEL)	Lethal (1/5 LD_{50})	Sublethal (LOAEL)	Lethal (1/5 LD_{50})	Sublethal (LOAEL)	Lethal (1/5 LD_{50})	Sublethal (LOAEL)	Lethal (1/5 LD_{50})	Sublethal (LOAEL)
Volatile Organic Compounds																
Acetone	600	273000	600	273000					600	273000			600	273000		
2-Butanone	547	173 [a]	547	173 [a]					547	173 [a]			547	173 [a]		
Ethylbenzene	700		700						700				700			
2-Hexanone	547	173 [a]	547	173 [a]					547	173 [a]			547	173 [a]		
Methylene chloride	320		320						320				320			
4-Methyl-2-pentanone	420	173	420	173					420	173			420	173		
Toluene	1000	76	1000	76					1000	76			1000	76		
Xylenes (total)	860	500	860	500	2014 [b]		2014 [b]		860	500	2014 [b]		860	500	2014 [b]	
Semivolatile Organic Compounds																
Acenaphthene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
Acenaphthylene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
Anthracene	3400	10 [d]	3400	10 [d]					3400	10 [d]			3400	10 [d]		
Benzo(a)anthracene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
Benzo(a)pyrene	24	10	24	10					24	10			24	10		
Benzo(b)fluoranthene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
Benzo(g,h,i)perylene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
Benzo(k)fluoranthene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
Carbazole	100	10 [d]	100	10 [d]					100	10 [d]			100	10 [d]		
Chrysene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
Dibenz(a,h)anthracene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
Dibenzofuran	500 [b]		500 [b]						500 [b]				500 [b]			
Diethylphthalate	1720	3250	1720	3250					1720	3250			1720	3250		
Di-n-octylphthalate	1302	35	1302	35					1302	35			1302	35		
bis(2-Ethylhexyl)phthalate	160	35	160	35					160	35			160	35		
Fluoranthene	40	10 [d]	40	10 [d]					40	10 [d]			40	10 [d]		
Fluorene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
Indeno(1,2,3-cd)pyrene	24 [c]	10 [d]	24 [c]	10 [d]					24 [c]	10 [d]			24 [c]	10 [d]		
2-Methylnaphthalene	330	10 [d]	330	10 [d]					330	10 [d]			330	10 [d]		
4-Methylphenol	220	50	220	50					220	50			220	50		
Naphthalene	110	10 [d]	110	10 [d]					110	10 [d]			110	10 [d]		
Phenanthrene	140	10 [d]	140	10 [d]					140	10 [d]			140	10 [d]		
Phenol	20	120	20	120					20	120			20	120		
Pyrene	160	10 [d]	160	10 [d]					160	10 [d]			160	10 [d]		
Pesticides and PCBs																
4,4'-DDD	17.4	0.2	17.4	0.2	77	0.14	77	0.14	12	3540	77	0.14	12	3540	400	0.14
4,4'-DDE	140	0.2 [e]	140	0.2 [e]	119 [f]	0.58	119 [f]	0.58	12 [g]	3540 [h]	448 [i]	0.58	12 [g]	3540 [h]	448 [i]	0.58
4,4'-DDT	17.4	0.2	17.4	0.2	119	0.14	119	0.14	12	3540	119	0.14	12	3540	448	0.14
Aroclor-1260	100	6.4	100	6.4	16	0.9	16	0.9	150	0.0075	16	9	150	0.0075	22	9
alpha-Chlordane	20	16	20	16	4.8	0.031 [a]	4.8	0.031 [a]	40	16	4.8	0.031 [a]	40	16	4.8	0.031 [a]
gamma-Chlordane	20	16	20	16	4.8	0.031 [a]	4.8	0.031 [a]	40	16	4.8	0.031 [a]	40	16	4.8	0.031 [a]
Dieldrin	7.6	0.65	7.6	0.65	0.6		0.6		13	0.05	0.6		13	0.05	0.6	
Inorganic Compounds																
Aluminum	740	425	740	425					740	425			740	425		
Arsenic	29	0.58	29	0.58	3.6	1	3.6	1	29	0.58	3.6	1	29	0.58	65	1
Barium	430 [b]	198	430 [b]	198					430 [b]	198			430 [b]	198		
Beryllium	2		2						2				2			
Cadmium	30	21.5	30	21.5		10		10	30	21.5		10	30	21.5		10
Chromium	40	1400	40	1400	25.2	200	25.2	200	40	1400	25.2	200	40	1400	25.2	200
Cobalt	18	13	18	13					18	13			18	13		
Copper	188	100	188	100		2.1 [a]		2.1 [a]	188	100		2.1 [a]	188	100		2.1 [a]
Iron	240		240						240				240			
Lead	60	2.5	60	2.5	75	6.25	75	6.25	60	2.5	75	50 [a]	60	2.5	75	50 [a]
Manganese	2300 [b]	140	2300 [b]	140					2300 [b]	140			2300 [b]	140		
Mercury	3.6	0.5	3.6	0.5	2.2	0.064	2.2	0.064	0.2	0.1	2.2	0.064	0.2	0.1	2.2	0.064
Nickel	70	158	70	158	100		100		70	158	100		70	158	100	

Table K.3-2
RTVs Selected for Ecological Risk Assessment
Units (mg/kgBW/day)

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Compound	Cotton mouse		Short-tailed shrew		Rufous-sided towhee		American woodcock		Red fox		Great-horned owl		Raccoon		Great blue heron	
	Lethal ($1/5\ LD_{50}$)	Sublethal (LOAEL)	Lethal ($1/5\ LD_{50}$)	Sublethal (LOAEL)	Lethal ($1/5\ LD_{50}$)	Sublethal (LOAEL)	Lethal ($1/5\ LD_{50}$)	Sublethal (LOAEL)	Lethal ($1/5\ LD_{50}$)	Sublethal (LOAEL)	Lethal ($1/5\ LD_{50}$)	Sublethal (LOAEL)	Lethal ($1/5\ LD_{50}$)	Sublethal (LOAEL)	Lethal ($1/5\ LD_{50}$)	Sublethal (LOAEL)
Selenium	27.6	0.2	27.6	0.2	2.7 [b]	0.6	2.7 [b]	0.6	27.6	0.2	2.7 [b]	0.6	27.6	0.2	2.7 [b]	0.61 [a]
Thallium	7	0.7	7	0.7	4.7		4.7		7	0.7	18		7	0.7	18	
Vanadium		8.4		8.4	20	11	20	11		8.4	20	11		8.4	20	11
Zinc	390 [b]	200	390 [b]	200					390 [b]	200			390 [b]	200		

Notes:
NOAEL = No Observed Adverse Effect Level. Value corresponds to the boxed value in Table K.3-1.
LOAEL = Lowest Observed Adverse Effect Level. Value corresponds to the boxed value in Table K.3-1.
LD_{50} = Median lethal dose. Value corresponds to one-fifth of the boxed value from Table K.3-1.

[a] Value is an NOAEL rather than a chronic LOAEL.
[b] Value is an acute LOAEL rather than an LD_{50}
[c] One fifth of the benzo(a)pyrene lethal LD_{50} mouse value was used as a surrogate.
[d] The benzo(a)pyrene sublethal LOAEL mouse value was used as a surrogate.
[e] The 4,4'-DDT sublethal LOAEL rat value was used as a surrogate.
[f] One-fifth of the 4,4'-DDT lethal LD_{50} californica quail value was used as a surrogate.
[g] One-fifth of the 4,4'-DDT lethal LD_{50} dog value was used as a surrogate.
[h] The 4,4'-DDT sublethal LOAEL dog value was used as a surrogate.
[i] One-fifth of the 4,4'-DDT lethal LD_{50} mallard value was used as a surrogate.

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Volatile Organic Compounds								
Acetone	Daphnia magna;Water flea	<24 H	48 H	EC_{50}IM		13,500,000	212193	80
	Selenastrum capricornutum;Green algae	LOG PHASE	96 H	GRO		7,000,000	310574	83
	Chlorella pyrenoidosa;Green algae	LOG PHASE	48 H	GRO		3,400,000	310574	83
	Scenedesmus pannonicus;Green algae	LOG PHASE	48 H	GRO		4,740,000	310574	83
	Lepomis macrochirus;Bluegill	5.3-7.2cm 3.5-3.9 g	96 H	LC_{50}	8,300,000		212406	68
	Indoplanorbis exustus;Snail	NR	48 H	LC_{50}	35,000,000		219158	72
	Semisulcospira libertina;Marsh snail	NR	48 H	LC_{50}	35,000,000		219158	72
	Cipangopaludina malleata;Mud snail	NR	48 H	LC_{50}	48,000,000		219158	72
	Physa acuta;Bladder snail	NR	48 H	LC_{50}	35,000,000		219158	72
	Ambystoma mexicanum;Salamander	3-4 WK	48 H	LC_{50}	20,000,000		219740	80
	Xenopus laevis;Clawed toad	3-4 WK	48 H	LC_{50}	24,000,000		219740	80
	Oncorhynchus mykiss;Rainbow trout	9.4 cm 10.8 g	24 H	LC_{50}	6,100,000		210991	78
	Pimephales promelas;Fathead minnow	0.12 g	96 H	LC_{50}	8,140,000		310183	83
	Pimephales promelas;Fathead minnow	0.12 g	96 H	LC_{50}	7,310,000		310183	83
	Oncorhynchus mykiss;Rainbow trout	1.0 g	96 H	LC_{50}	5,540,000		210666	80
	Aedes aegypti,Mosquito	3rd INST-AR	48 H	LC_{50}	15,000,000		310574	83
	Culex pipiens;Mosquito	3rd INST-AR	48 H	LC_{50}	17,000,000		310574	83
	Hydra oligactis;Hydra	BUD-LESS	48 H	LC_{50}	13,500,000		310574	83
	Lymnaea stagnalis;Great pond snail	3-4 WK	48 H	LC_{50}	7,000,000		310574	83
	Oncorhynchus mykiss;Rainbow trout	5-8 WK	48 H	LC_{50}	7,400,000		310574	83
	Oryzias latipes;Medaka, high-eyes	4-5 WK	48 H	LC_{50}	14,300,000		310574	83
	Pimephales promelas;Fathead minnow	3-4 WK	48 H	LC_{50}	15,000,000		310574	83
	Tubificidae;Oligochaete family	NR	48 H	LC_{50}	15,000,000		315788	83
	Chironomus thummi;Midge	NR	48 H	LC_{50}	13,000,000		315788	83
	Erpobdella octoculata,Leech	NR	48 H	LC_{50}	7,000,000		315788	83
	Asellus aquaticus;Aquatic sowbug	NR	48 H	LC_{50}	7,550,000		315788	83
	Lymnaea stagnalis;Great pond snail	NR	48 H	LC_{50}	7,000,000		315788	83
	Dugesia lugubris;Turbellarian	NR	48 H	LC_{50}	7,500,000		315788	83
	Hydra oligactis;Hydra	NR	48 H	LC_{50}	13,500,000		315788	83
	Corixa punctata;Water boatman	NR	48 H	LC_{50}	5,000,000		315788	83
	Gammarus pulex;Scud	NR	48 H	LC_{50}	6,000,000		315788	83
	Ischnura elegans;Dragonfly	NR	48 H	LC_{50}	6,400,000		315788	83
	Nemoura cinerea;Stonefly	NR	48 H	LC_{50}	10,300,000		315788	83
	Cloeon dipterum;Mayfly	NR	48 H	LC_{50}	7,600,000		315788	83
	Pimephales promelas;Fathead minnow	28 D	96 H	LC_{50}	7,280,000		312448	84
	Pimephales promelas;Fathead minnow	33 D	96 H	LC_{50}	8,120,000		312448	84
	Pimephales promelas;Fathead minnow	32 D	96 H	LC_{50}	6,210,000		312448	84
	Daphnia pulex;Water flea	<24 H	18 H	LC_{50}	1,220,000		212192	81
	Palaemonetes kadiakensis;Grass shrimp, freshwater prawn	JUV-ENILE	18 H	LC_{50}	2,610,000		212192	81
	Culex restuans;White dotted mosquito	3rd INST-AR	18 H	LC_{50}	6,190,000		212192	81
	Daphnia magna;Water flea	≤ 24 H	24 H	LC_{50}	35,000,000		310694	83
	Daphnia magna;Water flea	≤ 24 H	48 H	LC_{50}	31,000,000		310694	83
	Lepomis macrochirus;Bluegill	NR	96 H	LC_{50}	8,300,000		210949	68
	Gambusia affinis;Mosquitofish	ADULT FEMALE	24 H	LC_{50}	13,500,000		210508	57
	Gambusia affinis;Mosquitofish	ADULT FEMALE	48 H	LC_{50}	13,000,000		210508	57

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Acetone (cont.)	Gambusia affinis;Mosquitofish	ADULT FEMALE	96 H	LC_{50}	13,000,000		210508	57
	Rasbora heteromorpha;Harlequinfish, red rasbora	1.3-3 cm	24 H	LC_{50}	5,700,000		210542	69
	Rasbora heteromorpha;Harlequinfish, red rasbora	1.3-3 cm	48 H	LC_{50}	4,000,000		210542	69
	Oncorhynchus mykiss;Rainbow trout	10.0cm 10.2 g	6 H	LET	12,500,000		210991	78
	Daphnia magna;Water flea	≤24 H	7 D	LET	8,700,000		310694	83
	Daphnia magna;Water flea	8 H	0.25 H	LOC		9,280,000	212171	44
	Daphnia magna;Water flea	≤24 H	7 D	MOR	550,000		310694	83
	Daphnia magna;Water flea	≤24 H	14 D	MOR	550,000		310694	83
	Daphnia magna;Water flea	≤24 H	21 D	MOR	550,000		310694	83
	Daphnia magna;Water flea	≤24 H	28 D	MOR	550,000		310694	83
	Daphnia magna;Water flea	≤24 H	7 D	MOR	1,100,000		310694	83
	Daphnia magna;Water flea	≤24 H	14 D	MOR	1,100,000		310694	83
	Daphnia magna;Water flea	≤24 H	21 D	MOR	1,100,000		310694	83
	Daphnia magna;Water flea	≤24 H	28 D	MOR	1,100,000		310694	83
	Daphnia magna;Water flea	≤24 H	7 D	MOR	2,200,000		310694	83
	Daphnia magna;Water flea	≤24 H	14 D	MOR	2,200,000		310694	83
	Daphnia magna;Water flea	≤24 H	21 D	MOR	2,200,000		310694	83
	Daphnia magna;Water flea	≤24 H	28 D	MOR	2,200,000		310694	83
	Daphnia magna;Water flea	≤24 H	7 D	MOR	4,300,000		310694	83
	Daphnia magna;Water flea	≤24 H	14 D	MOR	4,300,000		310694	83
	Daphnia magna;Water flea	≤24 H	21 D	MOR	4,300,000		310694	83
	Daphnia magna;Water flea	≤24 H	28 D	MOR	4,300,000		310694	83
	Daphnia magna;Water flea	≤24 H	28 D	REP		1,100,000	310694	83
	Daphnia magna;Water flea	≤24 H	28 D	REP		4,300,000	310694	83
2-Butanone	Carassius auratus; Goldfish;	NR	24 H	LC50	2,400,000		215773	78
	Daphnia magna; Water flea;	1ST INSTAR, < 24 H	48 H	EC50IM		5,091,000	212193	80
	Daphnia magna; Water flea;	24 H	24 H	LC50	8,890,000		215718	77
	Daphnia magna; Water flea;	<24 H	24 H	LC50	520,000		215184	80
	Daphnia magna; Water flea;	<24 H	48 H	LC50	520,000		215184	80
	Daphnia magna; Water flea;	<24 H	48 H	MOR	70,000		215184	80
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	24 H	LC50	5,600,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	48 H	LC50	5,600,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	96 H	LC50	5,600,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	96 H	MOR	3,200,000		210508	57
	Lepomis macrochirus; Bluegill;	5 G, 7(5-11) CM	24 H	LC50	5,640,000		210922	54
	Lepomis macrochirus; Bluegill;	5 G, 7(5-11) CM	48 H	LC50	5,640,000		210922	54
	Lepomis macrochirus; Bluegill;	FINGERLING, 38-76 MM	96 H	LC0	10,000,000		212458	68
	Leuciscus idus; Ide, silver or golden orfe;	NR	NR	LC50	4,600,000		210547	78
	Leuciscus idus; Ide, silver or golden orfe;	NR	NR	LC50	4,600,000		210547	78
	Pimephales promelas; Fathead minnow;	0.12 G	96 H	LC50	3,200,000		310183	83
	Pimephales promelas; Fathead minnow;	31 D, 22.0 MM, 0.167 G	96 H	LC50	3,220,000		312448	84
4-Methyl-2-pentanone	Carassius auratus; Goldfish;	3.3 G	24 H	LC_{50}	460,000		210623	79
	Daphnia magna; Water flea,	24 H	24 H	LC_{50}	4,280,000		215718	77
	Daphnia magna; Water flea;	<= 24 H	21 D	REP *		7,800 to 39,000	210847	89

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
4-Methyl-2-pentanone (cont.)	Daphnia magna; Water flea;	<= 24 H	24 H	EC_{50}IM		3,682,000	210847	89
	Daphnia magna; Water flea;	NR	24 H	EC_0		474,000	210707	82
	Daphnia magna; Water flea;	NR	24 H	EC_0		930,000	216628	88
	Daphnia magna; Water flea;	NR	24 H	EC_{100}		5,000,000	210707	82
	Daphnia magna; Water flea;	NR	24 H	EC_{50}		1,550,000	210707	82
	Daphnia magna; Water flea;	NR	24 H	EC_{50}		3,623,000	216628	88
	Petromyzon marinus; Sea lamprey;	LARVAE, 8-15 CM	24 H	STR *		5,000	210638	57
	Pimephales promelas; Fathead minnow;	0.12 G	96 H	LC_{50}	509,000		310183	83
	Pimephales promelas; Fathead minnow;	29 D, 21.0 MM, 0.141 G	96 H	LC_{50}	505,000		312448	84
	Pimephales promelas; Fathead minnow;	31 D, 20.0 MM, 0.125 G	96 H	LC_{50}	540,000		312448	84
	Pimephales promelas; Fathead minnow;	EGGS TO FRY	3 to 33 D *	GRO *		105,000	310807	85
	Pimephales promelas; Fathead minnow;	EGGS TO FRY	3 to 33 D *	MOR *	418,000		310807	85
	Pimephales promelas; Fathead minnow;	EGGS TO FRY	3 to 33 D *	STR *		57,000	310807	85
	Scenedesmus subspicatus; Green algae;	LOG GRO PHASE	48 H	EC_{50}BM		980,000	212997	90
	Scenedesmus subspicatus; Green algae;	LOG GRO PHASE	48 H	EC_{50}GR		2,000,000	212997	90
Toluene	Aedes aegypti; Mosquito;	4TH INSTAR LARVAE	24 H	EC50IM		21,520	215700	77
	Aedes aegypti; Mosquito;	4TH INSTAR LARVAE	24 H	MOR * (Calc)	9,950		215700	77
	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC50	113,000		219385	91
	Brachydanio rerio; Zebra danio, zebrafish;	NR	48 H	LC50	25,000		215938	79
	Carassius auratus; Goldfish;	20-80 G, 1-1.5 YR, 13-20 CM	24 H	LC50	41,590		210416	76
	Carassius auratus; Goldfish;	20-80 G, 1-1.5 YR, 13-20 CM	48 H	LC50	27,620		210416	76
	Carassius auratus; Goldfish;	20-80 G, 1-1.5 YR, 13-20 CM	72 H	LC50	25,330		210416	76
	Carassius auratus; Goldfish;	20-80 G, 1-1.5 YR, 13-20 CM	96 H	LC50	22,800		210416	76
	Carassius auratus; Goldfish;	3.3 G	24 H	LC50	58,000		210623	79
	Carassius auratus; Goldfish;	3.8-6.4 CM, 1-2 G	24 H	LC50	57,680		210728	66
	Carassius auratus; Goldfish;	3.8-6.4 CM, 1-2 G	48 H	LC50	57,680		210728	66
	Carassius auratus; Goldfish;	3.8-6.4 CM, 1-2 G	96 H	LC50	57,680		210728	66
	Carassius auratus; Goldfish;	NR	24 H	LC50	130,000		215773	78
	Carassius auratus; Goldfish;	NR	30 D	HIS *		5,000	219764	79
	Carassius auratus; Goldfish;	NR	4 H	HEM *		60,000	219764	79
	Chlorella vulgaris; Green algae;	NR	24 H	EC50GR		245,000	212215	75
	Clarias lazera; Catfish;	19-23 CM, 150-180 G	2 to 96 H	BIO *		7,860	213997	91
	Clarias lazera; Catfish;	19-23 CM, 150-180 G	24 H	LC50 ?	36,600		213997	91
	Clarias lazera; Catfish;	19-23 CM, 150-180 G	48 H	LC50 ?	31,400		213997	91
	Clarias lazera; Catfish;	19-23 CM, 150-180 G	72 H	LC50 ?	29,500		213997	91
	Clarias lazera; Catfish;	19-23 CM, 150-180 G	96 H	LC50 ?	26,200		213997	91
	Cyprinus carpio; Common, mirror, colored, carp;	12-17 CM, 40-80 G	6 H	PHY *		100	310912	85
	Cyprinus carpio; Common, mirror, colored, carp;	NR	6 H	BIO *		100	311249	84
	Cyprinus carpio; Common, mirror, colored, carp;	NR	6 H	BIO *		100	311249	84
	Cyprinus carpio; Common, mirror, colored, carp;	NR	6 H	BIO *		100	311249	84
	Cyprinus carpio; Common, mirror, colored, carp;	NR	7 D	MOR *	1,500,000		216124	76
	Daphnia magna; Water flea;	1ST INSTAR	48 H	EC50IM		19,600	215087	79
	Daphnia magna; Water flea;	24 H	24 H	LC50	470,000		215718	77
	Daphnia magna; Water flea;	<24 H	24 H	LC50	310,000		215184	80
	Daphnia magna; Water flea;	<24 H	48 H	LC50	310,000		215184	80
	Daphnia magna; Water flea;	<24 H	48 H	MOR *	28,000		215184	80

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Toluene (cont.)	Daphnia magna; Water flea;	<= 24 H	21 D	REP *		1,000	210847	89
	Daphnia magna; Water flea;	<= 24 H	24 H	EC50IM		84,000	210847	89
	Daphnia magna; Water flea;	NR	24 H	EC0		53	216628	88
	Daphnia magna; Water flea;	NR	24 H	EC0		93	210707	82
	Daphnia magna; Water flea;	NR	24 H	EC100		500	210707	82
	Daphnia magna; Water flea;	NR	24 H	EC50		270	210707	82
	Daphnia magna; Water flea;	NR	24 H	EC50		84	216628	88
	Daphnia magna; Water flea;	NR	24 H	EC50IM		7,000	313142	88
	Diaptomus forbesi; Calanoid copepod;	NR	96 H	LC50	447,000		311282	83
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	24 H	LC50 ?	1,340,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	48 H	LC50 ?	1,260,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	96 H	LC50 ?	1,180,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	96 H	MOR *	560,000		210508	57
	Ictalurus punctatus; Channel catfish;	0.1 G	96 H	LC50	240,000		210666	80
	Lepomis humilis; Orangespotted sunfish;	4-6 G	1 H	LET	61000 to 65000		212409	17
	Lepomis macrochirus; Bluegill;	0.1 G	96 H	LC50	170,000		210666	80
	Lepomis macrochirus; Bluegill;	3.8-6.4 CM, 1-2 G	24 H	LC50	24,000		210728	66
	Lepomis macrochirus; Bluegill;	3.8-6.4 CM, 1-2 G	48 H	LC50	24,000		210728	66
	Lepomis macrochirus; Bluegill;	3.8-6.4 CM, 1-2 G	96 H	LC50	24,000		210728	66
	Lepomis macrochirus; Bluegill;	FINGERLING, 38-76 MM	96 H	LC0 ?	24,000		212458	68
	Lepomis macrochirus; Bluegill;	JUVENILE, 0.32-1.2 G	24 H	LC50	17,000		215590	81
	Lepomis macrochirus; Bluegill;	JUVENILE, 0.32-1.2 G	96 H	LC50	13,000		215590	81
	Oncorhynchus kisutch; Coho salmon, silver salmon;	0.3 G	96 H	LC50 (Calc)	8,110		210477	80
	Oncorhynchus kisutch; Coho salmon, silver salmon;	1 G, FRY	40 D	GRO * (Calc)		1,410	315191	81
	Oncorhynchus kisutch; Coho salmon, silver salmon;	1 G, FRY	40 D	GRO * (Calc)		2,760	315191	81
	Oncorhynchus kisutch; Coho salmon, silver salmon;	1 G, FRY	96 H	LC50 (Calc)	5,500		315191	81
	Oncorhynchus kisutch; Coho salmon, silver salmon;	JUVENILE, 6-10 CM	1 H	EC50AV ?		1,650	315211	81
	Oncorhynchus kisutch; Coho salmon, silver salmon;	JUVENILE, 6-10 CM	1 H	EC50AV ?		2,340	315211	81
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	2 YR	48 H	LC0	7,000		219125	72
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	2 YR	48 H	LC100	35,500		219125	72
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	2.4 G	96 H	LC50	24,000		210666	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	96 H	LC50	5,800		313142	88
	Oryzias latipes; Medaka, high-eyes;	EGGS	24 H	LC50 ?	80,000		215580	79
	Oryzias latipes; Medaka, high-eyes;	EGGS	48 H	LC50 ?	63,000		215580	79
	Oryzias latipes; Medaka, high-eyes;	EGGS	96 H	LC50 ?	54,000		215580	79
	Pimephales promelas; Fathead minnow;	1 D POST-HATCH, PROTOLARVAE	96 H	LC50	25,000		315560	82
	Pimephales promelas; Fathead minnow;	1 D POST-HATCH, PROTOLARVAE	96 H	LC50	27,000		315560	82
	Pimephales promelas; Fathead minnow;	1 D POST-HATCH, PROTOLARVAE	96 H	LC50	28,000		315560	82
	Pimephales promelas; Fathead minnow;	1 D POST-HATCH, PROTOLARVAE	96 H	LC50	36,000		315560	82
	Pimephales promelas; Fathead minnow;	3.8-6.4 CM, 1-2 G	24 H	LC50	46,310		210728	66
	Pimephales promelas; Fathead minnow;	3.8-6.4 CM, 1-2 G	24 H	LC50	56,000		210728	66
	Pimephales promelas; Fathead minnow;	3.8-6.4 CM, 1-2 G	48 H	LC50	46,310		210728	66
	Pimephales promelas; Fathead minnow;	3.8-6.4 CM, 1-2 G	48 H	LC50	56,000		210728	66
	Pimephales promelas; Fathead minnow;	3.8-6.4 CM, 1-2 G	96 H	LC50	34,270		210728	66
	Pimephales promelas; Fathead minnow;	3.8-6.4 CM, 1-2 G	96 H	LC50	42,330		210728	66
	Pimephales promelas; Fathead minnow;	30 D	96 H	LC50	18,000		315560	82

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
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NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
Toluene (cont.)	Pimephales promelas; Fathead minnow;	30 D	96 H	LC50	18000 to 30000		312405	83
	Pimephales promelas; Fathead minnow;	30 D	96 H	LC50	26,000		315560	82
	Pimephales promelas; Fathead minnow;	30 D	96 H	LC50	30,000		315560	82
	Pimephales promelas; Fathead minnow;	30 D	96 H	LC50	31,000		315560	82
	Pimephales promelas; Fathead minnow;	30-31 D, 16.5 MM, 0.067 G	96 H	LC50	31,700		213217	90
	Pimephales promelas; Fathead minnow;	31 D, 21.6 MM, 0.154 G	96 H	LC50	36,200		312858	86
	Pimephales promelas; Fathead minnow;	EMBRYO	32 D	GRO *		6,000	315560	82
	Pimephales promelas; Fathead minnow;	EMBRYO	32 D	GRO *		6,000	315560	82
	Pimephales promelas; Fathead minnow;	EMBRYO	96 H	LC50	55,000		315560	82
	Pimephales promelas; Fathead minnow;	EMBRYO	96 H	LC50	55000 to 72000		312405	83
	Pimephales promelas; Fathead minnow;	EMBRYO	96 H	LC50	59,000		315560	82
	Pimephales promelas; Fathead minnow;	EMBRYO	96 H	LC50	66,000		315560	82
	Pimephales promelas; Fathead minnow;	EMBRYO	96 H	LC50	72,000		315560	82
	Pimephales promelas; Fathead minnow;	EMBRYO - LARVAE	32 D	GRO *		6,000	312405	83
	Pimephales promelas; Fathead minnow;	EMBRYOS, 1-2 H	29 H	ABN *		30000 to 45000	311586	85
	Pimephales promelas; Fathead minnow;	FRY, 10-15 D, 11.6 MG, 9.5 MM	96 H	LC50	56,400		310432	83
	Pimephales promelas; Fathead minnow;	JUVENILE, 0.11 G, 1.8 CM	96 H	LC50	12,800		215087	79
	Pimephales promelas; Fathead minnow;	JUVENILE, 30-35 D, 76.8 MG, 14.9 MM	96 H	LC50	77,400		310432	83
	Pimephales promelas; Fathead minnow;	PROTOLARVAE	96 H	LC50	25000 to 36000		312405	83
	Pimephales promelas; Fathead minnow;	SUB-ADULT, 65-94 D, 391 MG, 28 MM	96 H	LC50	54,000		310432	83
	Poecilia reticulata; Guppy;	2-3 MO	14 D	LC50 (Calc)	68,300		216354	81
	Poecilia reticulata; Guppy;	6 M, 1.9-2.5 CM, 0.1-0.2 G	24 H	LC50	62,810		210728	66
	Poecilia reticulata; Guppy;	6 M, 1.9-2.5 CM, 0.1-0.2 G	48 H	LC50	60,950		210728	66
	Poecilia reticulata; Guppy;	6 M, 1.9-2.5 CM, 0.1-0.2 G	96 H	LC50	59,300		210728	66
	Poecilia reticulata; Guppy;	NR	96 H	LC50	28,200		313142	88
	Scenedesmus subspicatus, Green algae;	LOG GRO PHASE	48 H	EC50BM		160,000	212997	90
	Scenedesmus subspicatus; Green algae;	LOG GRO PHASE	48 H	EC50GR		125,000	212997	90
	Selenastrum capricornutum; Green algae;	EXPO GRO PHASE	8 D	EC50GR		9,400	213550	90
	Selenastrum capricornutum; Green algae;	NR	72 H	EC50GR		12,500	313142	88
	Tilapia mossambica; Mozambique tilapia;	15 G	24 H	BIO *		10,000	313236	88
	Tilapia mossambica; Mozambique tilapia;	40-50 G	96 H	ENZ *		45,000	311944	86
	Tilapia mossambica; Mozambique tilapia;	40-50 G	96 H	ENZ *		90,000	311944	86
	Tilapia mossambica; Mozambique tilapia;	NR	to 24 H	ENZ *		10000 to 40000	210805	88
Semivolatile Organic Compounds								
bis(2-Ethylhexyl)phthalate	Anacystis aeruginosa; Blue-green algae;	LOG-PHASE 500000 CELLS/ML	96 H	EC50GR		>=320	215336	81
	Anacystis aeruginosa; Blue-green algae;	LOG-PHASE 500000 CELLS/ML	96 H	PGR *		>=320	215336	81
	Brachydanio rerio; Zebra danio, zebrafish;	1-2 D	96 H	BEH *		>=320	215390	84
	Brachydanio rerio; Zebra danio, zebrafish;	1-2 D	96 H	LC50	>320		215390	84
	Brachydanio rerio; Zebra danio, zebrafish;	1-2 D	96 H	MOR *	>=320		215390	84
	Brachydanio rerio; Zebra danio, zebrafish;	4-5 WK	96 H	BEH *		>=320	215390	84
	Brachydanio rerio; Zebra danio, zebrafish;	4-5 WK	96 H	LC50	>320		215390	84
	Brachydanio rerio; Zebra danio, zebrafish;	4-5 WK	96 H	MOR *	>=320		215390	84
	Brachydanio rerio; Zebra danio, zebrafish;	<4 H, EGGS	5 WK	DVP *		>=1000	215390	84
	Brachydanio rerio; Zebra danio, zebrafish;	<4 H, EGGS	5 WK	GRO *		>=1000	215390	84
	Brachydanio rerio; Zebra danio, zebrafish;	<4 H, EGGS	5 WK	MOR *	>=1000		215390	84

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
bis(2-Ethylhexyl)phthalate (cont.)	Bufo woodhousei fowleri; Fowler's toad;	EMBRYO TO LARVA	to 8 D *	LC50	3,880		216772	78
	Bufo woodhousei fowleri; Fowler's toad;	LARVA	96 H *	LC50	3,880		216772	78
	Carassius auratus; Goldfish;	EGGS, 4 D POSTHATCH	8 D	LC50 *	> 186000		210563	79
	Carassius auratus; Goldfish;	EGGS, 4 D POSTHATCH	8 D	LC50 *	> 191000		210563	79
	Carassius auratus; Goldfish;	EGGS, 4 D POSTHATCH	96 H	LC50 *	> 186000		210563	79
	Carassius auratus; Goldfish;	EGGS, 4 D POSTHATCH	96 H	LC50 *	> 191000		210563	79
	Carassius auratus; Goldfish;	EMBRYO TO LARVA	96 H *	LC50	6,180		216772	78
	Chironomus plumosus; Midge;	EGG	30 D	HAT *		560	217688	77
	Chironomus plumosus; Midge;	LARVAE	30 D	DVP *		560	217688	77
	Chlorella pyrenoidosa; Green algae,	LOG-PHASE 10000 CELLS/ML	96 H	EC50GR		>320	215336	81
	Chlorella pyrenoidosa; Green algae;	LOG-PHASE 10000 CELLS/ML	96 H	PGR *		>=320	215336	81
	Daphnia magna, Water flea;	1ST INSTAR, 24 H	21 D	REP		3	210732	73
	Daphnia magna, Water flea;	< 24 H	21 D	MOR *	10		311061	82
	Daphnia magna; Water flea;	< 24 H	21 D	MOR *	100		311061	82
	Daphnia magna; Water flea;	< 24 H	21 D	MOR *	3.2		311061	82
	Daphnia magna; Water flea;	< 24 H	21 D	MOR *	32		311061	82
	Daphnia magna; Water flea;	< 24 H	48 H	LOC *		47	311061	82
	Daphnia magna; Water flea;	<1 D	2 WK	LC50	>320		215336	81
	Daphnia magna; Water flea;	<1 D	2 WK	MOR *	32		215336	81
	Daphnia magna; Water flea;	<1 D	2 WK	MOR *	>=320		215336	81
	Daphnia magna; Water flea;	<1 D	24 H	EC50IM		>320	215336	81
	Daphnia magna; Water flea;	<1 D	3 WK	LC50	>320		215336	81
	Daphnia magna; Water flea;	<1 D	3 WK	MOR *	>=320		215336	81
	Daphnia magna; Water flea;	<24 H	2 WK	REP *		320	215336	81
	Daphnia magna; Water flea;	<24 H	24 H	LC50	>68000		215184	80
	Daphnia magna; Water flea;	<24 H	48 H	LC50	11,000		215184	80
	Daphnia magna; Water flea;	<24 H	48 H	MOR *	1,100		215184	80
	Daphnia magna; Water flea;	FIRST INSTAR, < 24 H	21 D	MOR *	158		312340	87
	Daphnia magna; Water flea;	FIRST INSTAR, < 24 H	21 D	MOR *	811		312340	87
	Daphnia magna; Water flea;	FIRST INSTAR, < 24 H	7 D	BIO *		158	312340	87
	Daphnia magna; Water flea;	FIRST INSTAR, < 24 H	7 D	BIO *		811	312340	87
	Daphnia magna; Water flea;	FIRST INSTAR, < 24 H	7 D	MOR *	158		312340	87
	Daphnia magna; Water flea;	FIRST INSTAR, < 24 H	7 D	MOR *	811		312340	87
	Daphnia magna; Water flea;	NR	14 D	REP *		10	210736	73
	Daphnia magna; Water flea;	NR	14 D	REP *		3	210736	73
	Daphnia magna; Water flea;	NR	14 D	REP *		30	210736	73
	Daphnia magna; Water flea;	NR	21 D	REP *		10	210736	73
	Daphnia magna; Water flea;	NR	21 D	REP *		2.5	210736	73
	Daphnia magna; Water flea;	NR	21 D	REP *		3	210736	73
	Daphnia magna; Water flea;	NR	21 D	REP *		30	210736	73
	Daphnia pulex; Water flea;	NEONATE, < 24 H	48 H	EC50IM		133	312730	87
	Euglena gracilis; Flagellate euglenoid;	LOG-PHASE 10000 CELLS/ML	96 H	EC50GR		>320	215336	81
	Euglena gracilis; Flagellate euglenoid;	LOG-PHASE 10000 CELLS/ML	96 H	PGR *		>=320	215336	81
	Gammarus pseudolimnaeus, Scud;	JUVENILE	96 H	LC50	> 32000		210666	80
	Gammarus pseudolimnaeus; Scud,	NR	96 H	LC50	>32000		210732	73
	Gammarus pulex; Scud;	>12 MM	10 D	LOC *		100	210079	91

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
bis(2-Ethylhexyl)phthalate (cont.)	Gammarus pulex; Scud;	>12 MM	10 D	LOC *		500	210079	91
	Gasterosteus aculeatus; Three spine stickleback;	4-5 WK	24 H	EC50 *		> 300	210823	89
	Gasterosteus aculeatus; Three spine stickleback;	4-5 WK	24 H	LC50	> 300		210823	89
	Gasterosteus aculeatus; Three spine stickleback;	4-5 WK	48 H	EC50 *		> 300	210823	89
	Gasterosteus aculeatus; Three spine stickleback;	4-5 WK	48 H	LC50	> 300		210823	89
	Gasterosteus aculeatus; Three spine stickleback;	4-5 WK	72 H	EC50 *		> 300	210823	89
	Gasterosteus aculeatus; Three spine stickleback;	4-5 WK	72 H	LC50	> 300		210823	89
	Gasterosteus aculeatus; Three spine stickleback;	4-5 WK	96 H	EC50 *		> 300	210823	89
	Gasterosteus aculeatus; Three spine stickleback;	4-5 WK	96 H	LC50	> 300		210823	89
	Gasterosteus aculeatus; Three spine stickleback;	EGGS, < 6 H	35 D	EC50 *		> 320	210823	89
	Gasterosteus aculeatus; Three spine stickleback;	EGGS, < 6 H	35 D	LC50	> 320		210823	89
	Ictalurus punctatus; Channel catfish;	1.5 G	96 H	LC50	> 100000		210666	80
	Ictalurus punctatus; Channel catfish;	EMBRYO TO LARVA	96 H *	LC50	690		216772	78
	Jordanella floridae; Flagfish;	1-2 D	48 H	LC50	>320		215336	81
	Jordanella floridae; Flagfish;	1-2 D	96 H	BEH *		>=320	215336	81
	Jordanella floridae; Flagfish;	1-2 D	96 H	LC50	>320		215336	81
	Jordanella floridae; Flagfish;	28-35 D	1 WK	MOR *	>=320		215336	81
	Jordanella floridae; Flagfish;	28-35 D	2 WK	MOR *	>=320		215336	81
	Jordanella floridae; Flagfish;	28-35 D	3 WK	MOR *	>=320		215336	81
	Jordanella floridae; Flagfish;	28-35 D	4 WK	GRO *		>=320	215336	81
	Jordanella floridae; Flagfish;	28-35 D	4 WK	MOR *	>=320		215336	81
	Jordanella floridae; Flagfish;	28-35 D	4 WK	REP *		>=320	215336	81
	Jordanella floridae; Flagfish;	4-5 WK	48 H	LC50	>320		215336	81
	Jordanella floridae; Flagfish;	4-5 WK	96 H	BEH *		>=320	215336	81
	Jordanella floridae; Flagfish;	4-5 WK	96 H	LC50	>320		215336	81
	Jordanella floridae; Flagfish;	<36 H	4 WK	GRO *		>=320	215336	81
	Jordanella floridae; Flagfish;	<36 H	4 WK	LC50	>320		215336	81
	Jordanella floridae; Flagfish;	<36 H	4 WK	MOR *	>=320		215336	81
	Jordanella floridae; Flagfish;	<36 H	7 D	LC50	>320		215336	81
	Lepomis macrochirus; Bluegill;	0.32-1.2 G, JUVENILE	24 H	LC50	>770000		215590	81
	Lepomis macrochirus; Bluegill;	0.32-1.2 G, JUVENILE	96 H	LC50	>770000		215590	81
	Lepomis macrochirus; Bluegill;	0.6 G	96 H	LC50	> 100000		210666	80
	Lepomis macrochirus; Bluegill;	JUVENILE, 35 - 60 MM	0.7 H	AVO *		112,400	215272	80
	Micropterus salmoides; Largemouth bass;	EGGS, 4 D POSTHATCH	7.5 D	LC50 *	45,500		210563	79
	Micropterus salmoides; Largemouth bass;	EGGS, 4 D POSTHATCH	7.5 D	LC50 *	55,700		210563	79
	Micropterus salmoides; Largemouth bass;	EGGS, 4 D POSTHATCH	84 H	LC50 *	32,100		210563	79
	Micropterus salmoides; Largemouth bass;	EGGS, 4 D POSTHATCH	84 H	LC50 *	65,500		210563	79
	Micropterus salmoides; Largemouth bass;	EMBRYO TO LARVA	96 H *	LC50	32,900		216772	78
	Micropterus salmoides; Largemouth bass;	EMBRYO TO LARVA	96 H *	LC50	42,100		216772	78
	Oncorhynchus kisutch; Coho salmon, silver salmon;	1.5 G	96 H	LC50	> 100000		210666	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1.5 G	96 H	LC50	> 100000		210666	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EGGS, 4 D POSTHATCH	23 D	LC50 *	139,100		210563	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EGGS, 4 D POSTHATCH	23 D	LC50 *	154,000		210563	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EGGS, 4 D POSTHATCH	27 D	LC50 *	139,500		210563	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EGGS, 4 D POSTHATCH	27 D	LC50 *	149,200		210563	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EMBRYO TO LARVA	96 H *	LC50	139,500		216772	78

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
bis(2-Ethylhexyl)phthalate (cont.)	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EMBRYO TO LARVA	96 H *	LC50	149,200		216772	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGG	90 D	GRO *		54	215109	77
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGG	90 D	VTE *		14	215109	77
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGG	90 D	VTE *		5	215109	77
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	100 D	GRO *		62	217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	100 D	HAT *		54	217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	12 D *	MOR *	14		217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	12 D *	MOR *	5		217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	12 D *	MOR *	54		217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	24 D *	MOR *	14		217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	24 D *	MOR *	5		217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	24 D *	MOR *	54		217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	5 D *	MOR *	14		217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	5 D *	MOR *	5		217859	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EYED EGGS	5 D *	MOR *	54		217859	76
	Oryzias latipes; Medaka, high-eyes;	1-2 D	48 H	LC50	>320		215336	81
	Oryzias latipes; Medaka, high-eyes;	1-2 D	96 H	BEH *		>=320	215336	81
	Oryzias latipes; Medaka, high-eyes;	1-2 D	96 H	LC50	>320		215336	81
	Oryzias latipes; Medaka, high-eyes;	28-35 D	1 WK	MOR *	>=320		215336	81
	Oryzias latipes; Medaka, high-eyes;	28-35 D	2 WK	MOR *	>=320		215336	81
	Oryzias latipes; Medaka, high-eyes;	28-35 D	3 WK	MOR *	>=320		215336	81
	Oryzias latipes; Medaka, high-eyes;	28-35 D	4 WK	GRO *		>=320	215336	81
	Oryzias latipes; Medaka, high-eyes;	28-35 D	4 WK	LC50	>320		215336	81
	Oryzias latipes; Medaka, high-eyes;	28-35 D	4 WK	MOR *	>=320		215336	81
	Oryzias latipes; Medaka, high-eyes;	28-35 D	4 WK	REP *		>=320	215336	81
	Oryzias latipes; Medaka, high-eyes;	4-5 WK	48 H	LC50	>320		215336	81
	Oryzias latipes; Medaka, high-eyes;	4-5 WK	96 H	BEH *		>=320	215336	81
	Oryzias latipes; Medaka, high-eyes;	4-5 WK	96 H	LC50	>320		215336	81
	Oryzias latipes; Medaka, high-eyes;	<36 H	4 WK	LC50	>320		215336	81
	Oryzias latipes; Medaka, high-eyes;	<36 H	4 WK	MOR *	>=320		215336	81
	Oryzias latipes; Medaka, high-eyes;	<36 H	7 D	LC50	>320		215336	81
	Pimephales promelas; Fathead minnow;	7.5 MO, 1.24 G	56 D	GRO *		62	217859	76
	Pimephales promelas; Fathead minnow;	7.5 MO, 1.24 G	56 D	MOR *	62		217859	76
	Pimephales promelas; Fathead minnow;	FRY, 10 D	127 D	GRO *		100	215109	77
	Pimephales promelas; Fathead minnow;	FRY, 10 D	127 D	VTE *		11	215109	77
	Poecilia reticulata; Guppy;	21-28 D	1 WK	LC50	>320		215336	81
	Poecilia reticulata; Guppy;	21-28 D	2 WK	LC50	>320		215336	81
	Poecilia reticulata; Guppy;	21-28 D	4 WK	LC50	>320		215336	81
	Poecilia reticulata; Guppy;	21-28 D	48 H	LC50	>320		215336	81
	Rana arvalis; Moorfrog;	EGGS	3 WK	HAT		0.89 to 187.40	215904	87
	Rana pipiens; Leopard frog;	EMBRYO TO LARVA	to 8 D *	LC50	4,440		216772	78
	Rana pipiens; Leopard frog;	LARVA	96 H *	LC50	4,440		216772	78
	Salvelinus fontinalis; Brook trout;	ADULT, 1.5 YR	150 D	GRO *		52	215109	77
	Salvelinus fontinalis; Brook trout;	ADULT, 1.5 YR	150 D	VTE *		3.7	215109	77
	Selenastrum capricornutum; Green algae;	LOG-PHASE 50000 CELLS/ML	96 H	EC50GR		>320	215336	81
	Selenastrum capricornutum; Green algae;	LOG-PHASE 50000 CELLS/ML	96 H	PGR *		>=320	215336	81

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
bis(2-Ethylhexyl)phthalate (cont.)	Stephanodiscus hantzschii; Diatom;	LOG-PHASE 10000 CELLS/ML	96 H	EC50GR		>320	215336	81
	Stephanodiscus hantzschii; Diatom;	LOG-PHASE 10000 CELLS/ML	96 H	PGR *		>=320	215336	81
2-Methylnaphthalene	Scenedesmus subspicatus; Green algae;	NR	10 D	GRO *		2,000,000	215189	80
Pesticides/PCBs								
alpha Chlordane	Lepomis macrochirus; Bluegill;	NR	0.42 H	ENZ * (Calc)		17,100	212919	71
	Lepomis macrochirus; Bluegill;	NR	96 H	LC50	7		210666	80
Inorganic Compounds								
Aluminum	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC_{50}	> 3,000		219385	91
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	$EC_{50}BM$ *		2,500	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	$EC_{50}BM$ *		7,600	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	$EC_{50}GR$ *		12,700	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	$EC_{50}GR$ *		5,100	212262	74
	Salmo trutta; Brown trout;	ALEVIN	21 D	LC_{50}	84 to 105		213472	90
	Salmo trutta; Brown trout;	ALEVIN	28 D	LC_{50}	19		213472	90
	Salmo trutta; Brown trout;	ALEVIN	28 D	LC_{50}	79		213472	90
	Salmo trutta; Brown trout;	ALEVIN	42 D	LC_{50}	15		213472	90
	Salmo trutta; Brown trout;	ALEVIN	42 D	LC_{50}	72		213472	90
	Salmo trutta; Brown trout;	FERT EGG	<4 MO	HAT		<677	213472	90
	Salvelinus fontinalis; Brook trout;	0.2 G, 30 D	3 D	GRO *		268	213592	91
	Salvelinus fontinalis; Brook trout;	0.2 G, 30 D	56 D	MOR *	268		213592	91
	Salvelinus fontinalis; Brook trout;	ADULT, 25-30 CM	5 D	LET	320		216632	80
	Salvelinus fontinalis; Brook trout;	EYED EGGS	5 D	MOR *	320		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	11.5 D	LT_{50}	100		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	38.4 H	LT_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	4.7 D	LT_{50}	650		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	43.2 H	LT_{50}	1,000		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	5 D	LT_{50}	1,000		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	5.2 D	LT_{50}	100		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	50.4 H	LT_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	55.2 H	LT_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	67.2 H	LT_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	7.3 D	LT_{50}	630		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	79.2 H	LT_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	86.4 H	LT_{50}	1,000		216632	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	10.67 D	LT_{50}	480		216188	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	19.67 D	LT_{50}	470		216188	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	20.83 D	LT_{50}	20		216188	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	4.79 D	LT_{50}	42		216188	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	8.42 D	LT_{50}	500		216188	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	>20.83 D	LT_{50}	10		216188	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	>20.83 D	LT_{50}	500		216188	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	>20.83 D	LT_{50}	500		216188	80
	Salvelinus fontinalis; Brook trout;	RECENTLY HATCHED FRY	5 D	LET	320		216632	80

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Aluminum (cont.)	Salvelinus fontinalis; Brook trout;	YEARLINGS, 13-17 CM	5 D	LET	320		216632	80
Aluminum chloride	Ambystoma opacum; Marbled salamander;	EGGS	8 D	LC_{50}	2,280		216199	78
	Brachydanio rerio; Zebra danio, zebrafish;	LARVAE, 7-8 D POST-SPAWN	48 H	LC_{50}	106,000		311199	85
	Brachydanio rerio; Zebra danio, zebrafish;	LARVAE, 7-8 D POST-SPAWN	48 H	LC_{50}	80,000		311199	85
	Carassius auratus; Goldfish;	EGGS	7 D	LC_{50} *	150		215305	78
	Chilomonas paramecium; Cryptomonad;	NR	0.17 H	LET	2,400		212863	73
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	4,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	8,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	8,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	2,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	2,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	8,000		315166	81
	Daphnia magna; Water flea;	12 H	21 D	EC_{50}IM ?		1,400	212022	72
	Daphnia magna; Water flea;	12 H	21 D	EC_{50}RE ?		680	212022	72
	Daphnia magna; Water flea;	12 H	48 H	EC_{50}IM ?		3,900	212022	72
	Daphnia magna; Water flea;	4 H	64 H	EC_{50}IM (Calc)		1,400	212054	48
	Euglena gracilis; Flagellate euglenoid;	NR	3 H	MOR *	1,000,000		212863	73
	Gambusia affinis; Mosquitofish; Poeciliidae;	ADULT, FEMALE	24 H	LC_{50} ? (Calc)	29,600		210508	57
	Gambusia affinis; Mosquitofish; Poeciliidae;	ADULT, FEMALE	48 H	LC_{50} ? (Calc)	27,500		210508	57
	Gambusia affinis; Mosquitofish; Poeciliidae;	ADULT, FEMALE	96 H	LC_{50} ? (Calc)	27,100		210508	57
	Gambusia affinis; Mosquitofish; Poeciliidae;	ADULT, FEMALE	96 H	MOR * (Calc)	20,400		210508	57
	Microhyla carolinensis; Narrow mouthed frog;	EGGS	7 D	LC_{50} *	50		215305	78
	Micropterus salmoides; Largemouth bass;	EGGS	8 D	LC_{50}	170		216199	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EGGS	28 D	LC_{50}	560		216199	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EGGS	28 D	LC_{50} *	560		215305	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 11 WK	34.9 D	LT_{50}	5,140		219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 11 WK	43.9 D	LT_{50}	513		219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 11 WK	45 D	GRO *		513	219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	31.96 D	LT_{50}	5,230		219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	45 D	GRO *		51.6	219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	45 D	GRO *		51.6; 51.6	218830	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	45 D	GRO *		514	219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	45 D	PHY *		514; 514	218830	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 WK	4.7 D	PHY *		5,200; 5,050	218830	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 WK	7.46 D	LT_{50}	5,140		219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 WK	71.52 H	LT_{50}	5,200		219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 WK	9.25 D	PHY *		5,140; 1,570	218830	73
	Peranema trichophorum; Flagellate;	NR	0.17 H	LET	>1,000,000		212863	73
	Pimephales promelas; Fathead minnow;	1 D LARVAE	to 96 H	MOR	50 to 400		210836	89
	Pimephales promelas; Fathead minnow;	12 D LARVAE	to 96 H	MOR	50 to 400		210836	89
	Pimephales promelas; Fathead minnow;	30 D	to 109 D	HIS		30 to 60	213182	90
	Pimephales promelas; Fathead minnow;	ADULT	2 MO	REP *		66; 35	213070	89
	Pimephales promelas; Fathead minnow;	EMBRYO	4 D	HAT *		66; 35	213070	89
	Pimephales promelas; Fathead minnow;	JUVENILE	to 96 H	MOR	50 to 400		210836	89
	Pimephales promelas; Fathead minnow;	LARVAE, <24 H	14 D	GRO *		66, 35	213070	89
	Pimephales promelas; Fathead minnow;	LARVAE, <24 H	14 D	MOR *	66; 35		213070	89

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Aluminum chloride (cont.)	Tetrahymena pyriformis; Ciliate;	NR	0.17 H	LET	3,200		212863	73
	Tropisternus lateralis; Beetle;	ADULT	14 D	PHY * (Calc)		27,000	212868	69
Aluminum sulfate	Asellus aquaticus; Aquatic sowbug;	ADULT, 7 MM, 1.5 MG DRY WT	48 H	EC_{50}IM ?		6,570	311972	86
	Asellus aquaticus; Aquatic sowbug;	ADULT, 7 MM, 1.5 MG DRY WT	72 H	EC_{50}IM ?		4,370	311972	86
	Biomphalaria glabrata; Snail;	ADULT, 4-4.5 SUTURE WHORL	24 H	STR *		100	212853	63
	Biomphalaria glabrata; Snail;	ADULT, 4-4.5 SUTURE WHORL	24 H	STR *		1,000	212853	63
	Cladocera; Water flea order;	NR	2 MO *	POP *		500	217183	78
	Crangonyx pseudogracilis; Amphipod;	ADULT, 4 MM, 0.2 MG DRY WT	48 H	EC_{50}IM ?		12,800	311972	86
	Crangonyx pseudogracilis; Amphipod;	ADULT, 4 MM, 0.2 MG DRY WT	96 H	EC_{50}IM ?		9,190	311972	86
	Crustacea; Crustacean class;	NR	2 MO *	ABD *		500	217183	78
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	8,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	8,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	2,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	4,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	4,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	8,000		315166	81
	Daphnia magna; Water flea;	8 H, YOUNG	0.25 H *	LOC *		136,000	212171	44
	Fundulus heteroclitus; Mummichog;	NR	36 H	LC_{100} (Calc)	2,200		212865	15
	Fundulus heteroclitus; Mummichog;	NR	5 D	LC_{100} (Calc)	1,100		212865	15
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	24 H	LC_{50} ? (Calc)	69,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	48 H	LC_{50} ? (Calc)	38,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	48 H	MOR * (Calc)	< 28,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	96 H	LC_{50} ? (Calc)	37,000		210508	57
	Micropterus dolomieui; Smallmouth bass;	13.8(12-17) MM, 32.5(9-59) MG	30 D	GRO *		251.6	312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE	30 D	MOR *	251.6		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	100		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	196		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	217		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	32		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	320		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	56		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	560		312723	87
	Notemigonus crysoleucas; Golden shiner;	NR	45 D	MOR *	100,000		312756	86
	Notemigonus crysoleucas; Golden shiner;	NR	45 D	MOR *	100,000		312756	86
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	24 H	MOR *	910		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	24 H	MOR *	9,100		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	48 H	LET	9,100		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	48 H	MOR *	910		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	72 H	MOR *	910		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	HEM *		90	212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	HEM *		910	212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	HEM *		910	212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	MOR *	90		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	MOR *	910		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	10 D	LC0	200,000		216520	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	10 D	LC0	50,000		216520	80

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Aluminum sulfate (cont.)	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	42 H	LC_{100}	50,000		216520	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	42 H	LC_{100}	50,000		216520	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	96 H	MOR *	50,000		216520	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 11 WK	45 D	PHY *		513	218830	73
	Salvelinus fontinalis; Brook trout;	14 MO, 210 MM, 130 G	24 H	LC_{50} ?	4,000		216115	75
	Salvelinus fontinalis; Brook trout;	14 MO, 210 MM, 130 G	24 H	LC_{50} ?	4,450		216115	75
	Salvelinus fontinalis; Brook trout;	14 MO, 210 MM, 130 G	24 H	MOR *	5,000		216115	75
	Salvelinus fontinalis; Brook trout;	14 MO, 210 MM, 130 G	24 H	MOR *	5,000		216115	75
	Salvelinus fontinalis; Brook trout;	14 MONTHS, 210 MM, 130 G	96 H	LC_{50} ?	3,600		216115	75
	Salvelinus fontinalis; Brook trout;	EYED EMBRYO - LARVAE	45 D	GRO *		283	312720	87
	Salvelinus fontinalis; Brook trout;	EYED EMBRYO - LARVAE	60 D	BEH *		283	312720	87
	Salvelinus fontinalis; Brook trout;	EYED EMBRYO - LARVAE	60 D	MOR *	283		312720	87
	Stizostedion lucioperca; Pikeperch;	11.5-16 MM	24 H	MOR *	400		212700	75
Barium	Daphnia magna; Water flea;	<= 24 H	24 H	LC_{50}	> 530,000		215184	80
	Daphnia magna; Water flea;	<= 24 H	48 H	LC_{50}	410,000		215184	80
	Daphnia magna; Water flea;	<= 24 H	48 H	MOR *	68,000		215184	80
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC_{50}GR		26,000	311789	86
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		103,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		41,200	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR *		113,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR *		83,800	212262	74
Cadmium	Algae; Algae, phytoplankton, algal mat;	EXPO GRO PHASE	24 H	PSE		56,200	213095	89
	Algae; Algae, phytoplankton, algal mat;	NATURAL COMMUNITY	2 to 244 H	PGR		3.4 to 84 0	311823	85
	Algae; Algae, phytoplankton, algal mat;	NATURAL COMMUNITY	382 H	PGR		2 9 to 4.2	311823	85
	Algae; Algae, phytoplankton, algal mat;	PHYTOPLANKTON	14 D	BMS *		100	313109	88
	Anabolia nervosa; Quiver fly;	LARVAE	7 D	LET	9,000,000		210725	57
	Anodonta cygnea, Swan mussel;	10 (8.5-11.5) CM	to 12 WK	BIO *		50	213467	90
	Anodonta cygnea; Swan mussel;	NR	to 12 WK	PHY *		50	213466	90
	Asellus aquaticus; Aquatic sowbug;	8-10 MM	24 H	LC50 *	11,000		312041	85
	Asellus aquaticus; Aquatic sowbug;	8-10 MM	24 H	LC50 *	13,000		312041	85
	Asellus aquaticus; Aquatic sowbug;	8-10 MM	48 H	LC50 *	3,600		312041	85
	Asellus aquaticus; Aquatic sowbug;	8-10 MM	48 H	LC50 *	4,000		312041	85
	Asellus aquaticus; Aquatic sowbug;	8-10 MM	96 H	LC50 *	60		312041	85
	Asellus aquaticus; Aquatic sowbug;	8-10 MM	96 H	LC50 *	60		312041	85
	Asellus aquaticus; Aquatic sowbug;	ADULT, 9.87 MM	96 H	LC50	1,000		311953	86
	Asellus aquaticus; Aquatic sowbug;	ADULT, 9.87 MM	96 H	LC50	600		311953	86
	Asellus aquaticus; Aquatic sowbug;	EMBRYO, STAGE C	96 H	LC50	2,000		311953	86
	Asellus aquaticus; Aquatic sowbug;	EMBRYO, STAGE C	96 H	LC50	1,750		311953	86
	Asellus aquaticus; Aquatic sowbug;	EMBRYO, STAGE D	96 H	LC50	240		311953	86
	Asellus aquaticus; Aquatic sowbug;	EMBRYO, STAGE D	96 H	LC50	300		311953	86
	Asellus aquaticus; Aquatic sowbug;	JUVENILE, 1.60 MM	96 H	LC50	150		311953	86
	Asellus aquaticus; Aquatic sowbug;	JUVENILE, 1 60 MM	96 H	LC50	170		311953	86
	Asellus aquaticus; Aquatic sowbug,	JUVENILE, 2.30 MM	96 H	LC50	170		311953	86
	Asellus aquaticus; Aquatic sowbug,	JUVENILE, 2.30 MM	96 H	LC50	175		311953	86

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Cadmium (cont.)	Asellus aquaticus; Aquatic sowbug;	JUVENILE, 3.52 MM	96 H	LC50	230		311953	86
	Asellus aquaticus; Aquatic sowbug;	JUVENILE, 3.52 MM	96 H	LC50	320		311953	86
	Asellus aquaticus; Aquatic sowbug;	JUVENILE, 30 D, 1.35 MM	96 H	LC50	53		311953	86
	Asellus aquaticus; Aquatic sowbug;	JUVENILE, 30 D, 1.35 MM	96 H	LC50	80		311953	86
	Asellus aquaticus; Aquatic sowbug;	JUVENILE, 5.92 MM	96 H	LC50	450		311953	86
	Asellus aquaticus; Aquatic sowbug;	JUVENILE, 5.92 MM	96 H	LC50	540		311953	86
	Astacus astacus; European crayfish;	8-10 CM	2 WK	ENZ *		2	210376	91
	Astacus astacus; European crayfish;	8-10 CM	to 10 WK	HIS		2	210376	91
	Baetis rhodani; Mayfly;	8-10 MM	24 H	LC50 *	90,000		312041	85
	Baetis rhodani; Mayfly;	8-10 MM	24 H	LC50 *	95,000		312041	85
	Baetis rhodani; Mayfly;	8-10 MM	48 H	LC50 *	2,200		312041	85
	Baetis rhodani; Mayfly;	8-10 MM	48 H	LC50 *	4,000		312041	85
	Baetis rhodani; Mayfly;	8-10 MM	96 H	LC50 *	50		312041	85
	Baetis rhodani, Mayfly;	8-10 MM	96 H	LC50 *	70		312041	85
	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC50	1,300		219385	91
	Carassius auratus; Goldfish;	5.0-20.9 G	14 D	HEM *		445	310472	84
	Ceriodaphnia reticulata; Water flea;	< 4 H	48 H	LC50	66		311181	84
	Channa punctatus; Snake-head catfish;	FINGERLING	13 D	GRO *		3,500	313173	88
	Channa punctatus; Snake-head catfish;	FINGERLING	48 H	LC50	34,640		313173	88
	Channa punctatus; Snake-head catfish;	FINGERLING	96 H	LC50	18,500		313173	88
	Chironomidae; Midge family;	LARVAE	12 MO	POP		7.6	213176	88
	Chironomus plumosus; Midge;	LARVA-STATE L1	24 H	LC50	21,530		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L2	24 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L2	48 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L2	72 H	LC50	32,000		215356	89
	Chironomus plumosus, Midge;	LARVA-STATE L2	96 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	24 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	48 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	72 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	96 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	24 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	48 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	72 H	LC50	32,000		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	96 H	LC50	32,000		215356	89
	Chironomus riparius; Midge;	10-12 MM	24 H	LC50 *	200,000		312041	85
	Chironomus riparius; Midge;	10-12 MM	48 H	LC50 *	200,000		312041	85
	Chironomus riparius; Midge;	10-12 MM	96 H	LC50 *	200,000		312041	85
	Chironomus riparius; Midge;	10-12 MM	96 H	LC50 *	300,000		312041	85
	Chironomus riparius; Midge;	EGGS	7 to 96 H	MOR *	1,000		215356	89
	Chironomus riparius; Midge;	EGGS	7 to 96 H	MOR *	1,000		215356	89
	Chironomus riparius; Midge;	EGGS	<=24 H	MOR *	10,000		215356	89
	Chironomus riparius; Midge;	EGGS	<=24 H	MOR *	3,200		215356	89
	Chironomus riparius, Midge;	LARVA-STATE L1	24 H	LC50	53,610		215356	89
	Chironomus riparius, Midge;	LARVA-STATE L2	24 H	LC50	10,000		215356	89
	Chironomus riparius, Midge;	LARVA-STATE L2	48 H	LC50	10,000		215356	89
	Chironomus riparius, Midge,	LARVA-STATE L2	72 H	LC50	7,690		215356	89

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Cadmium (cont.)	Chironomus riparius; Midge;	LARVA-STATE L2	96 H	LC50	4,320		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	24 H	LC50	32,000		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	48 H	LC50	32,000		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	72 H	LC50	15,210		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	96 H	LC50	7,360		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	24 H	LC50	10,000		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	48 H	LC50	10,000		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	72 H	LC50	10,000		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	96 H	LC50	6,680		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L1	24 H	LC50	9,990		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	24 H	LC50	440		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	48 H	LC50	210		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	72 H	LC50	130		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	96 H	LC50	80		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	24 H	LC50	10,000		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	48 H	LC50	2,370		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	72 H	LC50	730		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	96 H	LC50	480		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	24 H	LC50	10,000		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	48 H	LC50	2,700		215356	89
	Chironomus tentans, Midge;	LARVA-STATE L4	72 H	LC50	1,930		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	96 H	LC50	1,410		215356	89
	Chironomus thummi; Midge;	LARVAE	7 D	LET	150,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	14 H	LET *	50,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	33 H	LET *	30,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	5.63 D	LET *	15,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	5.63 D	LET *	20,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	7 D	MOR *	13,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	96 H	LET *	25,000		210725	57
	Cyprinidae; Minnow, carp family;	2 SUMMERS	84 H	LET *	25,000		210725	57
	Cypris subglobosa; Ostracod;	NR	12 H	LC50	12,660		312365	88
	Cypris subglobosa; Ostracod;	NR	24 H	LC50	6,981		312365	88
	Cypris subglobosa; Ostracod;	NR	48 H	LC50	3,020		312365	88
	Cypris subglobosa; Ostracod;	NR	96 H	LC50	687.4		312365	88
	Daphnia lumholzi; Water flea;	NR	12 H	LC50	2,325		312365	88
	Daphnia lumholzi; Water flea;	NR	24 H	LC50	1,585		312365	88
	Daphnia lumholzi; Water flea;	NR	48 H	LC50	618.6		312365	88
	Daphnia lumholzi; Water flea;	NR	96 H	LC50	83		312365	88
	Daphnia magna; Water flea;	< 24 H	14 D	LC50	24		310589	85
	Daphnia magna; Water flea;	< 24 H	14 D	REP *		32	310589	85
	Daphnia magna; Water flea;	< 24 H	21 D	GRO *		0.32	310589	85
	Daphnia magna; Water flea;	< 24 H	21 D	LC50	14		310589	85
	Daphnia magna; Water flea;	< 24 H	21 D	LET	5.6		310589	85
	Daphnia magna; Water flea;	< 24 H	21 D	MOR *	1.0		310589	85
	Daphnia magna, Water flea;	< 24 H	21 D	MOR *	1.8		310589	85
	Daphnia magna; Water flea;	< 24 H	21 D	MOR *	3.2		310589	85

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Cadmium (cont.)	Daphnia magna; Water flea;	< 24 H	21 D	REP *		3.2	310589	85
	Daphnia magna; Water flea;	< 24 H	48 H	LC50	118		311181	84
	Daphnia magna; Water flea;	<= 24 H	48 H	LC50	24		310929	84
	Daphnia magna; Water flea;	<= 24 H	48 H	LC50	33		310929	84
	Daphnia magna; Water flea;	<= 24 H	48 H	LC50	36		310929	84
	Daphnia magna; Water flea;	<= 24 H	48 H	LC50	40		310929	84
	Daphnia magna; Water flea;	<= 24 H	48 H	LC50	62		310929	84
	Daphnia magna; Water flea;	<= 24 H	48 H	LC50	36		310929	84
	Daphnia magna; Water flea;	NR	28 D	LET	5.0		312770	87
	Daphnia magna; Water flea;	NR	28 D	MOR *	0.5		312770	87
	Daphnia magna; Water flea;	NR	28 D	MOR *	1.0		312770	87
	Daphnia magna; Water flea;	NR	3 WK	MOR *	22.9		210772	89
	Daphnia magna; Water flea;	NR	3 WK	MOR *	7.78		210772	89
	Daphnia magna; Water flea;	NR	3 WK	REP *		1.86	210772	89
	Daphnia pulex; Water flea;	< 24 H	48 H	LC50	68		311181	84
	Dugesia tigrina; Turbellarian, flatworm;	NR	96 H	LC50	2,250		218709	74
	Ephemerella ignita; Mayfly;	8-10 MM	24 H	LC50 *	54,000		312041	85
	Ephemerella ignita; Mayfly;	8-10 MM	24 H	LC50 *	61,000		312041	85
	Ephemerella ignita; Mayfly;	8-10 MM	48 H	LC50 *	18,000		312041	85
	Ephemerella ignita; Mayfly;	8-10 MM	48 H	LC50 *	19,000		312041	85
	Ephemerella ignita; Mayfly;	8-10 MM	96 H	LC50 *	12,000		312041	85
	Ephemerella ignita; Mayfly;	8-10 MM	96 H	LC50 *	13,000		312041	85
	Gambusia affinis; Mosquitofish,	NR	48 H	MOR *	6,700		313098	88
	Gammarus fasciatus; Scud;	0-1 WK	6 WK	GRO *		2.23	210772	89
	Gammarus fasciatus; Scud;	0-1 WK	6 WK	GRO *		3.42	210772	89
	Gammarus fasciatus; Scud;	0-1 WK	6 WK	MOR *	1.49		210772	89
	Gammarus fasciatus; Scud;	0-1 WK	6 WK	MOR *	2.23		210772	89
	Gammarus lacustris; Scud;	NR	96 H	LC50	40.1		313058	88
	Gammarus pulex; Scud;	8-12 MM	24 H	LC50 *	1,300		312041	85
	Gammarus pulex; Scud;	8-12 MM	24 H	LC50 *	1,600		312041	85
	Gammarus pulex; Scud;	8-12 MM	48 H	LC50 *	400		312041	85
	Gammarus pulex; Scud;	8-12 MM	48 H	LC50 *	400		312041	85
	Gammarus pulex; Scud;	8-12 MM	96 H	LC50 *	20		312041	85
	Gammarus pulex; Scud;	8-12 MM	96 H	LC50 *	30		312041	85
	Gammarus roeseli; Scud;	NR	7 D	LET	400		210725	57
	Heteropneustes fossilis; Indian catfish;	70 G	1 to 60 D	ENZ *		260	310049	82
	Hexagenia rigida; Mayfly;	YEARLING, NYMPHS, 24 MM	96 H	LC50	6,200		212091	80
	Hyalella azteca; Scud;	0-1 WK	6 WK	GRO *		2.23	210772	89
	Hyalella azteca; Scud;	0-1 WK	6 WK	MOR *	0.57		210772	89
	Hyalella azteca; Scud;	0-1 WK	6 WK	MOR *	0.92		210772	89
	Hydrodictyon reticulatum; Green algae;	NR	1 to 168 H	BMS		100 to 1000	213348	89
	Hydropsyche angustipennis; Caddisfly;	10-15 MM	24 H	LC50 *	200,000		312041	85
	Hydropsyche angustipennis; Caddisfly;	10-15 MM	48 H	LC50 *	200,000		312041	85
	Hydropsyche angustipennis; Caddisfly;	10-15 MM	96 H	LC50 *	520,000		312041	85
	Hydropsyche angustipennis; Caddisfly;	10-15 MM	96 H	LC50 *	200,000		312041	85
	Ictalurus nebulosus; Brown bullhead;	NR	24 H	THL *		50	313113	87

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Cadmium (cont.)	Invertebrates; Invertebrates;	CLADOCERA, COPEPODA, ROTIFERA	2 WK	POP *		3	311256	83
	Invertebrates; Invertebrates;	ZOOPLANKTON	14 D	BMS *		1	312800	87
	Invertebrates; Invertebrates;	ZOOPLANKTON	14 D	BMS *		3	312800	87
	Lamellidens marginalis; Mussel;	5.0-6.0 CM	1 to 30 D	GRO		500 to 2000	213776	91
	Lamellidens marginalis; Mussel;	5.0-6.0 CM	1 to 30 D	OC		500 to 2000	213776	91
	Lamellidens marginalis; Mussel;	5.0-6.0 CM	96 H	LC50	10,000		213776	91
	Lamellidens marginalis; Mussel;	7 CM	4.2 to 11.3 H	PHY *		500 to 2000	213311	89
	Lamellidens marginalis; Mussel;	NR	96 H	LC50	10,000		213311	89
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC50GR		200	311789	86
	Lepomis macrochirus; Bluegill;	NR	14 D	PHY		1 to 100	212707	88
	Lepomis macrochirus; Bluegill;	NR	48 H	BNZ *		1	213021	88
	Lepomis macrochirus; Bluegill;	NR	6 MO	LET	5,000		212143	73
	Limnodrilus hoffmeisteri; Oligochaete;	30-40 MM	24 H	LC50 *	20,000		312041	85
	Limnodrilus hoffmeisteri; Oligochaete;	30-40 MM	24 H	LC50 *	24,000		312041	85
	Limnodrilus hoffmeisteri; Oligochaete;	30-40 MM	48 H	LC50 *	6,400		312041	85
	Limnodrilus hoffmeisteri; Oligochaete;	30-40 MM	48 H	LC50 *	6,800		312041	85
	Limnodrilus hoffmeisteri; Oligochaete;	30-40 MM	96 H	LC50 *	2,400		312041	85
	Limnodrilus hoffmeisteri; Oligochaete;	30-40 MM	96 H	LC50 *	2,900		312041	85
	Lophopodella carteri; Bryozoa;	ANCENSTRULAE 2-3 DAYS	96 H	LC50	150		216703	80
	Macrobrachium hendersodayanus; Prawn;	NR	96 H	OC *		34	311545	84
	Morone saxatilis; Striped bass;	LARVAE, 1 D	1 to 52 H	MOR	1 to 20		310625	85
	Morone saxatilis; Striped bass;	LARVAE, 6 WK	290 H	LC50	6		310625	85
	Morone saxatilis; Striped bass;	LARVAE, 7 D	2 to 120 H	MOR	5 to 250		310625	85
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50BM *		14,600	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50BM *		7,400	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50GR *		20,800	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50GR *		809,000	212262	74
	Noemacheilus barbatulus; Stone loach;	7-21 G	25 WK	BIO		3	219243	90
	Notemigonus crysoleucas; Golden shiner;	ADULT, 70-90 MM	12 H	BNZ *		1,350	312205	87
	Notemigonus crysoleucas; Golden shiner;	ADULT, 70-90 MM	6 H	HBM *		1,350	312205	87
	Notemigonus crysoleucas; Golden shiner;	ADULT, 70-90 MM	96 H	LC50	3,150		312205	87
	Notemigonus crysoleucas; Golden shiner;	NR	48 H	BNZ *		100	213021	88
	Notemigonus crysoleucas; Golden shiner;	NR	96 H	PHY		1350 to 2400	212707	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	18 H	LET *	10,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	21 H	LET *	8,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	30 H	LET *	7,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	6 D	LET *	4,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	7 D	MOR *	3,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	77 H	LET *	5,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	2 SUMMERS	5.92 D	LET *	8,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	36-102 G	25 WK	BIO		3	219243	90
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	375 G	178 D	PHY *		3.6	310404	84
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	375 G	3 D	PHY *		6.4	310404	84
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	5.0 CM, 2.1 G	10 D	LC50 ?	5		219245	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	5.0 CM, 2.1 G	24 H	LC50 ?	4,200		219245	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	5.0 CM, 2.1 G	48 H	LC50 ?	9		219245	73

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Cadmium (cont.)	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	5.0 CM, 2.1 G	96 H	LC50 ?	6		219245	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	5.7 CM, 1.1 G	10 D	LC50 ?	7		219245	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	5.7 CM, 1.1 G	96 H	LC50 ?	7		219245	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	5.7 CM, 3.1 G	48 H	LC50 ?	7		219245	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FRY, 3 CM	48 H	LC50	358		210459	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FRY, 3 CM	48 H	LC50	3,698		210459	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FRY, 3 CM	48 H	LC50	677		210459	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FRY, 3 CM	48 H	LC50	91		210459	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	12 MO	BIO *		9	313110	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	2 MO	MOR	18 to 54		312383	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	3 MO	BIO	9		312383	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	7 D	MOR *	8 to 10		310185	68
	Oryzias latipes; Medaka, high-eyes;	EGG	NR	HAT		30 to 10000	213213	89
	Oryzias latipes; Medaka, high-eyes;	FERTILIZED EGGS	1 WK	ABN *		10	310880	84
	Pectinatella magnifica; Bryozoa;	ANCENSTRULAE 2-3 DAYS	96 H	LC50	700		216703	80
	Physa fontinalis; Bladder snail;	10-12 MM	24 H	LC50 *	4,200		312041	85
	Physa fontinalis; Bladder snail;	10-12 MM	24 H	LC50 *	4,400		312041	85
	Physa fontinalis; Bladder snail;	10-12 MM	48 H	LC50 *	1,800		312041	85
	Physa fontinalis; Bladder snail;	10-12 MM	48 H	LC50 *	2,100		312041	85
	Physa fontinalis; Bladder snail;	10-12 MM	96 H	LC50 *	80		312041	85
	Physa fontinalis; Bladder snail;	10-12 MM	96 H	LC50 *	80		312041	85
	Physa gyrina; Pouch snail;	ADULT	228 H	LC50 ?	830		212021	76
	Physa gyrina; Pouch snail;	ADULT	24 H	LC50 ?	7,600		212021	76
	Physa gyrina; Pouch snail;	ADULT	4 to 60 H	REP		1800 to 10000	212021	76
	Physa gyrina; Pouch snail;	ADULT	48 H	LC50 ?	4,250		212021	76
	Physa gyrina; Pouch snail;	ADULT	96 H	LC50 ?	1,370		212021	76
	Physa gyrina; Pouch snail;	JUVENILE	48 H	LC50 ?	690		212021	76
	Physa gyrina; Pouch snail;	JUVENILE	96 H	LC50 ?	410		212021	76
	Pimephales promelas; Fathead minnow;	NR	48 H	BNZ *		1	213021	88
	Pimephales promelas; Fathead minnow;	NR	48 H	BNZ *		10	213021	88
	Plumatella emarginata; Bryozoan;	ANCENSTRULAE 2-3 DAYS	96 H	LC50	1,090		216703	80
	Polycelis tenuis; Turbellarian;	10-12 MM	24 H	LC50 *	130,000		312041	85
	Polycelis tenuis; Turbellarian;	10-12 MM	24 H	LC50 *	270,000		312041	85
	Polycelis tenuis; Turbellarian;	10-12 MM	48 H	LC50 *	100,000		312041	85
	Polycelis tenuis; Turbellarian;	10-12 MM	48 H	LC50 *	125,000		312041	85
	Polycelis tenuis; Turbellarian;	10-12 MM	96 H	LC50 *	74,000		312041	85
	Polycelis tenuis; Turbellarian;	10-12 MM	96 H	LC50 *	80,000		312041	85
	Potamogeton crispus; Curled pondweed;	NR	NR	PSE *		1,000	217552	77
	Procambarus clarkii; Red swamp crayfish;	ADULT INTERMOLT	to 30 D	BIO		100	212572	89
	Procambarus clarkii; Red swamp crayfish;	ADULT INTERMOLT, 19.5-30.2 G	1 to 96 H	BIO *		10,000	215112	91
	Procambarus clarkii; Red swamp crayfish;	ADULT, INTERMOLT	96 H	ENZ *		100	312701	87
	Salvelinus fontinalis; Brook trout;	1 SUMMER	26 H	LET *	25,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	4.42 D	LET *	5,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	47 H	LET *	10,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	55 H	LET *	8,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	7 D	MOR *	4,000		210725	57

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Cadmium (cont.)	Salvelinus fontinalis; Brook trout;	1 SUMMER	76 H	LET *	6,000		210725	57
	Salvelinus fontinalis; Brook trout;	2 SUMMERS	5.83 D	LET *	25,000		210725	57
	Salvelinus fontinalis; Brook trout;	ADULT	30 D	STR *		3.6 to 60	312833	86
	Salvelinus fontinalis; Brook trout;	EMBRYO	NR	GRO *		0.02 to 2000	218196	88
	Salvelinus fontinalis; Brook trout;	EMBRYO	NR	HAT *		0.02 to 2000	218196	88
	Scyliorhinus canicula; Dogfish;	NR	to 10 D	BIO		25000 to 50000	212560	89
	Selenastrum capricornutum; Green algae;	25 E3 CELLS/ML, LAG PHASE	48 H	PGR *		30	213335	90
	Selenastrum capricornutum; Green algae;	25 E3 CELLS/ML, LAG PHASE	48 H	PHY *		30	213335	90
	Simocephalus vetulus; Water flea;	< 24 H	48 H	LC50	24		311181	84
	Spirodela polyrhiza; Large duckweed;	THREE FROND COLONY	14 D	PGR		100 to 10000	213264	89
	Spirodela polyrhiza; Large duckweed;	THREE FROND COLONY	14 D	PHY		100 to 10000	213264	89
	Tilapia mossambica; Mozambique tilapia;	103.59 G, 19.9 CM	to 45 D	HEM *		0.0783 to 6.4635	213331	90
	Tilapia mossambica; Mozambique tilapia;	NR	to 6 WK	HEM *		100,000	312792	87
	Tribolodon hakonensis; Japanese barbel;	4.3 CM, 1.1 G	48 H	LC50 ?	56 to 100		219245	73
	Tribolodon hakonensis; Japanese barbel;	4.3 CM, 1.1 G	96 H	LC50 ?	56 to 100		219245	73
	Tubifex tubifex; Tubificid worm;	NR	7 D	LET	5,000		210725	57
Chromium	Aedes aegypti; Mosquito;	LARVAE	48 H	LC_{50}	12,500		313255	88
	Ceriodaphnia reticulata; Water flea;	< 4 H	48 H	LC_{50}	45		311181	84
	Colisa fasciata; Giant gourami;	5.23 G, 5.41 CM, ADULT	24 H	HEM *		48,000	312803	87
	Colisa fasciata; Giant gourami;	NR	2 to 96 H	BIO *		48,000	312719	87
	Cyclops sp; Cyclopoid copepod;	ADULT	48 H	LC_{50}	10,470		313255	88
	Daphnia ambigua; Water flea;	12 H	72 H	$EC_{50}IM$		1,700	218476	76
	Daphnia ambigua; Water flea;	12 H	72 H	$EC_{50}IM$		7,700	218476	76
	Daphnia galeata; Water flea;	12 H	72 H	$EC_{50}IM$		65,600	218476	76
	Daphnia magna; Water flea;	12 H	72 H	$EC_{50}IM$		42,100	218476	76
	Daphnia magna; Water flea;	12 H	72 H	$EC_{50}IM$		5,200	218476	76
	Daphnia magna; Water flea;	24-48 HR, NEONATE	21 D	GRO *		5	213950	91
	Daphnia magna; Water flea;	24-48 HR, NEONATE	21 D	MOR	5 to 15		213950	91
	Daphnia magna; Water flea;	24-48 HR, NEONATE	21 D	REP *		5	213950	91
	Daphnia pulex; Water flea;	< 24 H	48 H	LC_{50}	22		311181	84
	Daphnia pulex; Water flea;	< 24 H	48 H	LC_{50}	48		311181	84
	Daphnia pulicaria; Water flea;	NR	96 H	LC_{50}	90,400		210394	89
	Dugesia dorotocephala; Turbellarian, flatworm;	12 H	72 H	$EC_{50}IM$		110,800	218476	76
	Dugesia tigrina; Turbellarian, flatworm;	18-20 MM	1 H	BEH *		50 to 500	310581	91
	Hydrodictyon reticulatum; Green algae;	NR	96 H	LC_{50}	2,220		218709	74
	Lemna minor; Duckweed;	NR	1 to 168 H	BMS		100 to 10000	213348	89
	Lophopodella carteri; Bryozoa;	20 COLONIES OR 40 FRONDS	4 D	$EC_{50}GR$		35,000	311789	86
	Myriophyllum spicatum; Water-milfoil;	ANCENSTRULAE, 2-3 D	96 H	LC_{50}	1,560		216703	80
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	$EC_{50}BM$ *		14,600	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	$EC_{50}BM$ *		9,900	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	$EC_{50}GR$ *		24,400	212262	74
	Mystus vittatus; Catfish;	4 CM APEX	32 D	$EC_{50}GR$ *		26,000	212262	74
	Pectinatella magnifica, Bryozoa;	80-100 MM, 6-10 G	96 H	LC_{50} ?	200,000		315793	82
	Pimephales promelas; Fathead minnow;	ANCENSTRULAE, 2-3 D	96 H	LC_{50}	1,440		216703	80
		40-68 MM	48 H	LC_{50}	58,000		210837	75

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Chromium (cont.)	Pimephales promelas; Fathead minnow;	40-68 MM	48 H	LC_{50}	61,000		210837	75
	Pimephales promelas; Fathead minnow;	40-68 MM	96 H	LC_{50}	37,000		210837	75
	Pimephales promelas; Fathead minnow;	40-68 MM	96 H	LC_{50}	32,000		210837	75
	Plumatella emarginata; Bryozoan;	ANCENSTRULAE, 2-3 D	96 H	LC_{50}	650		216703	80
	Simocephalus vetulus; Water flea;	< 24 H	48 H	LC_{50}	50		311181	84
Cobalt	Anabolia nervosa; Quiver fly;	LARVAE	7 D	LET	400,000		210725	57
	Chironomus thummi; Midge;	LARVAE	7 D	LET	600,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	10 H	LET *	1,000,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	29 H	LET *	500,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	4.5 D	LET *	150,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	43 H	LET *	300,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	65 H	LET *	200,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	7 D	MOR *	100,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	7 D	MOR *	90,000		210725	57
	Cyprinidae; Minnow, carp family;	2 SUMMERS	7.08 D	LET *	125,000		210725	57
	Gammarus roeseli; Scud;	NR	66 H	LET *	300,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	7 D	LET	8,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	14 H	LET *	100,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	26 H	LET *	55,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	36 H	LET *	50,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	4.08 D	LET *	35,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	63 H	LET *	40,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	2 SUMMERS	7 D	MOR *	30,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	58 H	LET *	50,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	20 H	LET *	100,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	3.58 D	LET *	45,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	60 H	LET *	55,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	67 H	LET *	50,000		210725	57
	Salvelinus fontinalis; Brook trout;	2 SUMMERS	7 D	MOR *	40,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	75 H	LET *	50,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	14 H	LET *	1,000,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	32 H	LET *	500,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	46 H	LET *	300,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	6.42 D	LET *	150,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	7 D	MOR *	125,000		210725	57
	Tinca tinca; Tench;	2 SUMMERS	72 H	LET *	200,000		210725	57
	Tubifex tubifex; Tubificid worm;	NR	72 H	LET *	300,000		210725	57
Copper	Algae; Algae, phytoplankton, algal mat;	EXPO GRO PHASE	7 D	LET	400,000		210725	57
	Algae; Algae, phytoplankton, algal mat;	PHYTOPLANKTON	24 H	PSE		<=1270	213095	89
	Algae; Algae, phytoplankton, algal mat;	PHYTOPLANKTON	124 H	PGR		10 to 400	311876	83
	Aquatic community; Aquatic community;	OLIGOTROPHIC STREAM	14 D	BMS *		100	313109	88
	Brachionus calyciflorus; Rotifer;	NEONATE	NR	POP *		2.5 to 15	218766	88
	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC50	26		219385	91
			24 H	LC50	31		219385	91

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Copper (cont.)	Callitriche platycarpa; Macrophyte;	NR	28 D	LT50 (Calc)	6,000		218344	78
	Carassius auratus; Goldfish;	NR	to 4 WK	PHY		100 to 4000	213419	89
	Ceriodaphnia dubia; Water flea;	ADULT	48 H	LC50	110		213110	89
	Ceriodaphnia dubia; Water flea;	ADULT	48 H	LC50	127		213110	89
	Ceriodaphnia dubia; Water flea;	ADULT	48 H	LC50	63		213110	89
	Ceriodaphnia dubia; Water flea;	ADULT	48 H	LC50	66		213110	89
	Ceriodaphnia dubia; Water flea;	ADULT	48 H	LC50	71		213110	89
	Ceriodaphnia dubia; Water flea;	ADULT	48 H	LC50	79		213110	89
	Ceriodaphnia dubia; Water flea;	FIRST INSTAR NEONATES, 2-8 H	7 D	MOR	1.5 to 122.5		213110	89
	Ceriodaphnia dubia; Water flea;	FIRST INSTAR NEONATES, 2-8 H	7 D	REP *		1.5	213110	89
	Ceriodaphnia dubia; Water flea;	FIRST INSTAR NEONATES, 2-8 H	7 D	REP *		6.3	213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	104		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	17		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	19		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	20		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	21		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	23		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	24		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	25		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	26		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	27		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	28		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	30		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	31		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	32		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	34		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	37		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	38		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	42		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	49		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	58		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	67		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	78		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	81		213110	89
	Ceriodaphnia dubia; Water flea;	NEONATE, <12 H, FIRST INSTAR	48 H	LC50	95		213110	89
	Ceriodaphnia dubia; Water flea;	< 4 H	48 H	LC50	17		311181	84
	Chironomidae; Midge family;	LARVAE	12 MO	POP		67	213176	88
	Chironomus plumosus, Midge;	LARVA-STATE L1	24 H	LC50	3,160		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L2	24 H	LC50	8,590		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L2	48 H	LC50	3,760		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L2	72 H	LC50	1,990		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L2	96 H	LC50	1,580		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	24 H	LC50	>10000		215356	89
	Chironomus plumosus, Midge;	LARVA-STATE L3	48 H	LC50	2,050		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	72 H	LC50	980		215356	89
	Chironomus plumosus, Midge;	LARVA-STATE L3	96 H	LC50	530		215356	89

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Copper (cont.)	Chironomus plumosus; Midge;	LARVA-STATE L4	24 H	LC50	23,600		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	48 H	LC50	12,510		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	72 H	LC50	6,260		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	96 H	LC50	2,200		215356	89
	Chironomus riparius; Midge;	2ND INSTAR LARVAE	240 H	LC50	200		215023	91
	Chironomus riparius; Midge;	2ND INSTAR LARVAE	48 H	LC50	1,200		215023	91
	Chironomus riparius; Midge;	2ND INSTAR LARVAE	96 H	LC50	700		215023	91
	Chironomus riparius; Midge;	LARVA-STATE L1	24 H	LC50	3,400		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L2	24 H	LC50	9,070		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L2	48 H	LC50	3,910		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L2	72 H	LC50	1,860		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L2	96 H	LC50	1,270		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	24 H	LC50	13,430		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	48 H	LC50	4,220		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	72 H	LC50	1,630		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	96 H	LC50	1,260		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	24 H	LC50	8,990		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	48 H	LC50	2,940		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	72 H	LC50	1,120		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	96 H	LC50	640		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L1	24 H	LC50	2,700		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	24 H	LC50	7,100		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	48 H	LC50	2,400		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	72 H	LC50	1,350		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	96 H	LC50	540		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	24 H	LC50	10,100		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	48 H	LC50	3,100		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	72 H	LC50	850		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	96 H	LC50	550		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	24 H	LC50	>10000		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	48 H	LC50	2,200		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	72 H	LC50	870		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	96 H	LC50	310		215356	89
	Chlorella vulgaris; Green algae;	NR	8 D	PGR		10 to 400	311876	83
	Cypris subglobosa; Ostracod;	NR	12 H	LC50	13,581		312365	88
	Cypris subglobosa; Ostracod;	NR	24 H	LC50	12,200		312365	88
	Cypris subglobosa; Ostracod;	NR	48 H	LC50	5,363		312365	88
	Cypris subglobosa, Ostracod;	NR	96 H	LC50	277.3		312365	88
	Daphnia lumholzi; Water flea;	NR	12 H	LC50	83		312365	88
	Daphnia lumholzi; Water flea;	NR	24 H	LC50	67.2		312365	88
	Daphnia lumholzi; Water flea;	NR	48 H	LC50	54.6		312365	88
	Daphnia lumholzi; Water flea;	NR	96 H	LC50	9.4		312365	88
	Daphnia magna; Water flea;	< 24 H	48 H	LC50	54		311181	84
	Daphnia magna; Water flea;	<= 24 H	48 H	EC50IM (Calc)		31 8	310529	83
	Daphnia magna; Water flea,	> 24 H	48 H	EC50IM (Calc)		102	310633	84
	Daphnia magna; Water flea;	> 24 H	48 H	EC50IM (Calc)		146	310633	84

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Copper (cont.)	Daphnia magna; Water flea;	> 24 H	48 H	EC50IM (Calc)		207	310633	84
	Daphnia magna; Water flea;	> 24 H	48 H	EC50IM (Calc)		257	310633	84
	Daphnia magna; Water flea;	> 24 H	48 H	EC50IM (Calc)		266	310633	84
	Daphnia magna; Water flea;	> 24 H	48 H	EC50IM (Calc)		341	310633	84
	Daphnia magna; Water flea;	> 24 H	48 H	EC50IM (Calc)		36	310633	84
	Daphnia magna; Water flea;	> 24 H	48 H	EC50IM (Calc)		55	310633	84
	Daphnia magna; Water flea;	> 24 H	48 H	EC50IM (Calc)		92.8	310633	84
	Daphnia magna; Water flea;	> 24 H	48 H	EC50IM (Calc)		96.6	310633	84
	Daphnia magna; Water flea;	NR	24 H	MOR	772		312372	85
	Daphnia pulex; Water flea;	< 24 H	36 D	LET	10.1		310453	84
	Daphnia pulex; Water flea;	< 24 H	42 D	REP *		10.1	310453	84
	Daphnia pulex; Water flea;	< 24 H	48 H	LC50	53		311181	84
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	10.8		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	11.4		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	113		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	165		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	184		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	199		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	213		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	240		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	35.5		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	53.3		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	55.3		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	55.4		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	627		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	7 24		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	76.4		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	78.8		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	84.7		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	9.06		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	9.3		215081	78
	Daphnia pulicaria; Water flea;	NR	48 H	LC50	97.2		215081	78
	Dugesia dorotocephala; Turbellarian, flatworm;	18-20 MM	1 H	BEH *		20 to 200	310581	91
	Dugesia tigrina; Turbellarian, flatworm;	NR	96 H	LC50	2,450		218709	74
	Elodea nuttallii; Waterweed, ditchmoss;	NR	14 D	LT50 (Calc)	6,000		218344	78
	Gambusia affinis; Mosquitofish;	NR	12 H	LC50 ?	49		315578	78
	Gambusia affinis; Mosquitofish;	NR	133 D	MOR *	3.2		315578	78
	Gambusia affinis; Mosquitofish;	NR	48 H	MOR *	160		313098	88
	Gambusia affinis; Mosquitofish;	NR	96 H	LC50 ?	56		315578	78
	Gammarus lacustris; Scud;	ADULT	0.12 H	BEH		0.05 to 5000	311804	83
	Gammarus lacustris; Scud;	NR	96 H	LC50	212		313058	88
	Gammarus pulex; Scud;	JUVENILE, 2-3 MOLT, 3-5 MM	240 H	LC50	33		215023	91
	Gammarus pulex; Scud;	JUVENILE, 2-3 MOLT, 3-5 MM	48 H	LC50	47		215023	91
	Gammarus pulex, Scud;	JUVENILE, 2-3 MOLT, 3-5 MM	96 H	LC50	37		215023	91
	Gnathonemus petersii; Electric fish;	JUVENILE, 5-20 G	4 H	PHY *		500	310685	84
	Invertebrates; Invertebrates;	MACRO-INVERTEBRATES	14 D	BEH *		5.5	213398	89

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Copper (cont.)	Invertebrates; Invertebrates;	MACROINVERTEBRATES	10 D	LC50	15		210388	89
	Invertebrates; Invertebrates;	MACROINVERTEBRATES	10 D	LC50	6		210388	89
	Invertebrates; Invertebrates;	MACROINVERTEBRATES	4 D	LC50	14		210388	89
	Invertebrates; Invertebrates;	MACROINVERTEBRATES	4 D	LC50	26		210388	89
	Lamellidens marginalis; Mussel;	5.0-6.0 CM	1 to 30 D	GRO		250 to 1000	213776	91
	Lamellidens marginalis; Mussel;	5.0-6.0 CM	1 to 30 D	OC		250 to 1000	213776	91
	Lamellidens marginalis; Mussel;	5.0-6.0 CM	96 H	LC50	5,000		213776	91
	Lamellidens marginalis; Mussel;	7 CM	to 9.75 H	PHY *		250 to 1000	213311	89
	Lamellidens marginalis; Mussel;	NR	96 H	LC50	5,000		213311	89
	Lamellidens marginalis; Mussel;	NR	96 H	LC50	5,000		213875	91
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC50GR		1,100	311789	86
	Lemna minor; Duckweed;	NR	21 D	LT50 (Calc)	6,000		218344	78
	Lepomis macrochirus; Bluegill;	5.3-7.2 CM, 3.5-3.9 G	96 H	LC50	1,250		212406	68
	Lepomis macrochirus; Bluegill;	NR	4 D	BEH		36 to 130	212858	89
	Lepomis macrochirus; Bluegill;	NR	NR	BEH		25 to 1800	212858	89
	Lophopodella carteri; Bryozoa;	ANCENSTRULAE, 2-3 DAYS	96 H	LC50	510		216703	80
	Macrobrachium hendersodayanus; Prawn;	NR	96 H	OC *		1,750	311545	84
	Myriophyllum spicatum, Water-milfoil;	4 CM APEX	32 D	EC50BM *		250	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50BM *		380	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50GR *		1,500	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50GR *		700	212262	74
	Oncorhynchus kisutch; Coho salmon, silver salmon;	JUVENILE, 6 G	96 H	LC50	164 ; 17		310541	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	11 CM, 13 G	96 H	LC50 ?	250		212122	72
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	32 MM, 0.36 G	15 H *	MOR *	200		218499	74
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	32 MM, 0.36 G	16.67 H *	MOR *	200		218499	74
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	32 MM, 0.36 G	24 H	LC50	130		218499	74
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	32 MM, 0.36 G	24 H	LC50	140		218499	74
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	32 MM, 0.36 G	4.33 H *	MOR *	2,000		218499	74
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	32 MM, 0.36 G	5.5 H *	MOR *	2,000		218499	74
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	55.5 G	40 D	GRO *		225	218386	76
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	6-8 G	48 H	HEM *		30	219917	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	75-100 G	48 H	MOR *	85		315401	82
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	75-100 G	8 H	PHY *		170	315401	82
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 0.2 G	1 WK	MOR *	4.0		315625	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 0.2 G	1 WK	MOR *	5.8		315625	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 0.2 G	1 WK	MOR *	9.6		315625	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 0.2 G	7 D	PHY *		4.0	315625	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 0.25 G	1 WK	MOR *	5.1		315625	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 0.25 G	1 WK	MOR *	9.5		315625	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 0.25 G	7 D	PHY *		2.1	315625	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 0.25 G	7 D	PHY *		3.9	315625	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 0.6 G	7 D	PHY *		6	315625	79
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	13 MO	MOR *	10		212122	72
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	13 MO	MOR *	19		212122	72
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	48 H	LC50	400		218317	68
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	48 H	LC50	500		218317	68

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Copper (cont.)	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	GRO * (Calc)		3	310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR *	17		310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR *	31		310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR * (Calc)	10		310527	83
	Osteichthyes; Bony fish class;	ADULT GUPPY, 20-30 MM	48 H	LC50	21		212882	88
	Osteichthyes; Bony fish class;	ADULT GUPPY, 20-30 MM	96 H	LC50	16		212882	88
	Osteichthyes; Bony fish class;	JUVENILE GUPPY, 8-15 MM	48 H	LC50	14		212882	88
	Osteichthyes; Bony fish class;	JUVENILE GUPPY, 8-15 MM	96 H	LC50	8.7		212882	88
	Pectinatella magnifica; Bryozoa;	ANCENSTRULAE, 2-3 DAYS	96 H	LC50	140		216703	80
	Pimephales promelas; Fathead minnow;	20-69 MM	96 H	LC50 ?	20,000		218320	76
	Pimephales promelas; Fathead minnow;	20-69 MM	96 H	LC50 ?	20,000		218320	76
	Pimephales promelas; Fathead minnow;	20-69 MM	96 H	LC50 ?	21,000		218320	76
	Pimephales promelas; Fathead minnow;	20-69 MM	96 H	LC50 ?	21,000		218320	76
	Pimephales promelas; Fathead minnow;	20-69 MM	96 H	LC50 ?	21,000		218320	76
	Pimephales promelas; Fathead minnow;	20-69 MM	96 H	LC50 ?	5,600		218320	76
	Pimephales promelas; Fathead minnow;	20-69 MM	96 H	LC50 ?	> 16000		218320	76
	Pimephales promelas; Fathead minnow;	EMBRYO, 1 D	30 D	GRO *		221.8	215081	78
	Pimephales promelas; Fathead minnow;	EMBRYO, 1 D	30 D	MOR *	221.8		215081	78
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	7 D	GRO *		25.8	311182	85
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	7 D	GRO *		9.89	311182	85
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	7 D	LC50	70		311182	85
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	1,001		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	1,129		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	114		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	121		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	1,586		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	2,050		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	2,336		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	436		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	516		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	550		215081	78
	Pimephales promelas; Fathead minnow;	NR	96 H	LC50	88.5		215081	78
	Plumatella emarginata; Bryozoan;	ANCENSTRULAE, 2-3 DAYS	96 H	LC50	140		216703	80
	Poecilia reticulata; Guppy;	JUVENILE	96 H	LC50	112		212010	76
	Poecilia reticulata; Guppy;	JUVENILE	96 H	LC50	138		212010	76
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	1045 H	LC50	890		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	1227 H	LC50	776		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	1358 H	LC50	657		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	146 H	LC50	3,024		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	246 H	LC50	2,330		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	342 H	LC50	1,780		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	453 H	LC50	1,520		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	49 H	LC50	11,000		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	549 H	LC50	1,380		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	622 H	LC50	1,190		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	72 H	LC50	8,100		311758	83

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Copper (cont.)	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	734 H	LC50	1,150		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	843 H	LC50	1,090		311758	83
	Procambarus clarkii; Red swamp crayfish;	ADULT, 24.8 G, 9.3 CM	945 H	LC50	1,000		311758	83
	Procambarus clarkii; Red swamp crayfish;	EMBRYO	1147 H	LC50	206		311758	83
	Procambarus clarkii; Red swamp crayfish;	EMBRYO	1267 H	LC50	184		311758	83
	Procambarus clarkii; Red swamp crayfish;	EMBRYO	436 H	LC50	3,350		311758	83
	Procambarus clarkii; Red swamp crayfish;	EMBRYO	598 H	LC50	1,700		311758	83
	Procambarus clarkii; Red swamp crayfish;	EMBRYO	855 H	LC50	1,140		311758	83
	Procambarus clarkii; Red swamp crayfish;	EMBRYO	903 H	LC50	716		311758	83
	Procambarus clarkii; Red swamp crayfish;	EMBRYO	927 H	LC50	556		311758	83
	Procambarus clarkii; Red swamp crayfish;	LARVAE	12 H	LC50	4,170		311758	83
	Procambarus clarkii; Red swamp crayfish;	LARVAE	140 H	LC50	527		311758	83
	Procambarus clarkii; Red swamp crayfish;	LARVAE	24 H	LC50	1,990		311758	83
	Procambarus clarkii; Red swamp crayfish;	LARVAE	247 H	LC50	242		311758	83
	Procambarus clarkii; Red swamp crayfish;	LARVAE	344 H	LC50	199		311758	83
	Procambarus clarkii; Red swamp crayfish;	LARVAE	456 H	LC50	146		311758	83
	Procambarus clarkii; Red swamp crayfish;	LARVAE	48 H	LC50	1,350		311758	83
	Procambarus clarkii; Red swamp crayfish;	LARVAE	504 H	LC50	67		311758	83
	Procambarus clarkii; Red swamp crayfish;	LARVAE	98 H	LC50	720		311758	83
	Salmo salar; Atlantic salmon;	2-3 YR	96 H	LC50	125		212068	72
	Salmo trutta; Brown trout;	78 G, 3RD YR CLASS	53 D	HIS *		15	310527	83
	Salvelinus fontinalis; Brook trout;	YEARLING, 14-16 CM, 30-42 G *	720 D	GRO *		9.4	218397	74
	Salvelinus fontinalis; Brook trout;	YEARLING, 14-16 CM, 30-42 G *	720 D	HAT *		9.4	218397	74
	Salvelinus fontinalis; Brook trout;	YEARLING, 14-16 CM, 30-42 G *	720 D	MOR *	9.4		218397	74
	Salvelinus fontinalis; Brook trout;	YEARLING, 14-16 CM, 30-42 G *	720 D	REP *		9.4	218397	74
	Simocephalus vetulus; Water flea;	< 24 H	48 H	LC50	57		311181	84
Iron	Dugesia dorotocephala; Turbellarian, flatworm,	18-20 MM	1 H	BEH *		1,000 to 50,000	310581	91
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC_{50}GR		3,700	311789	86
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EGGS AND LARVA	NR	DVP *		5,700	315523	82
	Salmo trutta; Brown trout;	ALEVIN	NR	MOR *	5,170		311637	83
	Salmo trutta; Brown trout;	EGG	NR	HAT *		460	311637	83
	Salmo trutta; Brown trout;	EYED EGGS	NR	MOR *	5,170		311637	83
	Salmo trutta; Brown trout;	NEWLY HAT ALEVIN	NR	MOR *	3,020		311637	83
	Tilapia sparrmanii; Banded bream;	10.24-99.43 G	2 to 72 H	OC *		88,000	213066	89
Lead	Astacus astacus, European crayfish,	8-10 CM	2 WK	ENZ *		20	210376	91
	Astacus astacus; European crayfish;	8-10 CM	to 10 WK	HIS		20	210376	91
	Barbus arulius; Barb;	1.24 G	4 D	HIS		200,000 to 400,0(	219972	87
	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC_{50}	> 4,000		219385	91
	Brachydanio rerio; Zebra danio, zebrafish;	DECHLORIONATED EGG	24 H			72	219870	80
	Brachydanio rerio; Zebra danio, zebrafish;	EGG	48 H			72	219870	80
	Bufo arenarum; Toad;	EMBRYO	24 H	DVP *		1,000	213162	90
	Bufo arenarum; Toad;	EMBRYO	24 H	MOR *	1,000		213162	90
	Carassius auratus; Goldfish;	UNDERYEARLING	1 WK *	ENZ *		470	315460	77
	Ceriodaphnia reticulata; Water flea;	< 4 H	48 H	LC_{50}	530		311181	84

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Lead (cont.)	Daphnia magna; Water flea;	< 24 H	48 H	LC_{50}	4,400		311181	84
	Daphnia pulex; Water flea;	< 24 H	48 H	LC_{50}	5,100		311181	84
	Dugesia dorotocephala; Turbellarian, flatworm;	18-20 MM	1 H	BEH *		100 to 1,000	310581	91
	Dugesia tigrina; Turbellarian, flatworm;	NR	96 H	LC_{50}	160,000		218709	74
	Hyalella azteca; Scud;	NR	5 D	LC_{100}	5,000		219804	80
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC_{50}GR		8,000	311789	86
	Lepomis gibbosus; Pumpkinseed;	> 1.75 YR	<=2 WK *	ENZ *		90	315460	77
	Micropterus dolomieui; Smallmouth bass;	EGG	96 H	MOR *	<=15,900		312153	86
	Micropterus dolomieui; Smallmouth bass;	FINGERLING	10 WK	LOC *		405	312153	86
	Micropterus dolomieui; Smallmouth bass;	FINGERLING	90 D	GRO *		405	312153	86
	Micropterus dolomieui; Smallmouth bass;	FINGERLING	90 D	HEM *		405	312153	86
	Micropterus dolomieui; Smallmouth bass;	FINGERLING	96 H	LC_{50}	29,000		312153	86
	Micropterus dolomieui; Smallmouth bass;	SAC FRY, 7 D POST-SPAWN	96 H	MOR *	<=15,900		312153	86
	Micropterus dolomieui; Smallmouth bass;	SWIM-UP FRY, 17 D POST-SPAWN	96 H	LC_{50}	2,800		312153	86
	Micropterus dolomieui; Smallmouth bass;	SWIM-UP, FRY 17 D POST-SPAWN	96 H	LC_{50}	2,200		312153	86
	Micropterus salmoides; Largemouth bass;	NR	24 H	BEH *		1,500	311127	78
	Micropterus salmoides; Largemouth bass;	NR	24 H	RES *		1,050	311127	78
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		363,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		808,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR *		725,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR *		767,000	212262	74
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	10.5 G	32 WK	HIS *			310573	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	15 G	24 H	HEM *		130	315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	110		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	120		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	120		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	210		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	300		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	470		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	490		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	500		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	52		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	53		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	740		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	80		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	85		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	900		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	910		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	53 G	1 WK	MOR *	1,000		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	6-18 MO	<=2 WK *	ENZ *		10	315460	77
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	6.5 G	30 WK	HIS *		120	310573	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NEWLY HAT, SAC FRY	189 D	ABN *		32	219830	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NEWLY HAT, SAC FRY	189 D	ENZ *		100	219830	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NEWLY HAT, SAC FRY	189 D	HEM *		100	219830	80
	Pimephales promelas; Fathead minnow;	JUVENILE	4 WK	PHY		500 to 1,000	210204	89
	Potamogeton crispus; Curled pondweed;	NR	NR	PSE *		25,000	217552	77

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Lead (cont.)	Salvelinus fontinalis; Brook trout;	6-18 MO	<=2 WK *	ENZ *		90	315460	77
	Simocephalus vetulus; Water flea;	< 24 H	48 H	LC_{50}	4,500		311181	84
Manganese	Algae; Algae, phytoplankton, algal mat;	NATURAL COLONY	38 D	POP *		280	212862	69
	Anabolia nervosa; Quiver fly;	LARVAE	7 D	LET	2,000,000		210725	57
	Chironomus thummi; Midge;	LARVAE	7 D	LET	1,000,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	2.25 H	LET *	1,000,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	24 H	LET *	2,000,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	25 H	LET *	1,800,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	4.17 D	LET *	800,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	5.13 D	LET *	700,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	6.63 D	LET *	650,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	7 D	MOR *	600,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	78 H	LET *	900,000		210725	57
	Cyprinidae; Minnow, carp family;	2 SUMMERS	48 H	LET *	2,000,000		210725	57
	Gammarus roeseli; Scud;	NR	7 D	LET	70,000		210725	57
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	$EC_{50}GR$		31,000	311789	86
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	10 H	LET *	700,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	13 H	LET *	600,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	34 H	LET *	300,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	5 D	LET *	100,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	7 D	MOR *	75,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	77 H	LET *	150,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	2 SUMMERS	34 H	LET *	600,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	15 H	LET *	700,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	23 H	LET *	600,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	4.79 D	LET *	150,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	66 H	LET *	300,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	7 D	MOR *	100,000		210725	57
	Salvelinus fontinalis; Brook trout;	2 SUMMERS	41 H	LET *	600,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	48 H	LET *	2,000,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	6.75 D	LET *	1,500,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	7 D	MOR *	1,200,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	7 D	MOR *	1,300,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	96 H	LET *	1,800,000		210725	57
	Tinca tinca; Tench;	2 SUMMERS	7 D	LET *	2,000,000		210725	57
	Tubifex tubifex; Tubificid worm;	NR	7 D	LET	700,000		210725	57
Mercury	Aedes aegypti; Mosquito;	LARVAE	48 H	LC50	290		313255	88
	Algae; Algae, phytoplankton, algal mat;	PHYTOPLANKTON	14 D	BMS *	100		313109	88
	Amoeba sp; Amoeba;	NR	>1.66 H	LT50	500		218981	73
	Anabolia nervosa; Quiver fly;	LARVAE	7 D	LET	2,000		210725	57
	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC50	60		219385	91
	Carassius auratus; Goldfish;	15-25 G	to 15 D	BIO *	50		219207	72
	Carassius auratus; Goldfish;	20-25 G	to 15 D	BIO *	50		219207	72
	Caridina rajadhari; Freshwater prawn; Decapoda;	NR	24 H	LC50	9,120		311025	85

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Mercury (cont.)	Caridina rajadhari; Freshwater prawn; Decapoda;	NR	48 H	LC50	6.918		311025	85
	Caridina rajadhari; Freshwater prawn; Decapoda;	NR	72 H	LC50	5.784		311025	85
	Caridina rajadhari; Freshwater prawn; Decapoda;	NR	96 H	LC50	4.786		311025	85
	Caridina rajadhari; Freshwater prawn; Decapoda;	STAGE C, 2.5 CM	30 D	HIS * (Calc)	0 51		311025	85
	Chironomus plumosus; Midge;	LARVA-STATE L1	24 H	LC50	3,180		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	24 H	LC50	2,430		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	48 H	LC50	1,760		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	72 H	LC50	1,360		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L3	96 H	LC50	600		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	24 H	LC50	3,230		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	48 H	LC50	1,280		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	72 H	LC50	880		215356	89
	Chironomus plumosus; Midge;	LARVA-STATE L4	96 H	LC50	880		215356	89
	Chironomus riparius; Midge;	EGGS	7 to 96 H	MOR *	>=320		215356	89
	Chironomus riparius; Midge;	EGGS	7 to 96 H	MOR *	>=320		215356	89
	Chironomus riparius; Midge;	EGGS	<=24 H	MOR *	>10000		215356	89
	Chironomus riparius; Midge;	EGGS	<=24 H	MOR *	>=3200		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L1	24 H	LC50	1,690		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L2	24 H	LC50	1,960		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L2	48 H	LC50	820		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L2	72 H	LC50	260		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L2	96 H	LC50	220		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	24 H	LC50	750		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	48 H	LC50	240		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	72 H	LC50	230		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L3	96 H	LC50	230		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	24 H	LC50	4,800		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	48 H	LC50	790		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	72 H	LC50	710		215356	89
	Chironomus riparius; Midge;	LARVA-STATE L4	96 H	LC50	480		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L1	24 H	LC50	2,280		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	24 H	LC50	23,400		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	48 H	LC50	8,040		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	72 H	LC50	570		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L2	96 H	LC50	240		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	24 H	LC50	29,600		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	48 H	LC50	6,700		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	72 H	LC50	580		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L3	96 H	LC50	280		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	24 H	LC50	32,300		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	48 H	LC50	6,860		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	72 H	LC50	3,040		215356	89
	Chironomus tentans; Midge;	LARVA-STATE L4	96 H	LC50	570		215356	89
	Chironomus thummi; Midge;	LARVAE	7 D	LET	3,500		210725	57
	Cyclops sp, Cyclopoid copepod;	ADULT	48 H	LC50	600		313255	88
	Cyprinidae; Minnow, carp family;	1 SUMMER	1.25 H	LET *	100,000		210725	57

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Mercury (cont.)	Cyprinidae; Minnow, carp family;	1 SUMMER	2.5 H	LET *	75,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	24.25 H	LET *	1,500		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	4.5 H	LET *	50,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	60 H	LET *	1,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	7 D	MOR *	290		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	7 D	MOR *	300		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	7 D	MOR *	500		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	7 D	MOR *	700		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	8.5 H	LET *	5,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	84 H	LET *	800		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	58 H	LET *	4,500		210725	57
	Cyprinidae; Minnow, carp family;	2 SUMMERS	96 H	LC50	270		218709	74
	Dugesia tigrina; Turbellarian, flatworm;	NR	<24 H	LT50	50 to 500		315524	79
	Gambusia affinis; Mosquitofish;	NR	7 D	LET	100		210725	57
	Gammarus roselli; Scud;	NR	20 H	PHY *	100		310685	84
	Gnathonemus petersii; Electric fish;	JUVENILE, 5-20 G	48 H	OC *	5,910		311622	84
	Lamellidens marginalis; Mussel;	32 G	1 to 30 D	GRO	500 to 2000		213776	91
	Lamellidens marginalis; Mussel;	5.0-6.0 CM	1 to 30 D	OC	500 to 2000		213776	91
	Lamellidens marginalis; Mussel;	5.0-6.0 CM	96 H	LC50	5,000		213776	91
	Lamellidens marginalis; Mussel;	5.0-6.0 CM	3. to 6.5 H	PHY *	500 to 2000		213311	89
	Lamellidens marginalis; Mussel;	7 CM	96 H	LC50	10,000		213311	89
	Lamellidens marginalis; Mussel;	NR	32 D	EC50BM *	3,400		212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50BM *	4,400		212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50GR *	1,200		212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC50GR *	12,000		212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	11 H	LET *	500		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	13.67 H	LET *	350		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	5.33 D	LET *	250		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	7 D	MOR *	150		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	8.17 H	LET *	800		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	24 H	LET *	500		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	2 SUMMERS	6.6 H	LT50	500		218981	73
	Planaria sp; Planarian, flatworm;	NR	NR	PSE *	5,000		217552	77
	Potamogeton crispus; Curled pondweed;	NR	16.33 H	LET *	800		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	18 H	LET *	500		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	21 H	LET *	350		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	4.25 D	LET *	300		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	7 D	MOR *	250		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	88 H	LET *	500		210725	57
	Salvelinus fontinalis; Brook trout;	2 SUMMERS	1 WK	HEM *	4,000		212931	87
	Tilapia mossambica; Mozambique tilapia;	7-10 CM, 6-10 G	11 WK	BIO *	10		310166	84
	Tilapia mossambica; Mozambique tilapia;	7.0-11.8 CM	7 D	LET	300		210725	57
	Tubifex tubifex; Tubificid worm;	NR						
Selenium	Brachionus calyciflorus, Rotifer,	NEONATE	24 H	LC50	16,000		219385	91
	Chironomus riparius, Midge;	<24 H	30 D	DVP *		6 to 6050	210956	90
	Chironomus riparius, Midge;	<24 H	48 H	EC50IM ?		14,300	210956	90

Table K.3-3
AQUIRE Toxicity Information
Units = µg/L

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Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Selenium (cont.)	Chironomus riparius; Midge;	<24 H	48 H	EC50IM ?		1,790	210956	90
	Daphnia magna; Water flea;	2 D	to 3 WK	MOR *	280		210486	80
	Daphnia magna; Water flea;	2 D	to 3 WK	REP *		280	210486	80
	Daphnia magna; Water flea;	<24 H	21 D	MOR *	1,410		210956	90
	Daphnia magna; Water flea;	<24 H	21 D	MOR *	711		210956	90
	Daphnia magna; Water flea;	<24 H	21 D	REP *		156	210956	90
	Daphnia magna; Water flea;	<24 H	21 D	REP *		348	210956	90
	Daphnia magna; Water flea;	<24 H	48 H	EC50IM ?		2,620	210956	90
	Daphnia magna; Water flea;	<= 24 H	48 H	EC50IM ?		9,340	210956	90
	Daphnia magna; Water flea;	<=24 H OLD	48 H	MOR *	220		215184	80
	Daphnia magna; Water flea;	<=24 H OLD	24 H	LC50	660		215184	80
	Daphnia magna; Water flea;	MIDDLE INSTAR	48 H	LC50	430		215184	80
	Daphnia magna; Water flea;	MIDDLE INSTAR	14 D	LC50	430		210486	80
	Daphnia magna; Water flea;	MIDDLE INSTAR	48 H	LC50	710		210486	80
	Dugesia dorotocephala; Turbellarian, flatworm;	18-20 MM	96 H	LC50	430		210486	80
	Hyalella azteca; Scud;	ADULT	1 H	BEH *		1000 to 10000	310581	91
	Hyalella azteca; Scud;	ADULT	14 D	LC50	70		210486	80
	Hyalella azteca; Scud;	ADULT	48 H	LC50	940		210486	80
	Lemna minor; Duckweed,	20 COLONIES OR 40 FRONDS	96 H	LC50	340		210486	80
	Lepomis macrochirus; Bluegill;	JUVENILE, 40-70 MM TOTAL LENGTH	4 D	EC50GR		2,400	311789	86
	Micropterus salmoides; Largemouth bass;	JUVENILE, 40-70 MM TOTAL LENGTH	48 H	RES *		5	310565	83
	Morone saxatilis; Striped bass;	220.2-277.3 G	48 H	RES *		5	310565	83
	Oncorhynchus kisutch; Coho salmon, silver salmon;	FRY, 0.5 G	80 D	GRO		10	213044	89
	Oncorhynchus kisutch; Coho salmon, silver salmon;	FRY, 0.5 G	96 H	LC50	21,800		213174	90
	Oncorhynchus kisutch; Coho salmon, silver salmon;	FRY, 0.5 G	96 H	LC50	24,500		213174	90
	Oncorhynchus kisutch; Coho salmon, silver salmon;	FRY, 0.7 G	96 H	LC50	25,800		213174	90
	Oncorhynchus tshawytscha; Chinook salmon;	FRY, 0.5 G	96 H	LC50	16,900		213174	90
	Oncorhynchus tshawytscha; Chinook salmon;	FRY, 0.5 G	96 H	LC50	46,600		213174	90
	Oncorhynchus tshawytscha; Chinook salmon;	FRY, 0.5 G	96 H	LC50	50,900		213174	90
	Oncorhynchus tshawytscha; Chinook salmon;	FRY, 0.6 G	96 H	LC50	85,500		213174	90
	Oncorhynchus tshawytscha; Chinook salmon;	PARR - SMOLT	96 H	LC50	67,100		213174	90
	Oncorhynchus tshawytscha; Chinook salmon;	SWIM-UP LARVAE	30 D	GRO *		26	312751	86
	Oncorhynchus tshawytscha; Chinook salmon;	SWIM-UP LARVAE	30 D	GRO *		3	213201	90
	Oncorhynchus tshawytscha; Chinook salmon;	SWIM-UP LARVAE	30 D	GRO *		5	213201	90
	Oncorhynchus tshawytscha; Chinook salmon;	SWIM-UP LARVAE	90 D	MOR *	5		213201	90
	Pimephales promelas; Fathead minnow;	2 D, EGG	90 D	MOR *	10		213201	90
	Pimephales promelas; Fathead minnow;	2 D, EGG	11 H *	LT50	25,000		210486	80
	Pimephales promelas; Fathead minnow;	2 D, EGG	12 H *	LT50	40		210486	80
	Pimephales promelas; Fathead minnow;	2 D, EGG	120 H *	LT50	1		210486	80
	Pimephales promelas; Fathead minnow;	2 D, EGG	14 H *	LT50	30,000		210486	80
	Pimephales promelas; Fathead minnow;	2 D, EGG	17 D	DVP *		10,000	210486	80
	Pimephales promelas; Fathead minnow;	2 D, EGG	17 D	DVP *		> 15000	210486	80
	Pimephales promelas; Fathead minnow;	2 D, EGG	17 D	HAT *		40,000	210486	80
	Pimephales promelas; Fathead minnow;	2 D, EGG	25 H *	LT50	20,000		210486	80
	Pimephales promelas; Fathead minnow;	2 D, EGG	33 H *	LT50	1,500		210486	80
	Pimephales promelas; Fathead minnow;	2 D, EGG	62 H *	LT50	1,000		210486	80

Table K.3-3
AQUIRE Toxicity Information
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NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Selenium (cont.)	Pimephales promelas; Fathead minnow;	2 D, EGG	85 H *	LT50	5		210486	80
	Pimephales promelas; Fathead minnow;	59-61 D	1 to 98 D	GRO		5000 to 30000	213930	89
	Pimephales promelas; Fathead minnow;	59-61 D	98 D			5000 to 30000	213930	89
	Pimephales promelas; Fathead minnow;	FRY, 0.03 G, 17 MM, 25-35 D	14 D	LC50	600		210486	80
	Pimephales promelas; Fathead minnow;	FRY, 0.03 G, 17 MM, 25-35 D	96 H	LC50	1,000		210486	80
Zinc	Algae; Algae, phytoplankton, algal mat;	CLADOCERA, COPEPODA, ROTIFERA	2 WK	CLR *		15 to 30	311256	83
	Algae; Algae, phytoplankton, algal mat;	EXPO GRO PHASE	24 H	PSE		<=98100	213095	89
	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC_{50}	1,300		219385	91
	Canthocamptus sp; Copepod;	LARVAE	24 H	LET	1,250		311797	85
	Carassius auratus; Goldfish;	20-25 G	to 15 D	BIO *		500	219207	72
	Ceriodaphnia reticulata; Water flea;	< 4 H	48 H	LC_{50}	76		311181	84
	Channa punctatus; Snake-head catfish;	2.4 G, 58 MM	24 H	BNZ *		56,000	315190	81
	Chironomidae; Midge family;	LARVAE	12 MO	POP		1,140	213176	88
	Clarias lazera; Catfish;	IMMATURE, 12-15 G	2 to 96 H	BIO *		32,000	312716	87
	Cyclops sp; Cyclopoid copepod;	ADULT	48 H	LC_{50}	3,310		313255	88
	Cypris subglobosa; Ostracod;	NR	12 H	LC_{50}	47,780		312365	88
	Cypris subglobosa; Ostracod;	NR	24 H	LC_{50}	50,620		312365	88
	Cypris subglobosa; Ostracod;	NR	48 H	LC_{50}	34,990		312365	88
	Cypris subglobosa; Ostracod;	NR	96 H	LC_{50}	8,352		312365	88
	Daphnia lumholzi; Water flea;	NR	12 H	LC_{50}	10,740		312365	88
	Daphnia lumholzi; Water flea;	NR	24 H	LC_{50}	6,704		312365	88
	Daphnia lumholzi; Water flea;	NR	48 H	LC_{50}	2,290		312365	88
	Daphnia lumholzi; Water flea;	NR	96 H	LC_{50}	437.5		312365	88
	Daphnia magna; Water flea;	24-48 HR, NEONATE	21 D	GRO *		150	213950	91
	Daphnia magna; Water flea;	24-48 HR, NEONATE	21 D	MOR	50 to 150		213950	91
	Daphnia magna; Water flea;	24-48 HR, NEONATE	21 D	REP *		150	213950	91
	Daphnia magna; Water flea;	< 24 H	48 H	LC_{50}	68		311181	84
	Daphnia pulex; Water flea;	< 24 H	48 H	LC_{50}	107		311181	84
	Dugesia dorotocephala; Turbellarian, flatworm;	18-20 MM	1 H	BEH *		1000 to 10000	310581	91
	Dugesia tigrina; Turbellarian, flatworm;	NR	96 H	LC_{50}	7,400		218709	74
	Gambusia affinis; Mosquitofish;	NR	48 H	LC_{50} ?	116		315578	78
	Gammarus lacustris; Scud;	NR	96 H	LC_{50}	2,240		313058	88
	Gomphonema parvulum; Diatom;	MIXED SPECIES	to 28 D	ABD *		1,000	212397	84
	Invertebrates; Invertebrates;	CLADOCERA, COPEPODA, ROTIFERA	2 WK	POP *		17.1 to 89.6	311256	83
	Invertebrates; Invertebrates,	CLADOCERA, COPEPODA, ROTIFERA	2 WK	POP *		30 to 90	311256	83
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC_{50}GR		10,000	311789	86
	Lepomis gibbosus; Pumpkinseed;	15-25 G	to 15 D	BIO *		500	219207	72
	Lepomis macrochirus; Bluegill;	NR	6 MO	MOR *	5,000		212143	73
	Lophopodella carteri; Bryozoa;	ANCENSTRULAE, 2-3 D	96 H	LC_{50}	5,630		216703	80
	Macrobrachium hendersodayanus; Prawn;	NR	96 H	OC *		7,870	311545	84
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		21,600	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR *		20,900	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR *		21,600	212262	74
	Mystus vittatus; Catfish;	80-100 MM, 6-10 G	96 H	LC_{50} ?	209,000		315793	82
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	20-50 G	6 H	PHY *		2,000	311200	82

Table K.3-3
AQUIRE Toxicity Information
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NAS Cecil Field, Jacksonville, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration		AQUIRE Reference Number	Year of Publication
					Lethal	Sublethal		
Zinc (cont.)	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	JUVENILE	to 4 WK	BIO		44 to 140	310107	84
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	48 H	LC_{50}	2,600		310185	68
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	48 H	LC_{50}	2,800		218317	68
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	48 H	LC_{50}	3,500		218317	68
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	GRO *		430	310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR *	120		310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR *	430		310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR * (Calc)	220		310527	83
	Osteichthyes; Bony fish class;	ADULT GUPPY, 20-30 MM	42 D	MOR * (Calc)	80		310527	83
	Osteichthyes; Bony fish class;	ADULT GUPPY, 20-30 MM	48 H	LC_{50}	2,630		212882	88
	Osteichthyes; Bony fish class;	JUVENILE GUPPY, 5-15 MM	96 H	LC_{50}	1,860		212882	88
	Osteichthyes; Bony fish class;	JUVENILE GUPPY, 5-15 MM	48 H	LC_{50}	1,970		212882	88
	Pectinatella magnifica; Bryozoa;	ANCENSTRULAE, 2-3 D	96 H	LC_{50}	1,360		212882	88
	Phaenopsectra sp; Chironomid;	MIXED SPECIES	96 H	LC_{50}	4,310		216703	80
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	to 28 D	ABD *		10,000	212397	84
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	7 D	GRO *	184		311182	85
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	7 D	GRO *	85		311182	85
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	7 D	LC_{50}	238		311182	85
	Pimephales promelas; Fathead minnow;	SUBADULT, 8-12 WK, <=250 MG	96 H	LC_{50}	238		311182	85
	Pimephales promelas; Fathead minnow;	SUBADULT, 8-12 WK, <=250 MG	2 to 35 D	GRO *	600		210678	89
	Plumatella emarginata; Bryozoan;	ANCENSTRULAE, 2-3 D	96 H	LC_{50}	2,540		210678	89
	Tilapia sparrmanii; Banded bream;	12.13-81.77 G	96 H	LC_{50}	5,300		216703	80
	Tilapia zillii; Tilapia;	IMMATURE, 7-9 G	2 to 72 H	OC *	98,000		213066	89
			2 to 96 H	BIO *	22,000		312716	87

Notes:
ABD = Abundance
ABN = Abnormalities
BCF = Bioconcentration factor
BEH = Behavioral change
BIO = Biochemical effect
BM = Biomass
BMS = Biomass
C = Celcius
CLR = Chlorophyll content
CM = Centimeter
D = Days
EC_{50} = Effect of concentration to 50% of the population
EMS =
ENZ = Enzyme effect
F = Farenheit
G = Grams
GR = Growth
GRO = Growth
H = Hours
HAT = Hatchability
HEM = Hematological effect
HIS = Histological effect
IM = Immobilization
LC_{50} = Lethal concentration to 50% of test organisms
LET = Lethality
LOC = Locomotor Behaviour
LT_{50} = Lethal threshold to 50% of test organisms
MM = Millimeter
MOR = Mortality
NR = Not reported
OC =
PGR =
PHY = Physiological effects
POP = Population, species diversity
PSE = Photosynthesis effect
RE = Reproduction
REP = Adverse effect to reproduction
RES = Respiratory effects
RN = Renewel
RSD = Residue
ST = Static
STR = Stress
THL =
VTE =
µg/L = Microgram per liter

[ ] = Lowest effect concentration (if a range is provided, the low end of the range is the lowest effect concentration).
* = Fish data presented for informational purposes, but not used for the OU2 BERA because of lack of suitable habitat.

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APPENDIX L

MODEL OF POTENTIAL EXPOSURES AND RISKS FOR REPRESENTATIVE WILDLIFE SPECIES TO ECPCS IN SURFACE SOILS AT SITE 5

Table L-1
Estimated Exposure from Ingestion of Maximum ECPCs in Food and Soil: Lethal Effects
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	MAXIMUM EXPOSURE POINT CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
Acetone	0.025						
2-Butanone	0.009						
2-Hexanone	0.002						
Methylene chloride	0.006						
Toluene	0.006						
Acenaphthene	0.17	5.0E-02	8.5E-03	8.7E-03	1.5E-03	1.9E-01	
Acenaphthylene	0.035	5.0E-02	1.8E-03	8.7E-03	3.1E-04	1.9E-01	
Anthracene	0.24	5.0E-02	1.2E-02	8.7E-03	2.1E-03	1.9E-01	
Benzo (a) anthracene	0.483	5.0E-02	2.4E-02	8.7E-03	4.2E-03	1.9E-01	
Benzo (a) pyrene	0.483	5.0E-02	2.4E-02	8.7E-03	4.2E-03	1.9E-01	
Benzo (b) fluoranthene	0.773	5.0E-02	3.9E-02	8.7E-03	6.8E-03	1.9E-01	
Benzo (g,h,i) perylene	0.412	5.0E-02	2.1E-02	8.7E-03	3.6E-03	1.9E-01	
Benzo (k) fluoranthene	0.424	5.0E-02	2.1E-02	8.7E-03	3.7E-03	1.9E-01	
Carbazole	0.17	5.0E-02	8.5E-03	8.7E-03	1.5E-03	1.9E-01	
Chrysene	0.483	5.0E-02	2.4E-02	8.7E-03	4.2E-03	1.9E-01	
Dibenz (a,h) anthracene	0.12	5.0E-02	6.0E-03	8.7E-03	1.0E-03	1.9E-01	
Dibenzofuran	0.058			3.3E-02	1.9E-03		
Diethylphthalate	0.14			5.1E-03	7.2E-04	4.8E-01	
bis(2-Ethylhexyl) phthalate	0.284			5.1E-03	1.5E-03	4.8E-01	
Fluoranthene	0.812	5.0E-02	4.1E-02	8.7E-03	7.1E-03	1.9E-01	
Fluorene	0.12	5.0E-02	6.0E-03	8.7E-03	1.0E-03	1.9E-01	
Indeno (1,2,3-cd) pyrene	0.399	5.0E-02	2.0E-02	8.7E-03	3.5E-03	1.9E-01	
2-Methylnaphthalene	0.022	5.0E-02	1.1E-03	8.7E-03	1.9E-04	1.9E-01	
Naphthalene	0.04	5.0E-02	2.0E-03	8.7E-03	3.5E-04	1.9E-01	
Phenanthrene	0.455	5.0E-02	2.3E-02	8.7E-03	4.0E-03	1.9E-01	

otential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil

k Assessment for Operable Unit 2
Field, Jacksonville, Florida

	Cotton mouse			Rufous-sided towhee			Short-tailed shrew		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
	6.9E−05	6.0E+02	1.2E−07	2.3E−04			3.5E−04	6.0E+02	5.9E−07
	2.5E−05	5.5E+02	4.5E−08	8.2E−05			1.3E−04	5.5E+02	2.3E−07
	5.5E−06	5.5E+02	1.0E−08	1.8E−05			2.8E−05	5.5E+02	5.2E−08
oride	1.7E−05	3.2E+02	5.2E−08	5.5E−05			8.5E−05	3.2E+02	2.6E−07
	1.7E−05	1.0E+03	1.7E−08	5.5E−05			8.5E−05	1.0E+03	8.5E−08
e	7.7E−04	2.4E+01	3.2E−05	2.2E−03			3.3E−03	2.4E+01	1.4E−04
ne	1.6E−04	2.4E+01	6.6E−06	4.5E−04			6.9E−04	2.4E+01	2.9E−05
	1.1E−03	3.4E+03	3.2E−07	3.1E−03			4.7E−03	3.4E+03	1.4E−06
racene	2.2E−03	2.4E+01	9.1E−05	6.2E−03			9.5E−03	2.4E+01	3.9E−04
ene	2.2E−03	2.4E+01	9.1E−05	6.2E−03			9.5E−03	2.4E+01	3.9E−04
ranthene	3.5E−03	2.4E+01	1.5E−04	9.9E−03			1.5E−02	2.4E+01	6.3E−04
perylene	1.9E−03	2.4E+01	7.7E−05	5.3E−03			8.1E−03	2.4E+01	3.4E−04
ranthene	1.9E−03	2.4E+01	8.0E−05	5.5E−03			8.3E−03	2.4E+01	3.5E−04
	7.7E−04	1.0E+02	7.7E−06	2.2E−03			3.3E−03	1.0E+02	3.3E−05
	2.2E−03	2.4E+01	9.1E−05	6.2E−03			9.5E−03	2.4E+01	3.9E−04
nthracene	5.4E−04	2.4E+01	2.3E−05	1.5E−03			2.4E−03	2.4E+01	9.8E−05
	3.9E−04	5.0E+02	7.9E−07	7.5E−04			8.2E−04	5.0E+02	1.6E−06
ate	4.7E−04	1.7E+03	2.8E−07	1.4E−03			2.0E−03	1.7E+03	1.1E−06
exyl) phthalate	9.6E−04	1.6E+02	6.0E−06	2.8E−03			4.0E−03	1.6E+02	2.5E−05
	3.7E−03	4.0E+01	9.2E−05	1.0E−02			1.6E−02	4.0E+01	4.0E−04
	5.4E−04	2.4E+01	2.3E−05	1.5E−03			2.4E−03	2.4E+01	9.8E−05
−cd) pyrene	1.8E−03	2.4E+01	7.5E−05	5.1E−03			7.8E−03	2.4E+01	3.3E−04
hthalene	9.9E−05	3.3E+02	3.0E−07	2.8E−04			4.3E−04	3.3E+02	1.3E−06
	1.8E−04	1.1E+02	1.6E−06	5.1E−04			7.8E−04	1.1E+02	7.1E−06
e	2.1E−03	1.4E+02	1.5E−05	5.9E−03			8.9E−03	1.4E+02	6.4E−05

Table L-3
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*Rufous-sided towhee*			*Short-tailed shrew*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Pyrene	2.8E-03	1.6E+02	1.8E-05	8.1E-03			1.2E-02	1.6E+02	7.7E-05
4,4'-DDD	1.9E-04	1.7E+01	1.1E-05	7.2E-04	7.7E+01	9.4E-06	1.4E-03	1.7E+01	8.2E-05
4,4'-DDE	1.8E-03	1.4E+02	1.3E-05	6.9E-03	1.2E+02	5.8E-05	1.4E-02	1.4E+02	1.0E-04
4,4'-DDT	3.6E-04	1.7E+01	2.1E-05	1.3E-03	1.2E+02	1.1E-05	2.6E-03	1.7E+01	1.5E-04
Aroclor-1260	2.5E-02	1.0E+02	2.5E-04	8.0E-02	1.6E+01	5.0E-03	1.5E-01	1.0E+02	1.5E-03
alpha-Chlordane	4.4E-05	2.0E+01	2.2E-06	1.7E-04	4.8E+00	3.5E-05	3.3E-04	2.0E+01	1.6E-05
gamma-Chlordane	3.5E-05	2.0E+01	1.8E-06	1.3E-04	4.8E+00	2.8E-05	2.6E-04	2.0E+01	1.3E-05
Dieldrin	2.2E-04	7.6E+00	2.9E-05	8.5E-04	6.0E-01	1.4E-03	1.7E-03	7.6E+00	2.2E-04
Barium	1.3E-01	4.3E+02	2.9E-04	3.1E-01			4.4E-01	4.3E+02	1.0E-03
Beryllium	1.2E-03	2.0E+00	6.2E-04	4.2E-03			7.1E-03	2.0E+00	3.5E-03
Cadmium	2.1E+00	3.0E+01	7.1E-02	2.1E+00			8.0E-02	3.0E+01	2.7E-03
Cobalt	4.0E-02	1.8E+01	2.2E-03	1.5E-01			2.8E-01	1.8E+01	1.5E-02
Copper	3.7E-01	1.9E+02	2.0E-03	4.8E-01			3.1E-01	1.9E+02	1.6E-03
Lead	1.4E-01	6.0E+01	2.3E-03	4.8E-01	7.5E+01	6.4E-03	8.2E-01	6.0E+01	1.4E-02
Manganese	4.0E-01	2.3E+03	1.8E-04	1.0E+00			1.7E+00	2.3E+03	7.2E-04
Mercury	1.5E-03	3.6E+00	4.3E-04	2.0E-03	2.2E+00	9.3E-04	1.3E-03	3.6E+00	3.6E-04
Nickel	3.1E-02	7.0E+01	4.4E-04	9.4E-02	1.0E+02	9.4E-04	1.6E-01	7.0E+01	2.2E-03
Selenium	9.9E-03	2.8E+01	3.6E-04	3.6E-02	2.7E+00	1.3E-02	6.7E-02	2.8E+01	2.4E-03
Zinc	4.4E+00	3.9E+02	1.1E-02	9.0E+00			1.2E+01	3.9E+02	3.2E-02
SUMMARY HAZARD INDEX			9.3E-02			2.8E-02			8.1E-02

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species. RTV for Benzo(a)pyrene used as a surrogate for all PAHs.

Table L-3
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Red fox*			*Great-horned owl*			*American woodcock*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	3.8E-05	6.0E+02	6.4E-08	1.2E-05			2.5E-04		
2-Butanone	1.4E-05	5.5E+02	2.5E-08	4.5E-06			9.1E-05		
2-Hexanone	3.1E-06	5.5E+02	5.6E-09	9.9E-07			2.0E-05		
Methylene chloride	9.2E-06	3.2E+02	2.9E-08	3.0E-06			6.1E-05		
Toluene	9.2E-06	1.0E+03	9.2E-09	3.0E-06			6.1E-05		
Acenaphthene	4.4E-04	2.4E+01	1.8E-05	1.9E-04			2.4E-03		
Acenaphthylene	9.0E-05	2.4E+01	3.7E-06	4.0E-05			5.0E-04		
Anthracene	6.2E-04	3.4E+03	1.8E-07	2.7E-04			3.4E-03		
Benzo (a) anthracene	1.2E-03	2.4E+01	5.2E-05	5.5E-04			6.9E-03		
Benzo (a) pyrene	1.2E-03	2.4E+01	5.2E-05	5.5E-04			6.9E-03		
Benzo (b) fluoranthene	2.0E-03	2.4E+01	8.3E-05	8.8E-04			1.1E-02		
Benzo (g,h,i) perylene	1.1E-03	2.4E+01	4.4E-05	4.7E-04			5.9E-03		
Benzo (k) fluoranthene	1.1E-03	2.4E+01	4.5E-05	4.9E-04			6.0E-03		
Carbazole	4.4E-04	1.0E+02	4.4E-06	1.9E-04			2.4E-03		
Chrysene	1.2E-03	2.4E+01	5.2E-05	5.5E-04			6.9E-03		
Dibenz (a,h) anthracene	3.1E-04	2.4E+01	1.3E-05	1.4E-04			1.7E-03		
Dibenzofuran	9.9E-05	5.0E+02	2.0E-07	2.9E-05			5.9E-04		
Diethylphthalate	3.4E-04	1.7E+03	2.0E-07	2.3E-04			1.4E-03		
bis(2-Ethylhexyl) phthalate	6.9E-04	1.6E+02	4.3E-06	4.8E-04			2.9E-03		
Fluoranthene	2.1E-03	4.0E+01	5.2E-05	9.3E-04			1.2E-02		
Fluorene	3.1E-04	2.4E+01	1.3E-05	1.4E-04			1.7E-03		
Indeno (1,2,3-cd) pyrene	1.0E-03	2.4E+01	4.3E-05	4.6E-04			5.7E-03		
2-Methylnaphthalene	5.6E-05	3.3E+02	1.7E-07	2.5E-05			3.1E-04		
Naphthalene	1.0E-04	1.1E+02	9.3E-07	4.6E-05			5.7E-04		
Phenanthrene	1.2E-03	1.4E+02	8.3E-06	5.2E-04			6.5E-03		
Pyrene	1.6E-03	1.6E+02	1.0E-05	7.2E-04			8.9E-03		

Table L-3
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Red fox*			*Great-horned owl*			*American woodcock*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
4,4'-DDD	4.4E-04	1.2E+01	3.7E-05	4.7E-04	7.7E+01	6.1E-06	1.1E-03	7.7E+01	1.4E-05
4,4'-DDE	4.3E-03	1.2E+01	3.6E-04	4.6E-03	4.5E+02	1.0E-05	1.0E-02	1.2E+02	8.6E-05
4,4'-DDT	8.0E-04	1.2E+01	6.6E-05	8.6E-04	1.2E+02	7.2E-06	1.9E-03	1.2E+02	1.6E-05
Aroclor-1260	8.3E-02	1.5E+02	5.6E-04	9.5E-02	1.6E+01	5.9E-03	1.1E-01	1.6E+01	6.8E-03
alpha-Chlordane	6.7E-05	4.0E+01	1.7E-06	5.7E-05	4.8E+00	1.2E-05	2.4E-04	4.8E+00	5.0E-05
gamma-Chlordane	5.4E-05	4.0E+01	1.4E-06	4.6E-05	4.8E+00	9.7E-06	1.9E-04	4.8E+00	4.1E-05
Dieldrin	4.7E-04	1.3E+01	3.6E-05	4.4E-04	6.0E-01	7.3E-04	1.2E-03	6.0E-01	2.1E-03
Barium	4.7E-02	4.3E+02	1.1E-04	8.2E-03			3.2E-01		
Beryllium	7.7E-04	2.0E+00	3.9E-04	2.0E-04			5.2E-03		
Cadmium	5.9E-01	3.0E+01	2.0E-02	6.8E-01			5.9E-02		
Cobalt	5.9E-02	1.8E+01	3.3E-03	4.7E-02			2.0E-01		
Copper	8.6E-02	1.9E+02	4.6E-04	6.0E-02			2.3E-01		
Lead	1.1E-01	6.0E+01	1.9E-03	5.4E-02	7.5E+01	7.2E-04	6.0E-01	7.5E+01	8.0E-03
Manganese	2.3E-01	2.3E+03	9.9E-05	9.6E-02			1.2E+00		
Mercury	3.1E-04	2.0E-01	1.6E-03	2.6E-04	2.2E+00	1.2E-04	9.4E-04	2.2E+00	4.3E-04
Nickel	2.2E-02	7.0E+01	3.1E-04	1.0E-02	1.0E+02	1.0E-04	1.1E-01	1.0E+02	1.1E-03
Selenium	1.3E-02	2.8E+01	4.8E-04	1.0E-02	2.7E+00	3.8E-03	5.0E-02	2.7E+00	1.8E-02
Zinc	4.9E+00	3.9E+02	1.3E-02	4.9E+00			9.1E+00		
SUMMARY HAZARD INDEX			4.2E-02			1.1E-02			3.7E-02

PDE = Potential Dietary Exposure (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species. RTV for Benzo(a)pyrene used as a surrogate for all PAHs.

Table L-4
Estimated Exposure from Ingestion of Maximum ECPCs in Food and Soil: Sublethal Effects
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	MAXIMUM EXPOSURE POINT CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
Acetone	0.025						
2-Butanone	0.009						
2-Hexanone	0.002						
Methylene chloride	0.006						
Toluene	0.006						
Acenaphthene	0.17	5.0E-02	8.5E-03	8.7E-03	1.5E-03	1.9E-01	
Acenaphthylene	0.035	5.0E-02	1.8E-03	8.7E-03	3.1E-04	1.9E-01	
Anthracene	0.24	5.0E-02	1.2E-02	8.7E-03	2.1E-03	1.9E-01	
Benzo (a) anthracene	0.483	5.0E-02	2.4E-02	8.7E-03	4.2E-03	1.9E-01	
Benzo (a) pyrene	0.483	5.0E-02	2.4E-02	8.7E-03	4.2E-03	1.9E-01	
Benzo (b) fluoranthene	0.773	5.0E-02	3.9E-02	8.7E-03	6.8E-03	1.9E-01	
Benzo (g,h,i) perylene	0.412	5.0E-02	2.1E-02	8.7E-03	3.6E-03	1.9E-01	
Benzo (k) fluoranthene	0.424	5.0E-02	2.1E-02	8.7E-03	3.7E-03	1.9E-01	
Carbazole	0.17	5.0E-02	8.5E-03	8.7E-03	1.5E-03	1.9E-01	
Chrysene	0.483	5.0E-02	2.4E-02	8.7E-03	4.2E-03	1.9E-01	
Dibenz (a,h) anthracene	0.12	5.0E-02	6.0E-03	8.7E-03	1.0E-03	1.9E-01	
Dibenzofuran	0.058			3.3E-02	1.9E-03		
Diethylphthalate	0.14			5.1E-03	7.2E-04	4.8E-01	
bis(2-Ethylhexyl) phthalate	0.284			5.1E-03	1.5E-03	4.8E-01	
Fluoranthene	0.812	5.0E-02	4.1E-02	8.7E-03	7.1E-03	1.9E-01	
Fluorene	0.12	5.0E-02	6.0E-03	8.7E-03	1.0E-03	1.9E-01	
Indeno (1,2,3-cd) pyrene	0.399	5.0E-02	2.0E-02	8.7E-03	3.5E-03	1.9E-01	
2-Methylnaphthalene	0.022	5.0E-02	1.1E-03	8.7E-03	1.9E-04	1.9E-01	
Naphthalene	0.04	5.0E-02	2.0E-03	8.7E-03	3.5E-04	1.9E-01	
Phenanthrene	0.455	5.0E-02	2.3E-02	8.7E-03	4.0E-03	1.9E-01	

Table L-4
Estimated Exposure from Ingestion of Maximum ECPCs in Food and Soil: Sublethal Effects
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	MAXIMUM EXPOSURE POINT CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
Pyrene	0.626	5.0E-02	3.1E-02	8.7E-03	5.5E-03	1.9E-01	
4,4'-DDD	0.0041	3.0E+00	1.2E-02	1.0E-02	4.1E-05	1.2E+00	2.9E+00
4,4'-DDE	0.00662	1.9E+01	1.3E-01	1.0E-02	6.6E-05	1.2E+00	2.9E+00
4,4'-DDT	0.0171	1.2E+00	2.1E-02	1.0E-02	1.7E-04	1.2E+00	2.9E+00
Aroclor-1260	0.392	3.3E+00	1.3E+00	1.2E-01	4.7E-02	3.8E+00	3.2E-01
alpha-Chlordane	0.0017	1.6E+00	2.7E-03	5.1E-03	8.7E-06	5.5E-01	1.8E+00
gamma-Chlordane	0.00138	1.6E+00	2.2E-03	5.1E-03	7.1E-06	5.5E-01	1.8E+00
Dieldrin	0.0027	5.5E+00	1.5E-02	1.7E-02	4.6E-05	1.5E+00	4.4E-01
Barium	15.3	1.4E-01	2.1E+00	3.0E-02	4.6E-01	7.5E-03	
Beryllium	0.29	9.4E-02	2.7E-02	2.0E-03	5.8E-04	5.0E-02	
Cadmium	0.53	1.2E+00	6.6E-01	3.3E+01	1.7E+01	2.1E+00	3.8E-01
Cobalt	3.7	5.5E-01	2.0E+00	4.0E-03	1.5E-02	1.0E+00	
Copper	3.46	6.8E-01	2.4E+00	7.8E-01	2.7E+00	6.0E-01	
Lead	33.1	9.7E-02	3.2E+00			2.8E-01	
Manganese	27.4	4.2E-01	1.2E+01	5.0E-02	1.4E+00	2.8E-01	
Mercury	0.06	6.8E-02	4.1E-03	1.8E-01	1.1E-02	1.0E-02	2.3E+00
Nickel	4.6	1.8E-01	8.3E-01	1.2E-02	5.5E-02	3.0E-01	
Selenium	0.69	7.6E-01	5.2E-01	9.0E-03	6.2E-03	7.5E-01	5.1E-01
Zinc	38.5	2.8E+00	1.1E+02	6.1E-01	2.3E+01	2.1E+00	

ECPC = Ecological Contaminant of Potential Concern
[a] Bioaccumulation data presented in: Table K.1-1
[b] ECPC concentrations in invertebrate tissue equals the invertebrate BAF multiplied by the average soil concentration of the contaminant.
[c] ECPC concentrations in plant tissue equals the plant BAF multiplied by the average soil concentration of the contaminant.

Table L-4
Estimated Exposure from Ingestion of Maximum ECPCs in Food and Soil: Sublethal Effects
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Rufous-sided towhee*	*Short-tailed shrew*	*Red fox*	*Great-horned owl*	*American woodcock*
Acetone	6.9E-05	2.3E-04	3.5E-04	6.2E-08	2.3E-06	8.9E-06
2-Butanone	2.5E-05	8.2E-05	1.3E-04	2.2E-08	8.3E-07	3.2E-06
2-Hexanone	5.5E-06	1.8E-05	2.8E-05	5.0E-09	1.9E-07	7.1E-07
Methylene chloride	1.7E-05	5.5E-05	8.5E-05	1.5E-08	5.6E-07	2.1E-06
Toluene	1.7E-05	5.5E-05	8.5E-05	1.5E-08	5.6E-07	2.1E-06
Acenaphthene	7.7E-04	2.2E-03	3.4E-03	7.1E-07	3.6E-05	8.5E-05
Acenaphthylene	1.6E-04	4.5E-04	6.9E-04	1.5E-07	7.5E-06	1.7E-05
Anthracene	1.1E-03	3.1E-03	4.7E-03	1.0E-06	5.1E-05	1.2E-04
Benzo (a) anthracene	2.2E-03	6.2E-03	9.5E-03	2.0E-06	1.0E-04	2.4E-04
Benzo (a) pyrene	2.2E-03	6.2E-03	9.5E-03	2.0E-06	1.0E-04	2.4E-04
Benzo (b) fluoranthene	3.5E-03	9.9E-03	1.5E-02	3.2E-06	1.7E-04	3.9E-04
Benzo (g,h,i) perylene	1.9E-03	5.3E-03	8.1E-03	1.7E-06	8.8E-05	2.1E-04
Benzo (k) fluoranthene	1.9E-03	5.5E-03	8.4E-03	1.8E-06	9.1E-05	2.1E-04
Carbazole	7.7E-04	2.2E-03	3.4E-03	7.1E-07	3.6E-05	8.5E-05
Chrysene	2.2E-03	6.2E-03	9.5E-03	2.0E-06	1.0E-04	2.4E-04
Dibenz (a,h) anthracene	5.4E-04	1.5E-03	2.4E-03	5.0E-07	2.6E-05	6.0E-05
Dibenzofuran	3.9E-04	7.5E-04	8.5E-04	1.6E-07	5.4E-06	2.1E-05
Diethylphthalate	4.7E-04	1.4E-03	2.0E-03	5.5E-07	4.4E-05	5.0E-05
bis(2-Ethylhexyl) phthalate	9.6E-04	2.8E-03	4.0E-03	1.1E-06	8.9E-05	1.0E-04
Fluoranthene	3.7E-03	1.0E-02	1.6E-02	3.4E-06	1.7E-04	4.1E-04
Fluorene	5.4E-04	1.5E-03	2.4E-03	5.0E-07	2.6E-05	6.0E-05
Indeno (1,2,3-cd) pyrene	1.8E-03	5.1E-03	7.9E-03	1.7E-06	8.6E-05	2.0E-04
2-Methylnaphthalene	9.9E-05	2.8E-04	4.3E-04	9.2E-08	4.7E-06	1.1E-05
Naphthalene	1.8E-04	5.1E-04	7.9E-04	1.7E-07	8.6E-06	2.0E-05
Phenanthrene	2.1E-03	5.9E-03	9.0E-03	1.9E-06	9.8E-05	2.3E-04

Table L-4
Estimated Exposure from Ingestion of Maximum ECPCs in Food and Soil: Sublethal Effects
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Rufous-sided towhee*	*Short-tailed shrew*	*Red fox*	*Great-horned owl*	*American woodcock*
Pyrene	2.8E-03	8.1E-03	1.2E-02	2.6E-06	1.3E-04	3.1E-04
4,4'-DDD	1.9E-04	7.2E-04	1.4E-03	5.9E-07	6.2E-05	3.7E-05
4,4'-DDE	1.8E-03	6.9E-03	1.4E-02	5.8E-06	6.0E-04	3.6E-04
4,4'-DDT	3.6E-04	1.3E-03	2.6E-03	1.1E-06	1.1E-04	6.6E-05
Aroclor-1260	2.5E-02	8.0E-02	1.5E-01	1.3E-04	1.8E-02	3.8E-03
alpha-Chlordane	4.4E-05	1.7E-04	3.3E-04	9.1E-08	7.1E-06	8.4E-06
gamma-Chlordane	3.5E-05	1.3E-04	2.6E-04	7.4E-08	5.7E-06	6.8E-06
Dieldrin	2.2E-04	8.5E-04	1.7E-03	7.4E-07	7.7E-05	4.3E-05
Barium	1.3E-01	3.1E-01	4.5E-01	7.7E-05	1.5E-03	1.1E-02
Beryllium	1.2E-03	4.2E-03	7.1E-03	1.2E-06	3.8E-05	1.8E-04
Cadmium	2.1E+00	2.1E+00	3.8E-01	1.1E-03	1.4E-01	8.3E-03
Cobalt	4.0E-02	1.5E-01	2.8E-01	9.6E-05	8.7E-03	7.1E-03
Copper	3.7E-01	4.8E-01	3.6E-01	1.4E-04	1.2E-02	8.9E-03
Lead	1.4E-01	4.8E-01	8.2E-01	1.8E-04	1.0E-02	2.1E-02
Manganese	4.0E-01	1.0E+00	1.7E+00	3.7E-04	1.8E-02	4.3E-02
Mercury	1.5E-03	2.0E-03	1.5E-03	4.2E-07	3.0E-05	3.7E-05
Nickel	3.1E-02	9.4E-02	1.6E-01	3.5E-05	1.9E-03	4.0E-03
Selenium	9.9E-03	3.6E-02	6.8E-02	2.1E-05	1.7E-03	1.7E-03
Zinc	4.4E+00	9.0E+00	1.3E+01	8.1E-03	9.4E-01	3.3E-01

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the SFF and ingestion rate, and dividing by body weight (Table 6-2).

Table L-5
Exposure Parameters and Assumptions for Representative Wildlife Species [a]
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Representative Wildlife Species		Percent Prey in Diet: Inverts	Plants	Small Mammals	Small Birds	Soil	Home Range (acres)	ED [b]	Site Foraging Frequency [c]	Food Ingestion Rate (kg/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	10%	88%	0%	0%	2%	0.147	1	1.00E+00	0.0029	0.021
Rufous-sided towhee	(Small omn. bird)	30%	65%	0%	0%	5%	1.5	1	1.00E+00	0.0071	0.039
Short-tailed shrew	(Small omn. mammal)	78%	12%	0%	0%	10%	0.96	1	1.00E+00	0.0024	0.017
Red fox	(Predatory mammal)	20%	10%	57%	10%	3%	1727	1	1.62E-03	0.24	4.69
Great-horned owl	(Predatory bird)	0%	0%	80%	19%	1%	15	1	1.87E-01	0.079	1.59
American woodcock	(Small omn. bird)	80%	10%	0%	0%	10%	80.1	1	3.50E-02	0.02	0.197

NOTES:

SITE AREA:	2.8 acres

[a] Documentation of exposure parameters presented in: Table 6-15

[b] ED = Exposure Duration (percentage of year receptor is expected to be found at study area)

[c] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0))

Table L-6
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*Rufous-sided towhee*			*Short-tailed shrew*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	6.9E-05	2.7E+05	2.5E-10	2.3E-04			3.5E-04	2.7E+05	1.3E-09
2-Butanone	2.5E-05	1.7E+02	1.4E-07	8.2E-05			1.3E-04	1.7E+02	7.3E-07
2-Hexanone	5.5E-06	1.7E+02	3.2E-08	1.8E-05			2.8E-05	1.7E+02	1.6E-07
Methylene chloride	1.7E-05			5.5E-05			8.5E-05		
Toluene	1.7E-05	7.6E+01	2.2E-07	5.5E-05			8.5E-05	7.6E+01	1.1E-06
Acenaphthene	7.7E-04	1.0E+01	7.7E-05	2.2E-03			3.4E-03	1.0E+01	3.4E-04
Acenaphthylene	1.6E-04	1.0E+01	1.6E-05	4.5E-04			6.9E-04	1.0E+01	6.9E-05
Anthracene	1.1E-03	1.0E+01	1.1E-04	3.1E-03			4.7E-03	1.0E+01	4.7E-04
Benzo (a) anthracene	2.2E-03	1.0E+01	2.2E-04	6.2E-03			9.5E-03	1.0E+01	9.5E-04
Benzo (a) pyrene	2.2E-03	1.0E+01	2.2E-04	6.2E-03			9.5E-03	1.0E+01	9.5E-04
Benzo (b) fluoranthene	3.5E-03	1.0E+01	3.5E-04	9.9E-03			1.5E-02	1.0E+01	1.5E-03
Benzo (g,h,i) perylene	1.9E-03	1.0E+01	1.9E-04	5.3E-03			8.1E-03	1.0E+01	8.1E-04
Benzo (k) fluoranthene	1.9E-03	1.0E+01	1.9E-04	5.5E-03			8.4E-03	1.0E+01	8.4E-04
Carbazole	7.7E-04	1.0E+01	7.7E-05	2.2E-03			3.4E-03	1.0E+01	3.4E-04
Chrysene	2.2E-03	1.0E+01	2.2E-04	6.2E-03			9.5E-03	1.0E+01	9.5E-04
Dibenz (a,h) anthracene	5.4E-04	1.0E+01	5.4E-05	1.5E-03			2.4E-03	1.0E+01	2.4E-04
Dibenzofuran	3.9E-04			7.5E-04			8.5E-04		
Diethylphthalate	4.7E-04	3.3E+03	1.5E-07	1.4E-03			2.0E-03	3.3E+03	6.1E-07
bis(2-Ethylhexyl) phthalate	9.6E-04	3.5E+01	2.7E-05	2.8E-03			4.0E-03	3.5E+01	1.2E-04
Fluoranthene	3.7E-03	1.0E+01	3.7E-04	1.0E-02			1.6E-02	1.0E+01	1.6E-03
Fluorene	5.4E-04	1.0E+01	5.4E-05	1.5E-03			2.4E-03	1.0E+01	2.4E-04
Indeno (1,2,3-cd) pyrene	1.8E-03	1.0E+01	1.8E-04	5.1E-03			7.9E-03	1.0E+01	7.9E-04
2-Methylnaphthalene	9.9E-05	1.0E+01	9.9E-06	2.8E-04			4.3E-04	1.0E+01	4.3E-05
Naphthalene	1.8E-04	1.0E+01	1.8E-05	5.1E-04			7.9E-04	1.0E+01	7.9E-05
Phenanthrene	2.1E-03	1.0E+01	2.1E-04	5.9E-03			9.0E-03	1.0E+01	9.0E-04

Table L-6
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*Rufous-sided towhee*			*Short-tailed shrew*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Pyrene	2.8E-03	1.0E+01	2.8E-04	8.1E-03			1.2E-02	1.0E+01	1.2E-03
4,4'-DDD	1.9E-04	2.0E-01	9.4E-04	7.2E-04	1.4E-01	5.1E-03	1.4E-03	2.0E-01	7.1E-03
4,4'-DDE	1.8E-03	2.0E-01	8.8E-03	6.9E-03	5.8E-01	1.2E-02	1.4E-02	2.0E-01	7.0E-02
4,4'-DDT	3.6E-04	2.0E-01	1.8E-03	1.3E-03	1.4E-01	9.5E-03	2.6E-03	2.0E-01	1.3E-02
Aroclor-1260	2.5E-02	6.4E+00	3.9E-03	8.0E-02	9.0E-01	8.9E-02	1.5E-01	6.4E+00	2.3E-02
alpha-Chlordane	4.4E-05	1.6E+01	2.7E-06	1.7E-04	3.1E-02	5.4E-03	3.3E-04	1.6E+01	2.0E-05
gamma-Chlordane	3.5E-05	1.6E+01	2.2E-06	1.3E-04	3.1E-02	4.3E-03	2.6E-04	1.6E+01	1.7E-05
Dieldrin	2.2E-04	6.5E-01	3.4E-04	8.5E-04			1.7E-03	6.5E-01	2.6E-03
Barium	1.3E-01	2.0E+02	6.4E-04	3.1E-01			4.5E-01	2.0E+02	2.3E-03
Beryllium	1.2E-03			4.2E-03			7.1E-03		
Cadmium	2.1E+00	2.2E+01	9.9E-02	2.1E+00	1.0E+01	2.1E-01	3.8E-01	2.2E+01	1.7E-02
Cobalt	4.0E-02	1.3E+01	3.1E-03	1.5E-01			2.8E-01	1.3E+01	2.1E-02
Copper	3.7E-01	1.0E+02	3.7E-03	4.8E-01	2.1E+00	2.3E-01	3.6E-01	1.0E+02	3.6E-03
Lead	1.4E-01	2.5E+00	5.4E-02	4.8E-01	6.3E+00	7.6E-02	8.2E-01	2.5E+00	3.3E-01
Manganese	4.0E-01	1.4E+02	2.9E-03	1.0E+00			1.7E+00	1.4E+02	1.2E-02
Mercury	1.5E-03	5.0E-01	3.1E-03	2.0E-03	6.4E-02	3.2E-02	1.5E-03	5.0E-01	3.0E-03
Nickel	3.1E-02	1.6E+02	2.0E-04	9.4E-02			1.6E-01	1.6E+02	9.9E-04
Selenium	9.9E-03	2.0E-01	5.0E-02	3.6E-02	6.0E-01	5.9E-02	6.8E-02	2.0E-01	3.4E-01
Zinc	4.4E+00	2.0E+02	2.2E-02	9.0E+00			1.3E+01	2.0E+02	6.4E-02
SUMMARY HAZARD INDEX			2.6E-01			7.3E-01			9.2E-01

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = lowest reported LOAEL for closest related species. Value for Benzo(a)pyrene used as a surrogate for all PAHs.

Table L-6
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Red fox*			*Great-horned owl*			*American woodcock*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	6.2E-08	2.7E+05	2.3E-13	2.3E-06			8.9E-06		
2-Butanone	2.2E-08	1.7E+02	1.3E-10	8.3E-07			3.2E-06		
2-Hexanone	5.0E-09	1.7E+02	2.9E-11	1.9E-07			7.1E-07		
Methylene chloride	1.5E-08			5.6E-07			2.1E-06		
Toluene	1.5E-08	7.6E+01	2.0E-10	5.6E-07			2.1E-06		
Acenaphthene	7.1E-07	1.0E+01	7.1E-08	3.6E-05			8.5E-05		
Acenaphthylene	1.5E-07	1.0E+01	1.5E-08	7.5E-06			1.7E-05		
Anthracene	1.0E-06	1.0E+01	1.0E-07	5.1E-05			1.2E-04		
Benzo (a) anthracene	2.0E-06	1.0E+01	2.0E-07	1.0E-04			2.4E-04		
Benzo (a) pyrene	2.0E-06	1.0E+01	2.0E-07	1.0E-04			2.4E-04		
Benzo (b) fluoranthene	3.2E-06	1.0E+01	3.2E-07	1.7E-04			3.9E-04		
Benzo (g,h,i) perylene	1.7E-06	1.0E+01	1.7E-07	8.8E-05			2.1E-04		
Benzo (k) fluoranthene	1.8E-06	1.0E+01	1.8E-07	9.1E-05			2.1E-04		
Carbazole	7.1E-07	1.0E+01	7.1E-08	3.6E-05			8.5E-05		
Chrysene	2.0E-06	1.0E+01	2.0E-07	1.0E-04			2.4E-04		
Dibenz (a,h) anthracene	5.0E-07	1.0E+01	5.0E-08	2.6E-05			6.0E-05		
Dibenzofuran	1.6E-07			5.4E-06			2.1E-05		
Diethylphthalate	5.5E-07	3.3E+03	1.7E-10	4.4E-05			5.0E-05		
bis(2-Ethylhexyl) phthalate	1.1E-06	3.5E+01	3.2E-08	8.9E-05			1.0E-04		
Fluoranthene	3.4E-06	1.0E+01	3.4E-07	1.7E-04			4.1E-04		
Fluorene	5.0E-07	1.0E+01	5.0E-08	2.6E-05			6.0E-05		
Indeno (1,2,3-cd) pyrene	1.7E-06	1.0E+01	1.7E-07	8.6E-05			2.0E-04		
2-Methylnaphthalene	9.2E-08	1.0E+01	9.2E-09	4.7E-06			1.1E-05		
Naphthalene	1.7E-07	1.0E+01	1.7E-08	8.6E-06			2.0E-05		
Phenanthrene	1.9E-06	1.0E+01	1.9E-07	9.8E-05			2.3E-04		
Pyrene	2.6E-06	1.0E+01	2.6E-07	1.3E-04			3.1E-04		

Table L-6
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 5
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Red fox*			*Great-horned owl*			*American woodcock*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
4,4'-DDD	5.9E-07	3.5E+03	1.7E-10	6.2E-05	1.4E-01	4.5E-04	3.7E-05	1.4E-01	2.6E-04
4,4'-DDE	5.8E-06	3.5E+03	1.6E-09	6.0E-04	5.8E-01	1.0E-03	3.6E-04	5.8E-01	6.2E-04
4,4'-DDT	1.1E-06	3.5E+03	3.0E-10	1.1E-04	1.4E-01	8.2E-04	6.6E-05	1.4E-01	4.7E-04
Aroclor-1260	1.3E-04	7.5E-03	1.8E-02	1.8E-02	9.0E+00	1.9E-03	3.8E-03	9.0E-01	4.3E-03
alpha-Chlordane	9.1E-08	1.6E+01	5.7E-09	7.1E-06	3.1E-02	2.3E-04	8.4E-06	3.1E-02	2.7E-04
gamma-Chlordane	7.4E-08	1.6E+01	4.6E-09	5.7E-06	3.1E-02	1.9E-04	6.8E-06	3.1E-02	2.2E-04
Dieldrin	7.4E-07	5.0E-02	1.5E-05	7.7E-05			4.3E-05		
Barium	7.7E-05	2.0E+02	3.9E-07	1.5E-03			1.1E-02		
Beryllium	1.2E-06			3.8E-05			1.8E-04		
Cadmium	1.1E-03	2.2E+01	4.9E-05	1.4E-01	1.0E+01	1.4E-02	8.3E-03	1.0E+01	8.3E-04
Cobalt	9.6E-05	1.3E+01	7.4E-06	8.7E-03			7.1E-03		
Copper	1.4E-04	1.0E+02	1.4E-06	1.2E-02	2.1E+00	5.7E-03	8.9E-03	2.1E+00	4.2E-03
Lead	1.8E-04	2.5E+00	7.2E-05	1.0E-02	5.0E+01	2.0E-04	2.1E-02	6.3E+00	3.3E-03
Manganese	3.7E-04	1.4E+02	2.6E-06	1.8E-02			4.3E-02		
Mercury	4.2E-07	1.0E-01	4.2E-06	3.0E-05	6.4E-02	4.7E-04	3.7E-05	6.4E-02	5.7E-04
Nickel	3.5E-05	1.6E+02	2.2E-07	1.9E-03			4.0E-03		
Selenium	2.1E-05	2.0E-01	1.0E-04	1.7E-03	6.0E-01	2.8E-03	1.7E-03	6.0E-01	2.9E-03
Zinc	8.1E-03	2.0E+02	4.0E-05	9.4E-01			3.3E-01		
SUMMARY HAZARD INDEX			1.8E-02			2.8E-02			1.8E-02

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = lowest reported LOAEL for closest related species. Value for Benzo(a)pyrene used as a surrogate for all PAHs.

APPENDIX M

APPENDIX M

MODEL OF POTENTIAL EXPOSURES AND RISKS FOR REPRESENTATIVE WILDLIFE SPECIES TO ECPCS IN TRIBUTARY SURFACE WATER AND SEDIMENTS AT SITE 5

Table M-1
Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Lethal Effects
Site 5 Drainage Ditch
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA			ESTIMATED TISSUE LEVELS IN PRIMARY FOOD ITEMS	
ANALYTE	MAXIMUM SEDIMENT CONCENTRATION (mg/kg)	MAXIMUM SURFACE WATER CONCENTRATION (mg/L)	BAFs and BCFs[a]	Aquatic Organism Tissue Concentration [b] (mg/kg)
Acetone	1.1E-01	1.6E-02		
2-Butanone	2.9E-02			
Ethylbenzene	9.0E-03			
Methylene chloride	1.1E-02			
4-Methyl-2-pentanone		3.0E-03		
Toluene	2.0E-02	2.0E-03		
Xylenes (total)	5.3E-02			
Di-n-octylphthalate	4.1E-01			
bis(2-Ethylhexyl) phthalat	1.9E+00			
Fluorene	2.3E-01			
2-Methylnaphthalene	1.5E+00			
4-Methylphenol	7.5E-02			
Naphthalene	1.1E+00			
4,4'-DDD	2.7E-02		2.1E+01	5.7E-01
4,4'-DDE	3.7E-03		2.1E+01	7.8E-02
4,4'-DDT	8.6E-03		2.1E+01	1.8E-01
Aroclor-1260	3.3E-01		1.2E+01	4.0E+00
Aluminum	1.1E+04	2.3E+00		
Barium	5.5E+01	4.9E-02		
Beryllium	1.6E-01			
Cadmium		1.9E-04	8.5E+02	1.6E-01
Chromium	1.0E+01			
Iron	3.4E+03	3.6E+00		
Lead	2.5E+01	6.4E-03		
Manganese	8.7E+00	3.6E-02	2.3E+03	8.2E+01
Vanadium	9.3E+00	4.4E-02		
Zinc	3.9E+01			

EXPOSURE PARAMETERS [c]

Representative Wildlife Species		Percent Prey in Diet: Aquatic Organisms	Percent Prey in Diet: Sediment	Home Range (acres)	ED [d]	Site Foraging Frequency [e]	Food Ingestion Rate (kg/day)	Water Ingestion Rate (L/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	0%	1%	0.147	1	1.00E+00	0.0029	0.0031	0.021
Rufous-sided towhee	(Small omn bird)	0%	3%	1.5	1	1.00E+00	0.0071	0.0067	0.039
Raccoon	(Piscivorous mammal)	93%	7%	385	1	1.00E+00	0.214	0.344	3.99
Great blue heron	(Pred. bird)	98%	2%	1.5	1	1.00E+00	0.401	0.101	2.23

NOTES:

SITE AREA: 0.30 acres

ECPC = Ecological Contaminant of Potential Concern

[a] BAF data presented in: Appendix K, Table K.1-4 BCF data are presented below.
BAFs are provided for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and Aroclor 1260. BCFs are provided for cadmium and manganese.
[b] ECPC concentrations in aquatic organism tissue equals the aquatic BAF/BCF multiplied by the maximum sediment/surface water concentration of the contaminant.
[c] Documentation of exposure parameters presented in: Table 6-15
[d] ED = Exposure Duration (percentage of year receptor is expected to be found at study area)
[e] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0))
[f] Only bioconcentration (BCF) values greater than 300 were considered as per USEPA, 1989__.

BIOCONCENTRATION OF INORGANIC SURFACE WATER CPCs

Analyte	Concentration (µg/L)	BCF[f]	Tissue Concentration	Source
Aluminum	2.32	250	NA	AQUIRE
Barium	0.0486	NA	NA	AQUIRE
Cadmium	0.00019	847	0.16	AQUIRE, USEPA 1980
Iron	3.61	NA	NA	AQUIRE
Lead	0.0064	NA	NA	AQUIRE
Manganese	0.0355	2316	82.2	AQUIRE
Vanadium	0.0443	NA	NA	AQUIRE

Table M-1
Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Lethal Effects
Site 5 Drainage Ditch
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [g]

ANALYTE	*Cotton mouse*	*Rufous-sided towhee*	*Raccoon*	*Great blue heron*
Acetone	2.5E-03	3.2E-03	1.8E-03	1.1E-03
2-Butanone	4.0E-05	1.3E-04	1.1E-04	1.0E-04
Ethylbenzene	1.2E-05	4.1E-05	3.4E-05	3.2E-05
Methylene chloride	1.5E-05	5.0E-05	4.1E-05	4.0E-05
4-Methyl-2-pentanone	4.4E-04	5.2E-04	2.6E-04	1.4E-04
Toluene	3.2E-04	4.3E-04	2.5E-04	1.6E-04
Xylenes (total)	7.3E-05	2.4E-04	2.0E-04	1.9E-04
Di-n-octylphthalate	5.7E-04	1.9E-03	1.5E-03	1.5E-03
bis(2-Ethylhexyl) phthalat	2.6E-03	8.6E-03	7.1E-03	6.8E-03
Fluorene	3.2E-04	1.0E-03	8.6E-04	8.3E-04
2-Methylnaphthalene	2.1E-03	6.8E-03	5.6E-03	5.4E-03
4-Methylphenol	1.0E-04	3.4E-04	2.8E-04	2.7E-04
Naphthalene	1.5E-03	5.0E-03	4.1E-03	4.0E-03
4,4'-DDD	3.7E-05	1.2E-04	2.8E-02	1.0E-01
4,4'-DDE	5.1E-06	1.7E-05	3.9E-03	1.4E-02
4,4'-DDT	1.2E-05	3.9E-05	9.0E-03	3.2E-02
Aroclor-1260	4.6E-04	1.5E-03	2.0E-01	7.1E-01
Aluminum	1.6E+01	5.0E+01	4.1E+01	4.0E+01
Barium	8.4E-02	2.6E-01	2.1E-01	2.0E-01
Beryllium	2.2E-04	7.3E-04	6.0E-04	5.8E-04
Cadmium	2.8E-05	3.3E-05	3.8E-02	7.1E-02
Chromium	1.4E-02	4.6E-02	3.8E-02	3.6E-02
Iron	5.2E+00	1.6E+01	1.3E+01	1.2E+01
Lead	3.5E-02	1.1E-01	9.4E-02	9.0E-02
Manganese	1.7E-02	4.6E-02	1.9E+01	3.6E+01
Vanadium	1.9E-02	5.0E-02	3.9E-02	3.5E-02
Zinc	5.4E-02	1.8E-01	1.5E-01	1.4E-01

[g] Calculated by summing the aquatic prey, surface water, and sediment exposure (Table 6-2).

Table M-2
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 5 Drainage Ditch
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*Rufous-sided towhee*		
	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	2.5E-03	6.0E+02	4.2E-06	3.2E-03		
2-Butanone	4.0E-05	5.5E+02	7.3E-08	1.3E-04		
Ethylbenzene	1.2E-05	7.0E+02	1.8E-08	4.1E-05		
Methylene chloride	1.5E-05	3.2E+02	4.7E-08	5.0E-05		
4-Methyl-2-pentanone	4.4E-04	4.2E+02	1.1E-06	5.2E-04		
Toluene	3.2E-04	1.0E+03	3.2E-07	4.3E-04		
Xylenes (total)	7.3E-05	8.6E+02	8.5E-08	2.4E-04	2.0E+03	1.2E-07
Di-n-octylphthalate	5.7E-04	1.3E+03	4.3E-07	1.9E-03		
bis(2-Ethylhexyl) phthalate	2.6E-03	1.6E+02	1.6E-05	8.6E-03		
Fluorene	3.2E-04	2.4E+01	1.3E-05	1.0E-03		
2-Methylnaphthalene	2.1E-03	3.3E+02	6.3E-06	6.8E-03		
4-Methylphenol	1.0E-04	2.2E+02	4.7E-07	3.4E-04		
Naphthalene	1.5E-03	1.1E+02	1.4E-05	5.0E-03		
4,4'-DDD	3.7E-05	1.7E+01	2.1E-06	1.2E-04	7.7E+01	1.6E-06
4,4'-DDE	5.1E-06	1.4E+02	3.6E-08	1.7E-05	1.2E+02	1.4E-07
4,4'-DDT	1.2E-05	1.7E+01	6.8E-07	3.9E-05	1.2E+02	3.3E-07
Aroclor-1260	4.6E-04	1.0E+02	4.6E-06	1.5E-03	1.6E+01	9.4E-05
Aluminum	1.6E+01	7.4E+02	2.1E-02	5.0E+01		
Barium	8.4E-02	4.3E+02	1.9E-04	2.6E-01		
Beryllium	2.2E-04	2.0E+00	1.1E-04	7.3E-04		
Cadmium	2.8E-05	3.0E+01	9.3E-07	3.3E-05		
Chromium	1.4E-02	4.0E+01	3.5E-04	4.6E-02	2.5E+01	1.8E-03
Iron	5.2E+00	2.4E+02	2.2E-02	1.6E+01		
Lead	3.5E-02	6.0E+01	5.9E-04	1.1E-01	7.5E+01	1.5E-03
Manganese	1.7E-02	2.3E+03	7.5E-06	4.6E-02		
Vanadium	0.0E+00			5.0E-02	2.0E+01	2.5E-03
Zinc	5.4E-02	3.9E+02	1.4E-04	1.8E-01		
SUMMARY HAZARD INDEX			4.4E-02			5.9E-03

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species. RTV for Benzo(a)pyrene used as a surrogate for all PAHs.

Table M-2

Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 5 Drainage Ditch
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	Raccoon			Great blue heron		
	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	1.8E-03	6.0E+02	3.0E-06	1.1E-03		
2-Butanone	1.1E-04	5.5E+02	2.0E-07	1.0E-04		
Ethylbenzene	3.4E-05	7.0E+02	4.8E-08	3.2E-05		
Methylene chloride	4.1E-05	3.2E+02	1.3E-07	4.0E-05		
4-Methyl-2-pentanone	2.6E-04	4.2E+02	6.2E-07	1.4E-04		
Toluene	2.5E-04	1.0E+03	2.5E-07	1.6E-04		
Xylenes (total)	2.0E-04	8.6E+02	2.3E-07	1.9E-04	2.0E+03	9.5E-08
Di-n-octylphthalate	1.5E-03	1.3E+03	1.2E-06	1.5E-03		
bis(2-Ethylhexyl) phthalate	7.1E-03	1.6E+02	4.5E-05	6.8E-03		
Fluorene	8.6E-04	2.4E+01	3.6E-05	8.3E-04		
2-Methylnaphthalene	5.6E-03	3.3E+02	1.7E-05	5.4E-03		
4-Methylphenol	2.8E-04	2.2E+02	1.3E-06	2.7E-04		
Naphthalene	4.1E-03	1.1E+02	3.8E-05	4.0E-03		
4,4'-DDD	2.8E-02	1.2E+01	2.4E-03	1.0E-01	4.0E+02	2.5E-04
4,4'-DDE	3.9E-03	1.2E+01	3.2E-04	1.4E-02	4.5E+02	3.1E-05
4,4'-DDT	9.0E-03	1.2E+01	7.5E-04	3.2E-02	4.5E+02	7.1E-05
Aroclor-1260	2.0E-01	1.5E+02	1.3E-03	7.1E-01	2.2E+01	3.2E-02
Aluminum	4.1E+01	7.4E+02	5.6E-02	4.0E+01		
Barium	2.1E-01	4.3E+02	4.9E-04	2.0E-01		
Beryllium	6.0E-04	2.0E+00	3.0E-04	5.8E-04		
Cadmium	3.8E-02	3.0E+01	1.3E-03	7.1E-02		
Chromium	3.8E-02	4.0E+01	9.4E-04	3.6E-02	2.5E+01	1.4E-03
Iron	1.3E+01	2.4E+02	5.4E-02	1.2E+01		
Lead	9.4E-02	6.0E+01	1.6E-03	9.0E-02	7.5E+01	1.2E-03
Manganese	1.9E+01	2.3E+03	8.3E-03	3.6E+01		
Vanadium	3.9E-02			3.5E-02	2.0E+01	1.8E-03
Zinc	1.5E-01	3.9E+02	3.8E-04	1.4E-01		
SUMMARY HAZARD INDEX			1.3E-01			3.7E-02

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species. RTV for Benzo(a)pyrene used as a surrogate for all PAHs.

Table M-3
Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Sublethal Effects
Site 5 Drainage Ditch
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA			ESTIMATED TISSUE LEVELS IN PRIMARY FOOD ITEMS	
ANALYTE	MAXIMUM SEDIMENT CONCENTRATION (mg/kg)	MAXIMUM SURFACE WATER CONCENTRATION (mg/L)	BAFs and BCFs [a]	Aquatic Organism Tissue Concentration [b] (mg/kg)
Acetone	1.1E-01	1.6E-02		
2-Butanone	2.9E-02			
Ethylbenzene	9.0E-03			
Methylene chloride	1.1E-02			
4-Methyl-2-pentanone		3.0E-03		
Toluene	2.0E-02	2.0E-03		
Xylenes (total)	5.3E-02			
Di-n-octylphthalate	4.1E-01			
bis(2-Ethylhexyl) phthalat	1.9E+00			
Fluorene	2.3E-01			
2-Methylnaphthalene	1.5E+00			
4-Methylphenol	7 5E-02			
Naphthalene	1.1E+00			
4,4'-DDD	2.7E-02		2.1E+01	5.7E-01
4,4'-DDE	3.7E-03		2.1E+01	7.8E-02
4,4'-DDT	8.6E-03		2 1E+01	1.8E-01
Aroclor-1260	3.3E-01		1.2E+01	4.0E+00
Aluminum	1.1E+04	2.3E+00		
Barium	5.5E+01	4.9E-02		
Beryllium	1.6E-01			
Cadmium		1.9E-04	8 5E+02	1.6E-01
Chromium	1.0E+01			
Iron	3.4E+03	3.6E+00		
Lead	2 5E+01	6.4E-03		
Manganese	8 7E+00	3.6E-02	2.3E+03	8.2E+01
Vanadium	9.3E+00	4.4E-02		
Zinc	3.9E+01			

EXPOSURE PARAMETERS [c]

Representative Wildlife Species		Percent Prey in Diet: Aquatic Organisms	Percent Prey in Diet: Sediment	Home Range (acres)	ED [d]	Site Foraging Frequency [e]	Food Ingestion Rate (kg/day)	Water Ingestion Rate (L/day)	Body Weight (kg)
Cotton mouse	(Small herb mammal)	0%	1%	0.147	1	1.00E+00	0.0029	0.0031	0.021
Rufous-sided towhee	(Small omn bird)	0%	3%	1.5	1	2.00E-01	0.0071	0.0067	0.039
Raccoon	(Piscivorous mammal)	93%	7%	385	1	7.79E-04	0.214	0.344	3.99
Great blue heron	(Pred. bird)	98%	2%	1.5	1	2.00E-01	0.401	0.101	2.23

NOTES:

SITE AREA:	0.30 acres

ECPC = Ecological Contaminant of Potential Concern

[a] BAF data presented in: Appendix K, Table K.1-4 . BCF data are presented below
BAFs are provided for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and Aroclor 1260. BCFs are provided for cadmium and manganese.
[b] ECPC concentrations in aquatic organism tissue equals the aquatic BAF/BCF multiplied by the maximum sediment/surface water concentration of the contaminant.
[c] Documentation of exposure parameters presented in: Table 6-15
[d] ED = Exposure Duration (percentage of year receptor is expected to be found at study area)
[e] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1 0))
[f] Only bioconcentration (BCF) values greater than 300 were considered as per USEPA, 1989__.

BIOCONCENTRATION OF INORGANIC SURFACE WATER CPCs

Analyte	Concentration (µg/L)	BCF [f]	Tissue Concentration	Source
Aluminum	2.32	250	NA	AQUIRE
Barium	0.0486	NA	NA	AQUIRE
Cadmium	0.00019	847	0.16	AQUIRE, USEPA 1980
Iron	3.61	NA	NA	AQUIRE
Lead	0.0064	NA	NA	AQUIRE
Manganese	0.0355	2316	82.2	AQUIRE
Vanadium	0.0443	NA	NA	AQUIRE

Table M-3

Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Sublethal Effects
Site 5 Drainage Ditch
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [g]

ANALYTE	*Cotton mouse*	*Rufous-sided towhee*	*Raccoon*	*Great blue heron*
Acetone	2.5E-03	6.5E-04	1.4E-06	2.2E-04
2-Butanone	4.0E-05	2.6E-05	8.5E-08	2.1E-05
Ethylbenzene	1.2E-05	8.2E-06	2.6E-08	6.5E-06
Methylene chloride	1.5E-05	1.0E-05	3.2E-08	7.9E-06
4-Methyl-2-pentanone	4.4E-04	1.0E-04	2.0E-07	2.7E-05
Toluene	3.2E-04	8.7E-05	1.9E-07	3.3E-05
Xylenes (total)	7.3E-05	4.8E-05	1.6E-07	3.8E-05
Di-n-octylphthalate	5.7E-04	3.7E-04	1.2E-06	2.9E-04
bis(2-Ethylhexyl) phthalat	2.6E-03	1.7E-03	5.6E-06	1.4E-03
Fluorene	3.2E-04	2.1E-04	6.7E-07	1.7E-04
2-Methylnaphthalene	2.1E-03	1.4E-03	4.4E-06	1.1E-03
4-Methylphenol	1.0E-04	6.8E-05	2.2E-07	5.4E-05
Naphthalene	1.5E-03	1.0E-03	3.2E-06	7.9E-04
4,4'-DDD	3.7E-05	2.5E-05	2.2E-05	2.0E-02
4,4'-DDE	5.1E-06	3.4E-06	3.0E-06	2.7E-03
4,4'-DDT	1.2E-05	7.8E-06	7.0E-06	6.4E-03
Aroclor-1260	4.6E-04	3.0E-04	1.6E-04	1.4E-01
Aluminum	1.6E+01	1.0E+01	3.2E-02	7.9E+00
Barium	8.4E-02	5.2E-02	1.7E-04	4.0E-02
Beryllium	2.2E-04	1.5E-04	4.7E-07	1.2E-04
Cadmium	2.8E-05	6.5E-06	2.9E-05	1.4E-02
Chromium	1.4E-02	9.1E-03	2.9E-05	7.2E-03
Iron	5.2E+00	3.2E+00	1.0E-02	2.5E+00
Lead	3.5E-02	2.3E-02	7.4E-05	1.8E-02
Manganese	1.7E-02	9.1E-03	1.5E-02	7.2E+00
Vanadium	1.9E-02	1.0E-02	3.0E-05	7.1E-03
Zinc	5.4E-02	3.6E-02	1.1E-04	2.8E-02

[g] Calculated by summing the aquatic prey, surface water, and sediment exposure (Table 6-2).

Table M-4
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 5 Drainage Ditch
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*Rufous-sided towhee*		
	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	2.5E-03	2.7E+05	9.2E-09	6.5E-04		
2-Butanone	4.0E-05	1.7E+02	2.3E-07	2.6E-05		
Ethylbenzene	1.2E-05			8.2E-06		
Methylene chloride	1.5E-05			1.0E-05		
4-Methyl-2-pentanone	4.4E-04	1.7E+02	2.6E-06	1.0E-04		
Toluene	3.2E-04	7.6E+01	4.2E-06	8.7E-05		
Xylenes (total)	7.3E-05	5.0E+02	1.5E-07	4.8E-05		
Di-n-octylphthalate	5.7E-04	3.5E+01	1.6E-05	3.7E-04		
bis(2-Ethylhexyl) phthalate	2.6E-03	3.5E+01	7.5E-05	1.7E-03		
Fluorene	3.2E-04	1.0E+01	3.2E-05	2.1E-04		
2-Methylnaphthalene	2.1E-03	1.0E+01	2.1E-04	1.4E-03		
4-Methylphenol	1.0E-04	5.0E+01	2.1E-06	6.8E-05		
Naphthalene	1.5E-03	1.0E+01	1.5E-04	1.0E-03		
4,4'-DDD	3.7E-05	2.0E-01	1.9E-04	2.5E-05	1.4E-01	1.8E-04
4,4'-DDE	5.1E-06	2.0E-01	2.6E-05	3.4E-06	5.8E-01	5.8E-06
4,4'-DDT	1.2E-05	2.0E-01	5.9E-05	7.8E-06	1.4E-01	5.6E-05
Aroclor-1260	4.6E-04	6.4E+00	7.1E-05	3.0E-04	9.0E-01	3.3E-04
Aluminum	1.6E+01	4.3E+02	3.7E-02	1.0E+01		
Barium	8.4E-02	2.0E+02	4.2E-04	5.2E-02		
Beryllium	2.2E-04			1.5E-04		
Cadmium	2.8E-05	2.2E+01	1.3E-06	6.5E-06	1.0E+01	6.5E-07
Chromium	1.4E-02	1.4E+03	9.9E-06	9.1E-03	2.0E+02	4.6E-05
Iron	5.2E+00			3.2E+00		
Lead	3.5E-02	2.5E+00	1.4E-02	2.3E-02	6.3E+00	3.7E-03
Manganese	1.7E-02	1.4E+02	1.2E-04	9.1E-03		
Vanadium	0.0E+00	8.4E+00	0.0E+00	1.0E-02	1.1E+01	9.1E-04
Zinc	5.4E-02	2.0E+02	2.7E-04	3.6E-02		
SUMMARY HAZARD INDEX			5.2E-02			5.2E-03

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = lowest reported LOAEL for closest related species. Value for Benzo(a)pyrene used as a surrogate for all PAHs.

Table M-4
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 5 Drainage Ditch
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Raccoon*			*Great blue heron*		
	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	1.4E-06	2.7E+05	5.1E-12	2.2E-04		
2-Butanone	8.5E-08	1.7E+02	4.9E-10	2.1E-05		
Ethylbenzene	2.6E-08			6.5E-06		
Methylene chloride	3.2E-08			7.9E-06		
4-Methyl-2-pentanone	2.0E-07	1.7E+02	1.2E-09	2.7E-05		
Toluene	1.9E-07	7.6E+01	2.5E-09	3.3E-05		
Xylenes (total)	1.6E-07	5.0E+02	3.1E-10	3.8E-05		
Di-n-octylphthalate	1.2E-06	3.5E+01	3.4E-08	2.9E-04		
bis(2-Ethylhexyl) phthalate	5.6E-06	3.5E+01	1.6E-07	1.4E-03		
Fluorene	6.7E-07	1.0E+01	6.7E-08	1.7E-04		
2-Methylnaphthalene	4.4E-06	1.0E+01	4.4E-07	1.1E-03		
4-Methylphenol	2.2E-07	5.0E+01	4.4E-09	5.4E-05		
Naphthalene	3.2E-06	1.0E+01	3.2E-07	7.9E-04		
4,4'-DDD	2.2E-05	3.5E+03	6.2E-09	2.0E-02	1.4E-01	1.4E-01
4,4'-DDE	3.0E-06	3.5E+03	8.6E-10	2.7E-03	5.8E-01	4.7E-03
4,4'-DDT	7.0E-06	3.5E+03	2.0E-09	6.4E-03	1.4E-01	4.6E-02
Aroclor-1260	1.6E-04	7.5E-03	2.1E-02	1.4E-01	9.0E+00	1.6E-02
Aluminum	3.2E-02	4.3E+02	7.6E-05	7.9E+00		
Barium	1.7E-04	2.0E+02	8.4E-07	4.0E-02		
Beryllium	4.7E-07			1.2E-04		
Cadmium	2.9E-05	2.2E+01	1.4E-06	1.4E-02	1.0E+01	1.4E-03
Chromium	2.9E-05	1.4E+03	2.1E-08	7.2E-03	2.0E+02	3.6E-05
Iron	1.0E-02			2.5E+00		
Lead	7.4E-05	2.5E+00	2.9E-05	1.8E-02	5.0E+01	3.6E-04
Manganese	1.5E-02	1.4E+02	1.1E-04	7.2E+00		
Vanadium	3.0E-05	8.4E+00	3.6E-06	7.1E-03	1.1E+01	6.4E-04
Zinc	1.1E-04	2.0E+02	5.7E-07	2.8E-02		
SUMMARY HAZARD INDEX			2.1E-02			2.1E-01

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = lowest reported LOAEL for closest related species. Value for Benzo(a)pyrene used as a surrogate for all PAHs.

APPENDIX N

APPENDIX N

MODEL OF POTENTIAL EXPOSURES AND RISKS FOR REPRESENTATIVE WILDLIFE SPECIES TO ECPCS IN WETLAND SURFACE WATER AND SEDIMENTS AT SITE 5

Table N-1
Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Lethal Effects
Site 5 Wetland
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA / **ESTIMATED TISSUE LEVELS IN PRIMARY FOOD ITEMS**

ANALYTE	MAXIMUM SEDIMENT CONCENTRATION (mg/kg)	MAXIMUM SURFACE WATER CONCENTRATION (mg/L)	BAFs and BCFs [a]	Aquatic Organism Tissue Concentration [b] (mg/kg)
Acetone	8.3E-01			
Aluminum	1.3E+04			
Arsenic	4.5E+00			
Barium	2.8E+01			
Beryllium	6.3E-01			
Chromium	1.7E+01			
Copper	3.7E+00			
Iron	2.7E+03			
Lead	1.3E+02			
Manganese	1.3E+01	4.2E-02	2.3E+03	9.6E+01
Mercury	1.7E-01		1.7E+01	2.8E+00
Vanadium	1.0E+01			
Zinc	8.2E+01			

EXPOSURE PARAMETERS [c]

Representative Wildlife Species		Percent Prey in Diet: Aquatic Organisms	Percent Prey in Diet: Sediment	Home Range (acres)	ED [d]	Site Foraging Frequency [e]	Food Ingestion Rate (kg/day)	Water Ingestion Rate (L/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	0%	1%	0.147	1	1.00E+00	0.0029	0.0031	0.021
American woodcock	(Small omn. bird)	0%	5%	80.1	1	1.00E+00	0.020	0.019	0.197
Short-tailed shrew	(Small omn. mammal)	0%	5%	0.96	1	1.00E+00	0.0024	0.0039	0.017
Raccoon	(Piscivorous mammal)	93%	7%	385	1	1.00E+00	0.214	0.344	3.99
Great horned owl	(Pred. bird)	0%	1%	15	1	1.00E+00	0.079	0.081	1.59

NOTES:

SITE AREA:	1.80 acres

ECPC = Ecological Contaminant of Potential Concern

[a] BAF data presented in: Appendix K, Table K.1-4 BCF data presented below.
BAF data presented for mercury, and BCF data presented for manganese.
[b] ECPC concentrations in aquatic organism tissue equals the aquatic BAF/BCF multiplied by the maximum sediment/surface water concentration of the contaminant.
[c] Documentation of exposure parameters presented in: Table 6-15
[d] ED = Exposure Duration (percentage of year receptor is expected to be found at study area)
[e] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0))
[f] Only bioconcentration (BCF) values greater than 300 were considered as per USEPA, 1989__.

BIOCONCENTRATION OF INORGANIC SURFACE WATER CPCs

Analyte	Concentration (µg/L)	BCF [f]	Tissue Concentration	Source
Manganese	0.042	2316	97.3	AQUIRE

Table N-1

Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Lethal Effects
Site 5 Wetland

Baseline Risk Assessment for Operable Unit 2

NAS Cecil Field, Jacksonville, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [g]

ANALYTE	*Cotton mouse*	*American woodcock*	*Short-tailed shrew*	*Raccoon*	*Great horned owl*
Acetone	1.1E-03	4.2E-03	5.9E-03	3.1E-03	2.1E-04
Aluminum	1.8E+01	6.4E+01	9.0E+01	4.8E+01	3.2E+00
Arsenic	6.2E-03	2.3E-02	3.2E-02	1.7E-02	1.1E-03
Barium	3.8E-02	1.4E-01	1.9E-01	1.0E-01	6.8E-03
Beryllium	8.7E-04	3.2E-03	4.4E-03	2.4E-03	1.6E-04
Chromium	2.3E-02	8.5E-02	1.2E-01	6.3E-02	4.1E-03
Copper	5.1E-03	1.9E-02	2.6E-02	1.4E-02	9.2E-04
Iron	3.8E+00	1.4E+01	1.9E+01	1.0E+01	6.8E-01
Lead	1.8E-01	6.5E-01	9.1E-01	4.8E-01	3.2E-02
Manganese	2.4E-02	7.0E-02	1.0E-01	2.3E+01	5.3E-03
Mercury	2.3E-04	8.6E-04	1.2E-03	1.4E-01	4.2E-05
Vanadium	1.4E-02	5.2E-02	7.2E-02	3.8E-02	2.5E-03
Zinc	1.1E-01	4.2E-01	5.8E-01	3.1E-01	2.0E-02

[g] Calculated by summing the aquatic prey, surface water, and sediment exposure (Table 6-2).

Table N-2
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 5 Wetland
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*American woodcock*			*Short-tailed shrew*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	1.1E-03	6.0E+02	1.9E-06	4.2E-03			5.9E-03	6.0E+02	9.8E-06
Aluminum	1.8E+01	7.4E+02	2.4E-02	6.4E+01			9.0E+01	7.4E+02	1.2E-01
Arsenic	6.2E-03	2.9E+01	2.1E-04	2.3E-02	3.6E+00	6.3E-03	3.2E-02	2.9E+01	1.1E-03
Barium	3.8E-02	4.3E+02	8.8E-05	1.4E-01			1.9E-01	4.3E+02	4.5E-04
Beryllium	8.7E-04	2.0E+00	4.4E-04	3.2E-03			4.4E-03	2.0E+00	2.2E-03
Chromium	2.3E-02	4.0E+01	5.8E-04	8.5E-02	2.5E+01	3.4E-03	1.2E-01	4.0E+01	2.9E-03
Copper	5.1E-03	1.9E+02	2.7E-05	1.9E-02			2.6E-02	1.9E+02	1.4E-04
Iron	3.8E+00	2.4E+02	1.6E-02	1.4E+01			1.9E+01	2.4E+02	8.0E-02
Lead	1.8E-01	6.0E+01	3.0E-03	6.5E-01	7.5E+01	8.7E-03	9.1E-01	6.0E+01	1.5E-02
Manganese	2.4E-02	2.3E+03	1.0E-05	7.0E-02			1.0E-01	2.3E+03	4.4E-05
Mercury	2.3E-04	3.6E+00	6.5E-05	8.6E-04	2.2E+00	3.9E-04	1.2E-03	3.6E+00	3.3E-04
Vanadium	1.4E-02			5.2E-02	2.0E+01	2.6E-03	7.2E-02		
Zinc	1.1E-01	3.9E+02	2.9E-04	4.2E-01			5.8E-01	3.9E+02	1.5E-03
SUMMARY HAZARD INDEX			4.4E-02			2.1E-02			2.3E-01

PDE = Potential Dietary Exposure (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species. RTV for Benzo(a)pyrene used as a surrogate for all PAHs.

Table N-2
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 5 Wetland
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Raccoon*			*Great horned owl*		
	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	3.1E-03	6.0E+02	5.2E-06	2.1E-04		
Aluminum	4.8E+01	7.4E+02	6.4E-02	3.2E+00		
Arsenic	1.7E-02	2.9E+01	5.8E-04	1.1E-03	3.6E+00	3.1E-04
Barium	1.0E-01	4.3E+02	2.4E-04	6.8E-03		
Beryllium	2.4E-03	2.0E+00	1.2E-03	1.6E-04		
Chromium	6.3E-02	4.0E+01	1.6E-03	4.1E-03	2.5E+01	1.6E-04
Copper	1.4E-02	1.9E+02	7.4E-05	9.2E-04		
Iron	1.0E+01	2.4E+02	4.3E-02	6.8E-01		
Lead	4.8E-01	6.0E+01	8.1E-03	3.2E-02	7.5E+01	4.3E-04
Manganese	2.3E+01	2.3E+03	9.8E-03	5.3E-03		
Mercury	1.4E-01	2.0E-01	7.1E-01	4.2E-05	2.2E+00	1.9E-05
Vanadium	3.8E-02			2.5E-03	2.0E+01	1.3E-04
Zinc	3.1E-01	3.9E+02	7.9E-04	2.0E-02		
SUMMARY HAZARD INDEX			8.4E-01			1.0E-03

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species. RTV for Benzo(a)pyrene used as a surrogate for all PAHs.

Table N-3
Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Sublethal Effects
Site 5 Wetland
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA			ESTIMATED TISSUE LEVELS IN PRIMARY FOOD ITEMS	
ANALYTE	MAXIMUM SEDIMENT CONCENTRATION (mg/kg)	MAXIMUM SURFACE WATER CONCENTRATION (mg/L)	BAFs and BCFs [a]	Aquatic Organism Tissue Concentration [b] (mg/kg)
Acetone	8.3E-01			
Aluminum	1.3E+04			
Arsenic	4.5E+00			
Barium	2.8E+01			
Beryllium	6.3E-01			
Chromium	1.7E+01			
Copper	3.7E+00			
Iron	2.7E+03			
Lead	1.3E+02			
Manganese	1.3E+01	4.2E-02	2.3E+03	9.6E+01
Mercury	1.7E-01		1.7E+01	2.8E+00
Vanadium	1.0E+01			
Zinc	8.2E+01			

EXPOSURE PARAMETERS [c]

Representative Wildlife Species		Percent Prey in Diet: Aquatic Organisms	Percent Prey in Diet: Sediment	Home Range (acres)	ED [d]	Site Foraging Frequency [e]	Food Ingestion Rate (kg/day)	Water Ingestion Rate (L/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	0%	1%	0.147	1	1.00E+00	0.0029	0.0031	0.021
American woodcock	(Small omn. bird)	0%	5%	80.1	1	2.25E-02	0.020	0.019	0.197
Short-tailed shrew	(Small omn. mammal)	0%	5%	0.96	1	1.00E+00	0.0024	-0.0039	0.017
Raccoon	(Piscivorous mammal)	93%	7%	385	1	4.68E-03	0.214	0.344	3.99
Great horned owl	(Pred. bird)	0%	1%	15	1	1.20E-01	0.079	0.081	1.59

NOTES:

SITE AREA:	1.80 acres

ECPC = Ecological Contaminant of Potential Concern

[a] BAF data presented in: Appendix K, Table K.1-4 BCF data presented below.
BAF data presented for mercury, and BCF data presented for manganese.
[b] ECPC concentrations in aquatic organism tissue equals the aquatic BAF/BCF multiplied by the maximum sediment/surface water concentration of the contaminant.
[c] Documentation of exposure parameters presented in: Table 6-15
[d] ED = Exposure Duration (percentage of year receptor is expected to be found at study area)
[e] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0))
[f] Only bioconcentration (BCF) values greater than 300 were considered as per USEPA, 1989__.

BIOCONCENTRATION OF INORGANIC SURFACE WATER CPCs

Analyte	Concentration (µg/L)	BCF [f]	Tissue Concentration	Source
Manganese	0.042	2316	97.3	AQUIRE

Table N-3

Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Sublethal Effects
Site 5 Wetland

Baseline Risk Assessment for Operable Unit 2

NAS Cecil Field, Jacksonville, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [g]

ANALYTE	*Cotton mouse*	*American woodcock*	*Short-tailed shrew*	*Raccoon*	*Great horned owl*
Acetone	1.1E-03	9.5E-05	5.9E-03	1.5E-05	2.5E-05
Aluminum	1.8E+01	1.4E+00	9.0E+01	2.2E-01	3.8E-01
Arsenic	6.2E-03	5.1E-04	3.2E-02	7.9E-05	1.3E-04
Barium	3.8E-02	3.1E-03	1.9E-01	4.8E-04	8.2E-04
Beryllium	8.7E-04	7.2E-05	4.4E-03	1.1E-05	1.9E-05
Chromium	2.3E-02	1.9E-03	1.2E-01	2.9E-04	5.0E-04
Copper	5.1E-03	4.2E-04	2.6E-02	6.5E-05	1.1E-04
Iron	3.8E+00	3.1E-01	1.9E+01	4.8E-02	8.1E-02
Lead	1.8E-01	1.5E-02	9.1E-01	2.3E-03	3.8E-03
Manganese	2.4E-02	1.6E-03	1.0E-01	1.1E-01	6.4E-04
Mercury	2.3E-04	1.9E-05	1.2E-03	6.7E-04	5.1E-06
Vanadium	1.4E-02	1.2E-03	7.2E-02	1.8E-04	3.0E-04
Zinc	1.1E-01	9.3E-03	5.8E-01	1.4E-03	2.4E-03

[g] Calculated by summing the aquatic prey, surface water, and sediment exposure (Table 6-2).

Table N-4
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 5 Wetland
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*American woodcock*			*Short-tailed shrew*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	1.1E-03	2.7E+05	4.2E-09	9.5E-05			5.9E-03	2.7E+05	2.1E-08
Aluminum	1.8E+01	4.3E+02	4.1E-02	1.4E+00			9.0E+01	4.3E+02	2.1E-01
Arsenic	6.2E-03	5.8E-01	1.1E-02	5.1E-04	1.0E+00	5.1E-04	3.2E-02	5.8E-01	5.5E-02
Barium	3.8E-02	2.0E+02	1.9E-04	3.1E-03			1.9E-01	2.0E+02	9.8E-04
Beryllium	8.7E-04			7.2E-05			4.4E-03		
Chromium	2.3E-02	1.4E+03	1.6E-05	1.9E-03	2.0E+02	9.5E-06	1.2E-01	1.4E+03	8.4E-05
Copper	5.1E-03	1.0E+02	5.1E-05	4.2E-04	2.1E+00	2.0E-04	2.6E-02	1.0E+02	2.6E-04
Iron	3.8E+00			3.1E-01			1.9E+01		
Lead	1.8E-01	2.5E+00	7.1E-02	1.5E-02	6.3E+00	2.4E-03	9.1E-01	2.5E+00	3.6E-01
Manganese	2.4E-02	1.4E+02	1.7E-04	1.6E-03			1.0E-01	1.4E+02	7.2E-04
Mercury	2.3E-04	5.0E-01	4.7E-04	1.9E-05	6.4E-02	3.0E-04	1.2E-03	5.0E-01	2.4E-03
Vanadium	1.4E-02	8.4E+00	1.7E-03	1.2E-03	1.1E+01	1.1E-04	7.2E-02	8.4E+00	8.6E-03
Zinc	1.1E-01	2.0E+02	5.6E-04	9.3E-03			5.8E-01	2.0E+02	2.9E-03
SUMMARY HAZARD INDEX			1.3E-01			3.5E-03			6.5E-01

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = lowest reported LOAEL for closest related species. Value for Benzo(a)pyrene used as a surrogate for all PAHs.

Table N-4

Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 5 Wetland

Baseline Risk Assessment for Operable Unit 2

NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Raccoon*			*Great horned owl*		
	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	1.5E-05	2.7E+05	5.3E-11	2.5E-05		
Aluminum	2.2E-01	4.3E+02	5.2E-04	3.8E-01		
Arsenic	7.9E-05	5.8E-01	1.4E-04	1.3E-04	1.0E+00	1.3E-04
Barium	4.8E-04	2.0E+02	2.4E-06	8.2E-04		
Beryllium	1.1E-05			1.9E-05		
Chromium	2.9E-04	1.4E+03	2.1E-07	5.0E-04	2.0E+02	2.5E-06
Copper	6.5E-05	1.0E+02	6.5E-07	1.1E-04	2.1E+00	5.3E-05
Iron	4.8E-02			8.1E-02		
Lead	2.3E-03	2.5E+00	9.1E-04	3.8E-03	5.0E+01	7.7E-05
Manganese	1.1E-01	1.4E+02	7.5E-04	6.4E-04		
Mercury	6.7E-04	1.0E-01	6.7E-03	5.1E-06	6.4E-02	7.9E-05
Vanadium	1.8E-04	8.4E+00	2.1E-05	3.0E-04	1.1E+01	2.8E-05
Zinc	1.4E-03	2.0E+02	7.2E-06	2.4E-03		
SUMMARY HAZARD INDEX			9.0E-03			3.7E-04

PDE = Potential Dietary Exposure (mg/kgBW/day)

HQ = Hazard Quotient (calculated by dividing PDE by RTV)

RTV = Reference Toxicity Value (mg/kgBW/day) = lowest reported LOAEL for closest related species. Value for Benzo(a)pyrene used as a surrogate for all PAHs.

APPENDIX O

APPENDIX O

MODEL FOR PREDICTION OF GROUNDWATER TO SURFACE WATER TRANSPORT AND DILUTION OF ECPCS

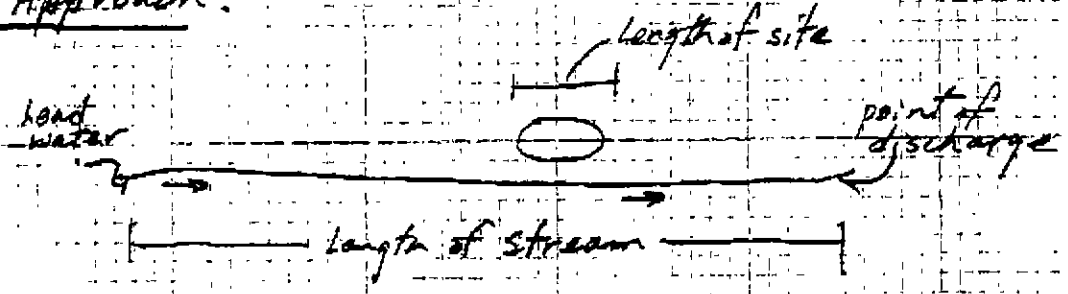
PROJECT	COMP. BY	JOB NO.
Calculation of Groundwater Dilution factor for Ditch at Site 5	AJL	8500.13 TKB
	CHK. BY	DATE 7/5/94

Data for the volume of water discharged from the ditch south of Site 5 are not available. Therefore, the approach taken to calculate a dilution factor will be based solely on base flow from groundwater using the following assumption

Assume: All flow in the ditch is a result of groundwater infiltration

This represents a conservative approach as any drainage from (1) the wetlands west of the site or (2) precipitation events would result in greater dilution.

Approach:



Calculate dilution based on portion of stream recharged by the site

Calculation: $\text{Dilution Factor} = \dfrac{\text{length of site}}{2 \times \text{Length of stream}}$

2 times the length of stream is used because groundwater infiltrates from both sides of the stream

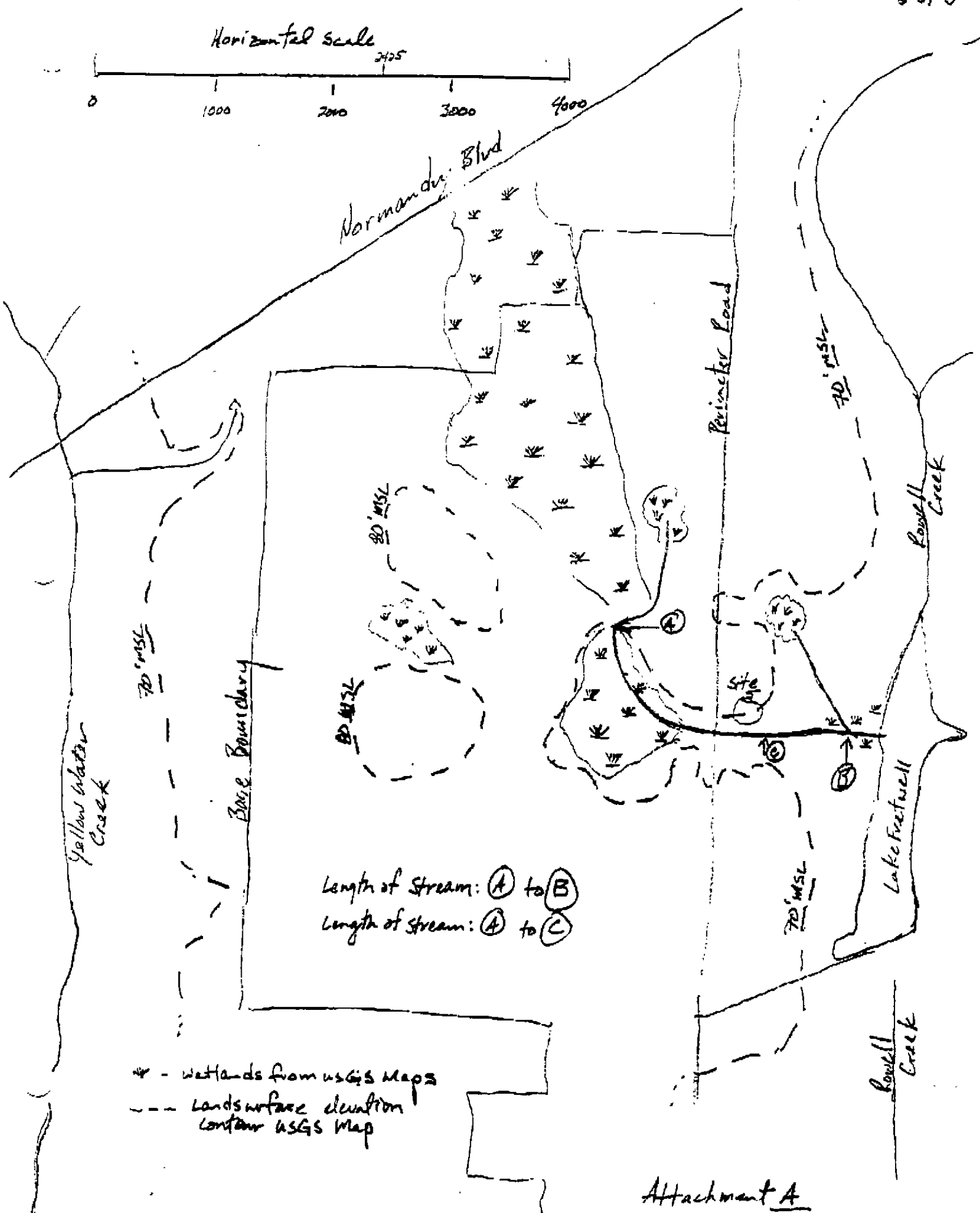
Length of stream - from Attachment A = 2425 feet
Length of Site - from site maps = 300 feet

$$\text{Dilution factor A-B} = \frac{300}{2(2425)} = 0.062$$

Dilution factor A-B = 0.062 indicates that as water from the stream enters the wetland east of site 5, groundwater from site 5 would be diluted 93.8 %

continued on 3 of

ATL 7/5/94



Attachment A

PROJECT Site 5 Dilution Factor	COMP. BY KTL	JOB NO. 8500.13
	CHK. BY	DATE 7/6/94

An additional Dilution Factor has been calculated for the length of stream A-C. Dilution Factor A-C represents the dilution estimated for the stream at the eastern edge of the site.

$$\text{Dilution Factor } A\text{-}C = \frac{300}{2(1725)} = 0.087$$

Dilution Factor A-C = 0.087 indicates that groundwater from the site is diluted 91.3% on the eastern edge of the site.

Recommend using Dilution Factor A-C = 0.087 for evaluation of dilution effects in the immediate vicinity of the site and Dilution Factor A-B = 0.062 for evaluation of dilution further downstream (east).

APPENDIX P

APPENDIX P

MODEL OF POTENTIAL EXPOSURES AND RISKS FOR REPRESENTATIVE WILDLIFE SPECIES TO ECPCS IN SURFACE SOILS AT SITE 17

Table P-1
Estimated Exposure from Ingestion of Maximum ECPCs in Food and Soil: Lethal Effects
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	MAXIMUM DETECTED CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
Acetone	1.012						
2-Butanone	0.23						
Toluene	0.112						
Xylenes (total)	0.006						
Benzo (b) fluoranthene	0.03	5.0E-02	1.5E-03	8.7E-03	2.6E-04	1.9E-01	
bis(2-Ethylhexyl) phthalate	0.075			5.1E-03	3.8E-04	4.8E-01	
4-Methylphenol	0.324			8.1E-01	2.6E-01		
Phenol	0.09			8.1E-01	7.3E-02		
4,4'-DDE	0.00045	1.7E+00	7.5E-04	1.0E-02	4.5E-06	1.2E+00	2.9E+00
Lead	8.3	1.8E-01	1.5E+00			2.8E-01	
Manganese	10.5	1.8E-01	1.9E+00	5.0E-02	5.3E-01	2.8E-01	
Thallium	0.31			1.1E-03	3.4E-04	1.5E+00	

ECPC = Ecological Contaminant of Potential Concern
[a] Bioaccumulation data presented in: Table K.1-1
[b] ECPC concentrations in invertebrate tissue equals the invertebrate BAF multiplied by the average soil concentration of the contaminant
[c] ECPC concentration in plant tissue equals the plant BAF multiplied by the average soil concentration of the contaminant.

Table P-1
Estimated Exposure from Ingestion of Maximum ECPCs in Food and Soil: Lethal Effects
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Rufous-sided towhee*	*Short-tailed shrew*	*Red fox*	*Great-horned owl*	*American woodcock*
Acetone	2.8E-03	9.2E-03	1.4E-02	1.6E-03	5.0E-04	1.0E-02
2-Butanone	6.4E-04	2.1E-03	3.2E-03	3.5E-04	1.1E-04	2.3E-03
Toluene	3.1E-04	1.0E-03	1.6E-03	1.7E-04	5.6E-05	1.1E-03
Xylenes (total)	1.7E-05	5.5E-05	8.5E-05	9.2E-06	3.0E-06	6.1E-05
Benzo (b) fluoranthene	1.4E-04	3.9E-04	5.9E-04	7.7E-05	3.4E-05	3.0E-04
bis(2-Ethylhexyl) phthalate	2.5E-04	7.3E-04	1.1E-03	1.8E-04	1.3E-04	7.6E-04
4-Methylphenol	3.3E-02	3.4E-02	9.0E-03	1.8E-03	1.6E-04	3.3E-03
Phenol	9.1E-03	9.4E-03	2.5E-03	5.1E-04	4.5E-05	9.1E-04
4,4'-DDE	1.2E-05	4.5E-05	8.9E-05	2.3E-05	2.1E-05	4.6E-06
Lead	4.4E-02	1.6E-01	2.8E-01	3.8E-02	1.7E-02	8.4E-02
Manganese	1.2E-01	2.6E-01	3.7E-01	5.2E-02	2.4E-02	1.1E-01
Thallium	9.0E-04	2.9E-03	4.4E-03	1.3E-03	1.3E-03	3.1E-03

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the SFF and ingestion rate, and dividing by body weight (Table 6-2)

Table P–2
Exposure Parameters and Assumptions for Representative Wildlife Species [a]
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Representative Wildlife Species		Percent Prey in Diet					Home Range (acres)	ED [b]	Site Foraging Frequency [c]	Food Ingestion Rate (kg/day)	Body Weight (kg)
		Inverts	Plants	Small Mammals	Small Birds	Soil					
Cotton mouse	(Small herb. mammal)	10%	88%	0%	0%	2%	0.147	1	1.00E+00	0.0029	0.021
Rufous–sided towhee	(Small omn. bird)	30%	65%	0%	0%	5%	1.5	1	1.00E+00	0.0071	0.039
Short–tailed shrew	(Small omn. mammal)	78%	12%	0%	0%	10%	0.96	1	1.00E+00	0.0024	0.017
Red fox	(Predatory mammal)	20%	10%	57%	10%	3%	1727	1	1.00E+00	0.24	4.69
Great–horned owl	(Predatory bird)	0%	0%	80%	19%	1%	15	1	1.00E+00	0.079	1.59
American woodcock	(Small omn. bird)	80%	10%	0%	0%	10%	80.1	1	1.00E+00	0.02	0.197

NOTES:

SITE AREA:	2.8 acres

[a] Documentation of exposure parameters presented in: Table 6–15
[b] ED = Exposure Duration (percentage of year receptor is expected to be found at study area)
[c] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0))

Table P-3
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*Rufous-sided towhee*			*Short-tailed shrew*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	2.8E-03	6.0E+02	4.7E-06	9.2E-03			1.4E-02	6.0E+02	2.4E-05
2-Butanone	6.4E-04	5.5E+02	1.2E-06	2.1E-03			3.2E-03	5.5E+02	5.9E-06
Toluene	3.1E-04	1.0E+03	3.1E-07	1.0E-03			1.6E-03	1.0E+03	1.6E-06
Xylenes (total)	1.7E-05	8.6E+02	1.9E-08	5.5E-05	2.0E+03	2.7E-08	8.5E-05	8.6E+02	9.8E-08
Benzo (b) fluoranthene	1.4E-04	2.4E+01	5.6E-06	3.9E-04			5.9E-04	2.4E+01	2.5E-05
bis(2-Ethylhexyl) phthalate	2.5E-04	1.6E+02	1.6E-06	7.3E-04			1.1E-03	1.6E+02	6.7E-06
4-Methylphenol	3.3E-02	2.2E+02	1.5E-04	3.4E-02			9.0E-03	2.2E+02	4.1E-05
Phenol	9.1E-03	2.0E+01	4.5E-04	9.4E-03			2.5E-03	2.0E+01	1.2E-04
4,4'-DDE	1.2E-05	1.4E+02	8.6E-08	4.5E-05	1.2E+02	3.8E-07	8.9E-05	1.4E+02	6.3E-07
Lead	4.4E-02	6.0E+01	7.3E-04	1.6E-01	7.5E+01	2.1E-03	2.8E-01	6.0E+01	4.7E-03
Manganese	1.2E-01	2.3E+03	5.2E-05	2.6E-01			3.7E-01	2.3E+03	1.6E-04
Thallium	9.0E-04	7.0E+00	1.3E-04	2.9E-03	4.7E+00	6.1E-04	4.4E-03	7.0E+00	6.3E-04
SUMMARY HAZARD INDEX			1.5E-03			2.7E-03			5.7E-03

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species. RTV for Benzo(a)pyrene used as a surrogate for all PAHs.

Table P-3
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Red fox*			*Great-horned owl*			*American woodcock*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	1.6E-03	6.0E+02	2.6E-06	5.0E-04			1.0E-02		
2-Butanone	3.5E-04	5.5E+02	6.5E-07	1.1E-04			2.3E-03		
Toluene	1.7E-04	1.0E+03	1.7E-07	5.6E-05			1.1E-03		
Xylenes (total)	9.2E-06	8.6E+02	1.1E-08	3.0E-06	2.0E+03	1.5E-09	6.1E-05	2.0E+03	3.0E-08
Benzo (b) fluoranthene	7.7E-05	2.4E+01	3.2E-06	3.4E-05			3.0E-04		
bis(2-Ethylhexyl) phthalate	1.8E-04	1.6E+02	1.1E-06	1.3E-04			7.6E-04		
4-Methylphenol	1.8E-03	2.2E+02	8.3E-06	1.6E-04			3.3E-03		
Phenol	5.1E-04	2.0E+01	2.5E-05	4.5E-05			9.1E-04		
4,4'-DDE	2.3E-05	1.2E+01	1.9E-06	2.1E-05	4.5E+02	4.8E-08	4.6E-06	1.2E+02	3.9E-08
Lead	3.8E-02	6.0E+01	6.3E-04	1.7E-02	7.5E+01	2.3E-04	8.4E-02	7.5E+01	1.1E-03
Manganese	5.2E-02	2.3E+03	2.3E-05	2.4E-02			1.1E-01		
Thallium	1.3E-03	7.0E+00	1.9E-04	1.3E-03	1.8E+01	7.1E-05	3.1E-03	4.7E+00	6.7E-04
SUMMARY HAZARD INDEX			8.8E-04			3.0E-04			1.8E-03

PDE = Potential Dietary Exposure (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species. RTV for Benzo(a)pyrene used as a surrogate for all PAHs.

Table P-4
Estimated Exposure from Ingestion of Maximum ECPCs in Food and Soil: Sublethal Effects
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	MAXIMUM DETECTED CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
Acetone	1.012						
2-Butanone	0.23						
Toluene	0.112						
Xylenes (total)	0.006						
Benzo (b) fluoranthene	0.03						
bis(2-Ethylhexyl) phthalate	0.075	5.0E-02	1.5E-03	8.7E-03	2.6E-04	1.9E-01	
4-Methylphenol	0.324			5.1E-03	3.8E-04	4.8E-01	
Phenol	0.09			8.1E-01	2.6E-01		
4,4'-DDE	0.00045			8.1E-01	7.3E-02		
Lead	8.3	1.7E+00	7.5E-04	1.0E-02	4.5E-06	1.2E+00	2.9E+00
Manganese	10.5	1.8E-01	1.5E+00			2.8E-01	
Thallium	0.31	1.8E-01	1.9E+00	5.0E-02	5.3E-01	2.8E-01	
				1.1E-03	3.4E-04	1.5E+00	

ECPC = Ecological Contaminant of Potential Concern
[a] Bioaccumulation data presented in: Table K.1-1
[b] ECPC concentration in invertebrate tissue equals the invertebrate BAF multiplied by the average soil concentration of the contaminant.
[c] ECPC concentration in plant tissue equals the plant BAF multiplied by the average soil concentration of the contaminant.

Table P–4
Estimated Exposure from Ingestion of Maximum ECPCs in Food and Soil: Sublethal Effects
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Rufous–sided towhee*	*Short–tailed shrew*	*Red fox*	*Great–horned owl*	*American woodcock*
Acetone	2.8E–03	9.2E–03	1.4E–02	2.5E–06	9.4E–05	3.6E–04
2–Butanone	6.4E–04	2.1E–03	3.2E–03	5.7E–07	2.1E–05	8.2E–05
Toluene	3.1E–04	1.0E–03	1.6E–03	2.8E–07	1.0E–05	4.0E–05
Xylenes (total)	1.7E–05	5.5E–05	8.5E–05	1.5E–08	5.6E–07	2.1E–06
Benzo (b) fluoranthene	1.4E–04	3.9E–04	5.9E–04	1.2E–07	6.4E–06	1.5E–05
bis(2–Ethylhexyl) phthalate	2.5E–04	7.3E–04	1.1E–03	3.0E–07	2.4E–05	2.7E–05
4–Methylphenol	3.3E–02	3.4E–02	9.0E–03	3.0E–06	3.0E–05	2.1E–04
Phenol	9.1E–03	9.4E–03	2.5E–03	8.3E–07	8.3E–06	5.8E–05
4,4'–DDE	1.2E–05	4.5E–05	8.9E–05	3.7E–08	3.9E–06	2.3E–06
Lead	4.4E–02	1.6E–01	2.8E–01	6.1E–05	3.2E–03	7.2E–03
Manganese	1.2E–01	2.6E–01	3.7E–01	8.5E–05	4.6E–03	9.3E–03
Thallium	9.0E–04	2.9E–03	4.4E–03	2.1E–06	2.4E–04	1.1E–04

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the SFF and ingestion rate, and dividing by body weight (Table 6–2).

Table P-5
Exposure Parameters and Assumptions for Representative Wildlife Species [a]
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Representative Wildlife Species		Percent Prey in Diet					Home Range (acres)	ED [b]	Site Foraging Frequency [c]	Food Ingestion Rate (kg/day)	Body Weight (kg)
		Inverts	Plants	Small Mammals	Small Birds	Soil					
Cotton mouse	(Small herb. mammal)	10%	88%	0%	0%	2%	0.147	1	1.00E+00	0.0029	0.021
Rufous-sided towhee	(Small omn. bird)	30%	65%	0%	0%	5%	1.5	1	1.00E+00	0.0071	0.039
Short-tailed shrew	(Small omn. mammal)	78%	12%	0%	0%	10%	0.96	1	1.00E+00	0.0024	0.017
Red fox	(Predatory mammal)	20%	10%	57%	10%	3%	1727	1	1.62E-03	0.24	4.69
Great-horned owl	(Predatory bird)	0%	0%	80%	19%	1%	15	1	1.87E-01	0.079	1.59
American woodcock	(Small omn. bird)	80%	10%	0%	0%	10%	80.1	1	3.50E-02	0.02	0.197

NOTES:

SITE AREA:	2.8 acres

[a] Documentation of exposure parameters presented in: Table 6-15
[b] ED = Exposure Duration (percentage of year receptor is expected to be found at study area)
[c] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0))

Table P-6
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*Rufous-sided towhee*			*Short-tailed shrew*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	2.8E-03	2.7E+05	1.0E-08	9.2E-03			1.4E-02	2.7E+05	5.2E-08
2-Butanone	6.4E-04	1.7E+02	3.7E-06	2.1E-03			3.2E-03	1.7E+02	1.9E-05
Toluene	3.1E-04	7.6E+01	4.1E-06	1.0E-03			1.6E-03	7.6E+01	2.1E-05
Xylenes (total)	1.7E-05	5.0E+02	3.3E-08	5.5E-05			8.5E-05	5.0E+02	1.7E-07
Benzo (b) fluoranthene	1.4E-04	1.0E+01	1.4E-05	3.9E-04			5.9E-04	1.0E+01	5.9E-05
bis(2-Ethylhexyl) phthalate	2.5E-04	3.5E+01	7.3E-06	7.3E-04			1.1E-03	3.5E+01	3.0E-05
4-Methylphenol	3.3E-02	5.0E+01	6.5E-04	3.4E-02			9.0E-03	5.0E+01	1.8E-04
Phenol	9.1E-03	1.2E+02	7.6E-05	9.4E-03			2.5E-03	1.2E+02	2.1E-05
4,4'-DDE	1.2E-05	2.0E-01	6.1E-05	4.5E-05	5.8E-01	7.8E-05	8.9E-05	2.0E-01	4.4E-04
Lead	4.4E-02	2.5E+00	1.8E-02	1.6E-01	6.3E+00	2.5E-02	2.8E-01	2.5E+00	1.1E-01
Manganese	1.2E-01	1.4E+02	8.5E-04	2.6E-01			3.7E-01	1.4E+02	2.6E-03
Thallium	9.0E-04	7.0E-01	1.3E-03	2.9E-03			4.4E-03	7.0E-01	6.3E-03
SUMMARY HAZARD INDEX			2.0E-02			2.5E-02			1.2E-01

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = lowest reported LOAEL for closest related species. Value for Benzo(a)pyrene used as a surrogate for all PAHs.

Table P-6
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Soil
Site 17
Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Red fox*			*Great-horned owl*			*American woodcock*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Acetone	2.5E-06	2.7E+05	9.2E-12	9.4E-05			3.6E-04		
2-Butanone	5.7E-07	1.7E+02	3.3E-09	2.1E-05			8.2E-05		
Toluene	2.8E-07	7.6E+01	3.7E-09	1.0E-05			4.0E-05		
Xylenes (total)	1.5E-08	5.0E+02	3.0E-11	5.6E-07			2.1E-06		
Benzo (b) fluoranthene	1.2E-07	1.0E+01	1.2E-08	6.4E-06			1.5E-05		
bis(2-Ethylhexyl) phthalate	3.0E-07	3.5E+01	8.4E-09	2.4E-05			2.7E-05		
4-Methylphenol	3.0E-06	5.0E+01	5.9E-08	3.0E-05			2.1E-04		
Phenol	8.3E-07	1.2E+02	6.9E-09	8.3E-06			5.8E-05		
4,4'-DDE	3.7E-08	3.5E+03	1.0E-11	3.9E-06	5.8E-01	6.8E-06	2.3E-06	5.8E-01	3.9E-06
Lead	6.1E-05	2.5E+00	2.4E-05	3.2E-03	5.0E+01	6.4E-05	7.2E-03	6.3E+00	1.2E-03
Manganese	8.5E-05	1.4E+02	6.0E-07	4.6E-03			9.3E-03		
Thallium	2.1E-06	7.0E-01	3.0E-06	2.4E-04			1.1E-04		
SUMMARY HAZARD INDEX			2.8E-05			7.0E-05			1.2E-03

PDE = Potential Dietary Exposure (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = lowest reported LOAEL for closest related species. Value for Benzo(a)pyrene used as a surrogate for all PAHs.

APPENDIX Q

APPENDIX Q

REGRESSION APPENDIX

APPENDIX Q

Statistical Analysis of Relationship Between Contaminant Concentrations and Observed Biological Effects

A series of regression analyses were performed to evaluate potential correlations between biological effects noted in the bioassays (dependent variable, or y) and chemical concentrations (independent variable, or x) for selected analytes (i.e., those analytes which appear to be present at higher concentrations in samples where effects were observed). At Site 5, regression analyses were performed for sediment concentrations versus daphnid survival, daphnid reproduction, and amphipod mortality. Additionally, analyses were performed for surface soil concentrations versus lettuce seed germination and earthworm weight gain. At Site 17, regression analyses were performed for surface soil concentrations versus lettuce seed germination and earthworm weight gain. Correlation coefficients (R^2 values) are summarized in Table Q-1 for each of the regression analyses performed. Results of these analyses are discussed below.

Site 5

Sediment. Daphnid survival and reproduction and amphipod mortality were regressed against DDT_R[1], Aroclor 1260, TPH, TOC, aluminum, barium, and vanadium concentrations in sediment at Site 5.

Relatively high correlation coefficients were associated with the regression analysis of daphnid survival versus inorganics and TOC. When daphnid survival was regressed against vanadium, TOC, aluminum, and barium, the resulting R^2 values were 0.77, 0.76, 0.75, and 0.75, respectively. No other correlations exist between daphnid survival or reproduction, and DDT_R, Aroclor 1260, and TPH.
Correlation coefficients for regression equations between amphipod mortality and TPH, DDT_R, and Aroclor 1260 were also relatively high (R^2 values = 0.70, 0.68 and 0.65, respectively). R^2 values for all other regression analyses were well below 0.50, indicating little correlation between the concentrations of DDT_R, Aroclor 1260, TPH, TOC, aluminum, barium, or vanadium and the observed biological effects.

Surface Soil. Lettuce seed germination and earthworm weight gain were regressed against TPH, Aroclor 1260, and lead concentrations in surface soil at Site 5.

A correlation between lettuce seed germination and both TPH and PCB concentrations resulted from the regression analyses, with R^2 values of 0.94 and 0.86, respectively. However, upon examination of the data set, it was apparent that the TPH concentration of 28000 mg/kg reported for CF5-SS-4 is an outlier (i.e., a hot spot), as was the Aroclor concentration of 2.2 at this location. When these noticeably higher data points were removed from the data set, the R^2

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[1] DDT_R = the sum of DDT + DDE + DDD concentrations in a sample.

values dropped to 0.01 and 0.05, respectively, indicating that when the remainder of the data are considered separately from this apparent hot spot, there is no noticeable correlation between either TPH or Aroclor 1260 and the observed biological effects.

The R^2 value for lettuce seed germination versus lead, and for all of the regression analyses on earthworm weight gain, were less than 0.10, indicating very little relationship between the concentrations these chemicals on the observed biological effects.

Site 17

Surface Soil. Lettuce seed germination and earthworm weight gain were regressed against TPH and lead concentrations in surface soil at Site 17.

R^2 values for all of the regression analyses were 0.14 or lower, indicating little to no relationship between the surface soil concentrations of either TPH or lead and the observed biological effects.

Table Q-1
Correlation Coefficients (R^2 Values) for Regression Analyses Between Contaminant Concentrations and Observed Biological Effects

Contaminant	Biological Effect	R^2 Value	Correlation (+/-)
Site 5 Sediment			
TPH	Daphnid Survival	0.35	-
TPH	Daphnid Reproduction	0.06	-
TPH	Amphipod Mortality	0.70	+
DDT_R	Daphnid Survival	0.38	-
DDT_R	Daphnid Reproduction	0.09	-
DDT_R	Amphipod Mortality	0.68	+
Aroclor 1260	Daphnid Survival	0.31	-
Aroclor 1260	Daphnid Reproduction	0.27	-
Aroclor 1260	Amphipod Mortality	0.65	+
TOC	Daphnid Survival	0.76	-
TOC	Daphnid Reproduction	0.34	-
TOC	Amphipod Mortality	0.0003	+
Aluminum	Daphnid Survival	0.75	-
Aluminum	Daphnid Reproduction	0.36	-
Aluminum	Amphipod Mortality	0.00007	-
Barium	Daphnid Survival	0.75	-
Barium	Daphnid Reproduction	0.36	-
Barium	Amphipod Mortality	0.00003	-
Vanadium	Daphnid Survival	0.77	-
Vanadium	Daphnid Reproduction	0.42	-
Vanadium	Amphipod Mortality	0.0011	+
Site 5 Surface Soil			
TPH	Lettuce Seed Germination	0.94/0.01 (a)	-/+
TPH	Earthworm Weight Gain	0.004	-
Aroclor 1260	Lettuce Seed Germination	0.86/0.05 (a)	-/-
Aroclor 1260	Earthworm Weight Gain	0.01	+

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Contaminant	Biological Effect	R^2 Value	Correlation (+/-)
Site 5 Surface Soil (cont'd)			
Lead	Lettuce Seed Germination	0.04	+
Lead	Earthworm Weight Gain	0.008	+
Site 17 Surface Soil			
TPH	Lettuce Seed Germination	0.11	-
TPH	Earthworm Weight Gain	0.14	+
Lead	Lettuce Seed Germination	0.04	-
Lead	Earthworm Weight Gain	0.01	-

(a) The first of this pair of values is the R2 resulting from inclusion of all of the data points. The second value is the R^2 resulting from exclusion of an apparent hot spot for TPH and Aroclor 1260 at CF5-SS-4.

SITE 5 SED

Daphnid Survival (y)	DDT (mg/kg) (x)
80	0.051
100	0.0069
80	0.0203
60	0.0285
100	0.0066

Regression Output:

Constant		96.65
Std Err of Y Est		15.27
R Squared		0.38
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	-558	
Std Err of Coef.	416	

Daphnid Survival (y)	PCB (mg/kg) (x)
80	0.33
100	0.07
80	0.14
60	0.19
100	0.088

Regression Output:

Constant		98.74
Std Err of Y Est		16.00
R Squared		0.31
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	-90	
Std Err of Coef.	77	

Daphnid Reprod. (y)	DDT (mg/kg) (x)
12	0.051
17	0.0069
9	0.0203
8	0.0285
11	0.0066

Regression Output:

Constant		12.73
Std Err of Y Est		3.85
R Squared		0.09
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	-59	
Std Err of Coef.	105	

Daphnid Reprod. (y)	PCB (mg/kg) (x)
12	0.33
17	0.07
9	0.14
8	0.19
11	0.088

Regression Output:

Constant		14.10
Std Err of Y Est		3.47
R Squared		0.27
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	-179	
Std Err of Coef.	172	

Amphipod Mortality (y)	DDT (mg/kg) (x)
76	0.051
0	0.0069
64	0.0203
29	0.0285
10	0.0066

Regression Output:

Constant		2.01
Std Err of Y Est		21.65
R Squared		0.68
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	1491	
Std Err of Coef.	589	

Amphipod Mortality (y)	PCB (mg/kg) (x)
76	0.33
0	0.07
64	0.14
29	0.19
10	0.088

Regression Output:

Constant		-6.20
Std Err of Y Est		22.68
R Squared		0.65
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	257	
Std Err of Coef.	109	

Daphnid Survival (y)	TPH (mg/kg) (x)
80	1450
100	170
80	550
60	717
100	23.3

Regression Output:

Constant		94.26
Std Err of Y Est		15.60
R Squared		0.35
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.02	
Std Err of Coef.	0.01	

Daphnid Reprod. (y)	TPH (mg/kg) (x)
12	1450
17	170
9	550
8	717
11	23.3

Regression Output:

Constant		12.30
Std Err of Y Est		3.92
R Squared		0.06
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.0016	
Std Err of Coef.	0.0035	

Amphipod Mortality (y)	TPH (mg/kg) (x)	
76	1450	~~#~~ 1
0	170	2
64	550	3
29	717	4
10	23.3	5

Regression Output:

Constant		6.92
Std Err of Y Est		20.95
R Squared		0.70
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	0.05	
Std Err of Coef.	0.02	

Daphnid Survival (y)	TOC (mg/kg) (x)
80	17100
100	6410
80	13900
60	97600
100	3970

Regression Output:

Constant		94.30
Std Err of Y Est		9.44
R Squared		0.76
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.0004	
Std Err of Coef.	0.0001	

Daphnid Reprod. (y)	TOC (mg/kg) (x)
12	17100
17	6410
9	13900
8	97600
11	3970

Regression Output:

Constant		12.84
Std Err of Y Est		3.30
R Squared		0.34
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.0001	
Std Err of Coef.	0.00004	

Amphipod Mortality (y)	TOC (mg/kg) (x)
76	17100
0	6410
64	13900
29	97600
10	3970

Regression Output:

Constant		35.42
Std Err of Y Est		38.31
R Squared		0.0003
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	0.000014	
Std Err of Coef.	0.000486	

Daphnid Survival (y)	Aluminum (mg/kg) (x)
80	1210
100	693
80	1970
60	11000
100	366

Regression Output:

Constant		93.83
Std Err of Y Est		9.69
R Squared		0.75
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.003	
Std Err of Coef.	0.001	

Daphnid Reprod. (y)	Aluminum (mg/kg) (x)
12	1210
17	693
9	1970
8	11000
11	366

Regression Output:

Constant		12.83
Std Err of Y Est		3.24
R Squared		0.36
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.0005	
Std Err of Coef.	0.0004	

Amphipod Mortality (y)	Aluminum (mg/kg) (x)
76	1210
0	693
64	1970
29	11000
10	366

Regression Output:

Constant		35.98
Std Err of Y Est		38.32
R Squared		0.00007
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.00006	
Std Err of Coef.	0.004	

Daphnid Survival (y)	Barium (mg/kg) (x)
80	7.2
100	4.7
80	11.2
60	55.4
100	3

Regression Output:

Constant		94.70
Std Err of Y Est		9.65
R Squared		0.75
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.66	
Std Err of Coef.	0.22	

Daphnid Reprod. (y)	Barium (mg/kg) (x)
12	7.2
17	4.7
9	11.2
8	55.4
11	3

Regression Output:

Constant		12.95
Std Err of Y Est		3.24
R Squared		0.36
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.10	
Std Err of Coef.	0.07	

Amphipod Mortality (y)	Barium (mg/kg) (x)
76	7.2
0	4.7
64	11.2
29	55.4
10	3

Regression Output:

Constant		35.94
Std Err of Y Est		38.32
R Squared		0.00003
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.009	
Std Err of Coef.	0.87	

Daphnid Survival (y)	Vanadium (mg/kg) (x)
80	1.6
100	1.5
80	3.5
60	9.3
100	1.2

Regression Output:

Constant		98.74
Std Err of Y Est		9.25
R Squared		0.77
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−4.31	
Std Err of Coef.	1.36	

Daphnid Reprod. (y)	Vanadium (mg/kg) (x)
12	1.6
17	1.5
9	3.5
8	9.3
11	1.2

Regression Output:

Constant		13.69
Std Err of Y Est		3.07
R Squared		0.42
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	−0.67	
Std Err of Coef.	0.45	

Amphipod Mortality (y)	Vanadium (mg/kg) (x)
76	1.6
0	1.5
64	3.5
29	9.3
10	1.2

Regression Output:

Constant		34.69
Std Err of Y Est		38.30
R Squared		0.0011
No. of Observations		5
Degrees of Freedom		3
X Coefficient(s)	0.33	
Std Err of Coef.	5.62	

SITE 5 SSOIL

Lettuce seed Germination (y)		TPH (mg/kg) (x)
88		51
22	*	28000
92		17
89		51
90		260
79	*	28
91		54
92		44
83		170
94		605
93		38
84		390
92		13
91		33
83		29

Regression Output:

Constant		88.94
Std Err of Y Est		4.64
R Squared		0.94
No. of Observations		15
Degrees of Freedom		13
X Coefficient(s)	−0.00239	
Std Err of Coef.	0.00017	

Lettuce seed Germination (y)	TPH (mg/kg) (x)
88	51
92	17
89	51
90	260
79 *	28
91	54
92	44
83	170
94	605
93	38
84	390
92	13
91	33
83	29

Regression Output:

Constant		88.33
Std Err of Y Est		4.75
R Squared		0.01
No. of Observations		14
Degrees of Freedom		12
X Coefficient(s)	0.00247	
Std Err of Coef.	0.00749	

run without outlier TPH conc. of 28,000 mg/kg

Lettuce Seed Germination (y)	Aroclor-1260 (mg/kg) (x)
88	0.11
22 *	2.2
92	0.037
89	0.39
90	0.66
79 *	0.41
91	0.087
92	0.019
83	0.02
94	0.0485
93	0.026
84	0.058
92	0.022
91	0.021
83	0.025

Regression Output:

Constant		92.24
Std Err of Y Est		6.80
R Squared		0.86
No. of Observations		15
Degrees of Freedom		13
X Coefficient(s)	-29.17042143	
Std Err of Coef.	3.2094885964	

Lettuce Seed Germination (y)	Aroclor-1260 (mg/kg) (x)
88	0.11
92	0.037
89	0.39
90	0.66
79	0.41
91	0.087
92	0.019
83	0.02
94	0.0485
93	0.026
84	0.058
92	0.022
91	0.021
83	0.025

Regression Output:

Constant	89.34
Std Err of Y Est	4.65
R Squared	0.05
No. of Observations	14
Degrees of Freedom	12
X Coefficient(s)	-5.0586464589
Std Err of Coef.	6.4635575275

run without outlier Aroclor 1260 Conc. of 2.2 mg/kg

Lettuce Seed Germination (y)	Lead (mg/kg) (x)
88	7.6
22 *	9.5
92	10.6
89	47.4
90	18.2
79 *	88.9
91	87
92	34.1
83	7.7
94	87.65
93	11.6
84	36.3
92	6.3
91	40.7
83	45.05

Regression Output:

Constant		80.17
Std Err of Y Est		18.09
R Squared		0.04
No. of Observations		15
Degrees of Freedom		13
X Coefficient(s)	0.11	
Std Err of Coef.	0.16	

Worm Weight Change (y)	TPH (mg/kg) (x)
−6.21	51
1.98	17
−6.77	51
10.83	260
−1.58	28
6.25	54
−3.31	44
−5.67	170
0.57	605
8.13	38
−1.77	390
3.46	13
3.85	33
11.05	29

Sample CF5−SS−4 deleted b/c worm wt. not availabl

Regression Output:

Constant		1.75
Std Err of Y Est		6.30
R Squared		0.004
No. of Observations		14
Degrees of Freedom		12
X Coefficient(s)	−0.002	
Std Err of Coef.	0.010	

Worm Weight Change (y)	Aroclor-1260 (mg/kg) (x)
-6.21	0.11
1.98	0.037
-6.77	0.39
10.83	0.66
-1.58	0.41
6.25	0.087
-3.31	0.019
-5.67	0.02
0.57	0.0485
8.13	0.026
-1.77	0.058
3.46	0.022
3.85	0.021
11.05	0.025

CF5-SS-4 deleted b/c worm wt. not available

Regression Output:

Constant		1.14
Std Err of Y Est		6.29
R Squared		0.01
No. of Observations		14
Degrees of Freedom		12
X Coefficient(s)	2.53	
Std Err of Coef.	8.73	

Worm Weight Change (y)	Lead (mg/kg) (x)
−6.21	7.6
1.98	10.6
−6.77	47.4
10.83	18.2
−1.58	88.9
6.25	87
−3.31	34.1
−5.67	7.7
0.57	87.65
8.13	11.6
−1.77	36.3
3.46	6.3
3.85	40.7
11.05	45.05

CF5−SS−4 deleted b/c worm wt. not available

Regression Output:

Constant	1.28
Std Err of Y Est	6.31
R Squared	0.0008
No. of Observations	14
Degrees of Freedom	12
X Coefficient(s)	0.01
Std Err of Coef.	0.06

SITE 17 SOIL

Worm Weight Change (y)	Lead (mg/kg) (x)
11.67	2.4
2.79	5.8
30.9	6.4
0.77	16.8
5.96	6.2
28.1	10.7
−4.19	7.3

Regression Output:

Constant	13.46
Std Err of Y Est	14.85
R Squared	0.01
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	−0.33
Std Err of Coef.	1.32

Worm Weight Change (y)	TPH (mg/kg) (x)
11.67	17
2.79	170
30.9	210
0.77	10
5.96	20
28.1	15
−4.19	100

Regression Output:

Constant	8.27
Std Err of Y Est	14.63
R Squared	0.04
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	0.03
Std Err of Coef.	0.07

Lettuce Seed Germination (y)	Lead (mg/kg) (x)
87	2.4
93	5.8
59 •	6.4
69 •	16.8
94	6.2
88	10.7
93	7.3

Regression Output:

Constant	92.18
Std Err of Y Est	13.96
R Squared	0.14
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	−1.12
Std Err of Coef.	1.24

Lettuce Seed Germination (y)	TPH (mg/kg) (x)
87	17
93	170
59 *	210
69 *	10
94	20
88	15
93	100

Regression Output:

Constant	87.47
Std Err of Y Est	14.22
R Squared	0.11
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	−0.05
Std Err of Coef.	0.07

APPENDIX R

APPENDIX R

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, COMPLETENESS SUMMARY REPORT

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, COMPLETENESS SUMMARY REPORT
OPERABLE UNIT 2
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

FINAL VERSION

JULY 1994

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Glossary

PARCC	Precision, Accuracy, Representativeness, Comparability, Completeness
NAS	Naval Air Station
OU	Operable Unit
RI	Remedial Investigation
QA/QC	Quality Assurance / Quality Control
USEPA	United States Environmental Protection Agency
DQO	Data Quality Objectives
SDG	Sample Delivery Group
LCS/LCSD	Laboratory Control Sample / Laboratory Control Sample Duplicate
MS/MSD	Matrix Spike / Matrix Spike Duplicate
IDL	Instrument Detection Limit
CRQL	Contract Required Quantitation Limit
CRDL	Contract Required Detection Limit
RPD	Relative Percent Difference
ASTM	American Society for Testing and Materials
VOC	Volatile Organic Compound
SVOC	Semivolatile Organic Compound
PCB	Polychlorinated Biphenyl
ug/kg	Micrograms per Kilogram
mg/kg	Milligrams per Kilogram
%R	Percent Recovery
RRF	Relative Response Factor
%RSD	Percent Relative Standard Deviation
%D	Percent Difference
ug/l	Micrograms per Liter

APPENDIX A

DATA QA/QC TABLES

PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY,
COMPLETENESS SUMMARY REPORT
OPERABLE UNIT TWO
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

1.0 INTRODUCTION

A Remedial Investigation (RI) was conducted at Operable Unit (OU) 2 on the Naval Air Station Cecil Field. This part of the RI included the collection and analyses of 381 environmental and quality control (QC) samples. Environmental samples were analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticide and polychlorinated biphenyls, and metals. These samples were analyzed in accordance with EPA's contract laboratory program 1990 statement of work. The analytical data were evaluated for quality assurance and quality control (QA/QC) based on the following U.S. Environmental Protection Agency (USEPA) guidance documents: *National Functional Guidelines for Organic Data Review*, June 1991 and the *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, July 1988 (functional guidelines).

Wadsworth/Alert Laboratories of Canton, Ohio performed 40,736 water, soil, sediment, and quality control chemical analyses. The samples were grouped into sample delivery groups (SDGs) of up to 20 field samples received by the laboratory over a period of up to 14 calendar days. The environmental samples are associated with QA/QC samples designed to document the data quality of the entire SDG or a sub-group of samples within an SDG. Table 1-1 is a cross reference table listing each OU-2 sample, its associated SDG, and the laboratory that performed the analysis.

This report summarizes the QA/QC evaluation of the data according to precision, accuracy, representativeness, completeness, and comparability (PARCC) relative to the project data quality objectives (DQOs). This report provides a quantitative and qualitative assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability.

The PARCC summary report evaluates and summarizes the results of QA/QC data validation for the entire sampling program. Each analytical fraction has a separate section for each of the PARCC criteria. These sections interpret specific QC deviations and their effects on both individual data points and the analyses as a whole. Variances from standard analytical methods are given in Section 6. Section 7 presents a summary of the PARCC criteria by comparing quantitative parameters with acceptability criteria defined in the project DQO's. Qualitative PARCC criteria are also summarized in this section. Section 8 displays data QC tables summarizing the samples analyzed, all data outside functional guidelines QC criteria,

rejected data, pesticide instumental performance information, and concentrations of metals analytes above four times matrix spiking levels.

Precision and Accuracy of Environmental Data

Environmental data quality depends on sample collection procedures, analytical methods and instrumentation, documentation and sample matrix properties. Both sampling procedures and laboratory analysis contain potential sources of uncertainty, error, or bias that affect the overall quality of a measurement. Sample errors may result from incomplete equipment decontamination, inappropriate sampling techniques, homogenization or non-homogenization of samples, improper filtering, and improper preservation. The accuracy of analytical results is dependent on selecting appropriate analytical methods, maintaining equipment properly, and selecting effective laboratory software. The sample matrix also is an important factor in the ability to obtain precise and accurate results.

Environmental and laboratory QA/QC samples assess the effects of sampling procedures and evaluate laboratory derived contaminations, laboratory performance, and matrix effects. QA/QC samples include: trip blanks, equipment rinsate blanks, method blanks, laboratory control samples (LCSs), surrogate spikes, matrix spike/matrix spike duplicates (MS/MSDs), laboratory duplicates, and field duplicates.

Before conducting the PARCC evaluation, the analytical data were validated according to the functional guidelines for organic and inorganic data review (USEPA, 1991; 1988, respectively). Samples not meeting functional guideline acceptance criteria were qualified with a flag, an abbreviation indicating a problem with the data. The following are flags used in data validation.

J <u>Estimated</u> The associated numerical value is an estimated quantity. The analyte was detected but the reported value may not be accurate or precise. The "J" qualification indicates the data fell outside QC limits, but the exceedance was not sufficient to cause rejection of the data. The "J" qualifier is also applied to sample results that are above the method instrument limit (IDL), but are less than the contract required quantitation limit (CRQL) for organic compounds or contract required detection limit (CRDL) for inorganic compounds. It also designates imprecision in low-level inorganic results.

R <u>Rejected</u> The data is unusable (the compound or analyte may or may not be present). Use of the "R" qualifier indicates a significant variance from functional guideline acceptance criteria. Either resampling or reanalysis is necessary to determine the presence or absence of the rejected analyte.

U <u>Undetected</u> Analyses were performed for the compound or analyte, but it was not detected. The associated numerical value is the CRQL for organic compound analyses and the CRDL for inorganic analyses. The "U" designation is also applied to suspected blank contaminations. The "U" flag is used to qualify any result detected in an environ-

mental sample at a concentration less than 10 times the value of the concentration in any associated blank for common laboratory contaminants and less than 5 times the concentration in any associated blank for all other analytes.

UJ Estimated/Undetected Analyses were performed for the compound or analyte, but it was not detected and the sample quantitation or detection limit is an estimated quantity due to poor accuracy or precision. This qualification is also used to flag possible false negative results in the case where low bias in the analytical system is indicated by low surrogate, internal standard, or other spike recovery.

Once the data are reviewed and qualified according to the functional guidelines, the data set is then evaluated using PARCC criteria. PARCC criteria provide an evaluation of overall data useability. The following is a discussion of PARCC criteria as related to the project DQOs.

Precision is a measure of the agreement or reproducibility of analytical results under a given set of conditions. It is a quantity that cannot be measured directly, but is calculated from percent recovery data. Precision is expressed as the relative percent difference (RPD):

$$RPD = ((D1-D2)/(1/2\ (D1+D2))) \times 100$$

Where D1 and D2 are the reported concentrations for sample and duplicate analyses. Precision is primarily assessed by calculating an RPD from the percent recoveries of the spiked compounds for each sample in the MS/MSD pair. In the absence of an MS/MSD pair, two LCSs are spiked and analyzed in each analytical SDG as an alternative means of assessing precision. An additional measure of sampling precision was obtained by collecting and analyzing field duplicate samples, which were compared using RPD calculations and other precision evaluation criteria.

MS and MSD samples, consisting of split organic samples usually collected in separate containers during the field sampling event, are spiked by the laboratory with target analytes prior to preparation and analysis. These samples measure the overall efficiency of the analytical method in recovering target analytes from an environmental matrix. An LCS is similar to an MS/MSD sample in that the LCS is spiked with the same target analytes prior to preparation and analysis. However, the LCS is prepared using a controlled interference-free matrix instead of a field sample aliquot. Laboratory reagent water is used to prepare aqueous LCS. Non-aqueous LCSs are prepared using media approved by the American Society for Testing and Materials (ASTM) for their homogeneity. The LCS measures laboratory efficiency in recovering target analytes from either a solid or aqueous matrix in the absence of matrix interferences.

In inorganics analysis, one matrix spike sample is analyzed accompanied by an unspiked laboratory duplicate. The data reviewer compares the reported results of the original analysis and the laboratory duplicate, then calculates RPDs, which are used to assess laboratory precision.

Laboratory and field sampling precision are further evaluated by calculating RPDs for field sample duplicate pairs. The sampler collects two field samples at the same location and under identically controlled conditions. The laboratory then analyzes the samples under identical conditions. With the exception of volatile organic compound (VOC) samples, field duplicate sample pairs are homogenized in the field before being placed in separate sample containers. VOC field duplicate sample pairs are discrete samples collected at the same time.

Possible causes of poor precision include sample heterogeneity, improper sample collection or handling, inconsistent sample preparation, and improper instrument use. Field duplicate RPDs are evaluated only when a compound is detected above the CRQL or CRDL, resulting in fewer RPD data pairs available for evaluation as compared to spike samples such as LCS or MS/MSD. The information obtained from field duplicate samples is of substantial value because the samples may not be affected by problems in the analytical system associated with the spiking of a sample matrix (particularly solid matrices).

An RPD outside the numerical QC limit in either MS/MSD samples or LCS duplicates indicates imprecision. Imprecision is the variance in the consistency with which the laboratory arrives at a particular reported result. Thus, the actual analyte concentration may be higher or lower than the reported result.

Accuracy is a measure of the agreement of an experimental determination and the true value of the parameter being measured. It is used to identify bias in a given measurement system. Recoveries outside acceptable QC limits may be caused by factors such as instrumentation, analyst error, or matrix interference. Accuracy is assessed through the analysis of MS, MSD, LCS, and samples containing surrogate spikes. Surrogate spikes are either isotopically labeled compounds or compounds that are not typically detected in the samples. Surrogate spikes are added to every blank, environmental sample, MS/MSD, and standard, for VOC, semivolatile organics (SVOC), pesticide, and polychlorinated biphenyl (PCB) analyses. Accuracy of inorganic analyses is determined using the percent recoveries of MS and LCS analyses alone.

Percent recovery (%R) is calculated using the following equation:

$$\%R = ((A-B)/C) \times 100$$

where A = measured concentration in the spiked sample,
B = measured concentration of the spike compound in the unspiked sample, and
C = concentration of the spike.

The percent recovery of each analyte spiked in MS/MSD samples, LCS samples, and surrogate compounds added to environmental samples is compared with the acceptance criteria specified by the functional guidelines (USEPA, 1991; 1988, respectively). Spike recoveries outside the acceptable QC accuracy limits provide an indication of bias, where the reported data may overestimate or underestimate the actual concentration of compounds detected or quantitation limits reported for environmental samples.

Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population. It is evaluated by reviewing the QC results of blank samples. Positive detections of compounds in the blank samples identify compounds that may have been introduced into the samples during sample collection, transport, preparation, or analysis.

The QA/QC blanks collected and analyzed for organic analysis are: method blanks, equipment rinsate blanks, and trip blanks. A method blank is a laboratory grade water or solid matrix that contains the method reagents and has undergone the same preparation and analysis as the environmental samples. The method blank provides a measure of the combined contamination derived from the laboratory source water, glassware, instruments, reagents, and sample preparation steps. Method blanks are prepared for each sample of a similar matrix extracted by a similar method at a similar concentration level.

Equipment rinsate blanks consist of analyte-free water poured over or through the sample collection equipment. The water is collected in a sample container for laboratory analysis. These blanks are collected after the sampling equipment is decontaminated, and measure efficiency of the decontamination procedure. Equipment rinsate blanks were collected and analyzed for all target analytes.

Trip blanks are blanks used to identify possible volatile organics contamination introduced into the sample during transport. A trip blank is a sample bottle filled in the laboratory with reagent-grade water and preserved to a pH less than 2 with hydrochloric acid. It is transported to the site, stored with the sample containers, and returned unopened to the laboratory for analysis. Trip blanks were included in each cooler containing VOC samples.

In inorganics analysis, equipment or rinsate blanks, preparation blanks, and initial and continuing calibration blanks measure analyte artifacts and baseline shift. A preparation blank is a laboratory grade water or solid matrix that contains all the reagents and is carried through the sample preparation process. A preparation blank is prepared and analyzed with each inorganic SDG preparation assess contamination from laboratory reagents, glassware, source water, and preparation procedures.

Initial and continuing calibration blanks consist of acidified laboratory grade water that is injected at the beginning and at a regular frequency during each 12 - hour sample analysis run. These blanks estimate residual contaminants from the previous sample or standards analysis and measure baseline shifts that commonly occur in emission and absorption spectroscopies.

Contaminants found in both the environmental sample and a blank sample are assumed to be laboratory artifacts if the concentaration in the environmental samle is less than 5 times the blank value for regular target analytes or 10 times the blank value common laboratory contaminants.

Comparability is a qualitative expression of the confidence with which one data set may be compared to another. It provides an assessment of the equivalence of the analytical results to data obtained from other analyses. It is important that data sets be comparable if they are used in conjunction with other data sets. The factors affecting comparability include the following: sample collection and handling techniques, matrix type, and analytical method. If these aspects of sampling and analysis are carried out according to standard analytical procedures, the data are considered comparable. Comparability is also dependent upon other PARCC criteria, because only when precision, accuracy, and representativeness are known can data sets be compared with confidence.

Completeness is defined as the percentage of acceptable measurements compared to the total number of measurements made. Completeness is evaluated to determine if an acceptable amount of useable data were obtained so that a valid scientific site assessment can be completed. Completeness equals the total number of analytes for each fraction minus the total number of rejected analytes divided by the total number of analytes multiplied by 100. As specified in the project DQOs, the goal for completeness for target analytes in each analytical fraction is 96 percent.

Percent completeness is calculated using the following equation:

$$\%C = ((T - R)/T) \times 100$$

where
% C = percent completeness,
T = total number of analytes, and
R = total number of rejected analytes.

The following sections present a review of QC data for each analytical method.

2.0 VOLATILE ORGANIC COMPOUNDS

A total of 275 samples were analyzed for VOCs. The samples were divided into 16 separate SDGs. This chapter discusses the QA/QC supporting documentation as defined by the PARCC criteria and evaluated based on the DQOs.

2.1 Precision

MS/MSD and field duplicate samples were used to assess precision. MS/MSD samples were analyzed in all SDGs except WA012. Both water and soil MS/MSDs were analyzed in SDG WA009. Only soil/sediment MS/MSDs were analyzed in SDGs WA003, WA005, WA006, WA007, WA008, WA016, WA017, WA018 and WA019 as the SDGs consisted of soil samples only. Only water MS/MSDs were analyzed in SDGs WA010, WA011, WA013, WA014, and WA015 as the SDGs consisted of water samples only.

SDGs WA005, WA007, WA009, WA010, WA011, WA013, WA014, WA015, WA016, WA017, WA018, and WA019 contained field sample duplicate pairs, which provided an additional measure of precision. SDGs WA003, WA006, WA008, and WA012 did not contain field sample duplicate pairs. SDGs with duplicate sample pairs were evaluated for precision with the understanding that these results may not be representative of concentrations found in the other samples within the SDG.

2.1.1 MS/MSD Samples

The functional guidelines establishes RPD QC limits for MS/MSD samples as follows:

Compound	Soil RPD	Water RPD
1,1-Dichloroethene	22	14
Trichloroethene	24	14
Benzene	21	11
Toluene	21	13
Chlorobenzene	21	13

Non-compiant MS/MSD results for all SDGs and analytical fractions are presented in Table 2-1. The only VOC RPD exceedances noted were the following:

SDG No.	Compound	Matrix	RPD	RPD Limit
WA011	Toluene	Water	92	13
	Benzene	Water	21	11
WA014	Toluene	Water	22	13

SDG No.	Compound	Matrix	RPD	RPD Limit
WA014	Benzene	Water	12	11

These results represent a moderate lack of precision in the positive results for the water samples in the two SDGs. Because precision is directly proportional to the reported result, positive results are affected more than negative results.

2.1.2 Duplicate Samples

Duplicate sample pairs were analyzed with SDGs WA005, WA007, WA009, WA016, WA017, WA0018, and WA011 for soil only. SDGs WA010, WA011, WA013, WA014, and WA015 were analyzed for water duplicates only. SDGs WA003, WA006, WA008, and WA012 contained no field duplicate samples. The duplicate sample results are presented in Table 2-2. Precision calculations were performed on analytes that exceeded CRQL in both the sample and duplicate. The following compounds were detected in the field duplicates outside functional guideline limits:

SDG No.	Duplicate Nos.	Compound	RPD (ug/kg)
WA005	CF5BR10S0/ CF5BR10S0DUP	Trichloroethene	200
		Toluene	200
		Ethylbenzene	200
		Xylene (total)	164
WA016	CF17SS3/ CF17SS3D	2-Butanone	67
		Toluene	86

The RPDs for the two field duplicate pairs did not meet the 60 percent RPD limit for soil samples for results above the CRQL. Positive results in SDG WA005 are considered highly imprecise. Positive results in SDG WA016 are considered moderately imprecise. These were the only exceedances in the 12 SDGs containing field duplicates. There were few positive results detected in the field duplicate pairs.

2.1.3 Conclusion

The MS/MSD analytical results, which were largely (96.5 percent) compliant with functional guideline QC criteria, indicate an acceptable level of sample collection and analytical precision was attained. The information provided by the field duplicate samples is limited because few calculable RPDs were available. If a precision problem exists with negative results, it is confined to the concentration range at or below the IDL, and is generally below the concentration range of concern to the data user. It is essential for negative results to be carefully evaluated for low biases. Low biases can result in an analyte being present in the sample and not being detected (false negatives).

2.2 Accuracy

The percent recovery results of MS/MSDs and surrogate spikes are used to assess accuracy. MS/MSD recovery results are presented in Table 2-1. As previously stated, SDG WA009 included MS/MSD samples for water, and soil matrices. Only soil MS/MSDs were analyzed in SDGs WA003, WA005, WA006, WA007, WA008, WA016, WA017, WA018, and WA019. Only water MS/MSDs were analyzed in SDGs WA010, WA011, WA013, WA014, and WA015. SDG WA012 did not contain MS/MSD samples. Assessment of accuracy was made by calculating the percent recoveries of the five spiking compounds: 1,1-dichloroethene, trichloroethene, benzene, toluene, and chlorobenzene.

2.2.1 MS/MSD Samples

All %R values for the MS/MSD samples met functional guidelines recovery criteria in the 14 SDGs with the exception of SDG WA011. The %Rs of toluene in SDG WA011 were 72 % and 192 % in spiked samples CF5MW30SMS and CF5MW30SMSD, respectively, which were outside the 75 to 125 percent QC limits. The two QC deviations do not represent a problem with accuracy, but rather precision, which was previously discussed.

2.2.2 Surrogate Spikes

Three surrogate compounds were added by the laboratory to each environmental QA/QC sample submitted for VOC analysis. The VOC surrogate spike compounds were bromofluorobenzene, 1,2-dichloroethane-d4, and toluene-d8. Bromofluorobenzene is not a target compound and 1,2-dichloroethane-d4 and toluene-d8 are isotopically labeled target compounds. The use of these compounds as surrogates enables the laboratory to separate the surrogates from compounds of interest and to accurately calculate recoveries. Surrogate spike recoveries for VOC analyses were compared to the QC criteria in the USEPA functional guidelines, as follows:

Surrogate	Solid Matrix (percent)	Aqueous Matrix (percent)
Toluene-d8	84-138	88-110
Bromofluorobenzene	59-113	86-115
1,2-Dichloroethane-d4	70-121	76-114

Of the 966 surrogate percent recoveries evaluated, only two were outside the QC limits. These results do not suggest an analytical trend detrimental to accuracy.

2.2.3 Initial and Continuing Calibration

Initial and continuing calibration results provide another means of evaluating accuracy within a particular SDG. Relative response factor (RRF), percent relative standard deviation (%RSD), and percent difference (%D) are the three major parameters used to measure the

effectiveness of instrument calibration. RRF is a measure of the relative spectral response of an analyte compared to its internal standard. %RSD is an expression of the linearity of instrument response. %D is a comparison of a continuing calibration instrumental response with its initial response. The most critical of the three calibration parameters, RRF, has the potential to affect data accuracy across an SDG when it is outside acceptable QC limits. %RSD and %D exceedances suggest more routine instrumental anomalies, which typically affect only samples with positive results for the compounds with exceeded %RSDs or %Ds and were run within the particular analytical window in which the exceedances occurred.

There were RRF exceedances for 2-hexanone in SDGs WA003, WA005, WA006, WA009, WA010, WA011, WA012, WA013, WA014, and WA015 (Table 2-3). Twenty-four RRFs were below the 0.050 QC limit in these 10 SDGs. There were exceedances for 4-methyl-2-pentanone in SDGs WA011, WA012, WA013, and WA014. Five RRFs were below the 0.050 QC limit in these four SDGs. 2-Hexanone and 4-metyhyl-2-pentanone in these SDG's are biased very low. All negative results for these compounds in the affected calibration runs were rejected by the validator. Positive results were flagged as estimated. Negative results for these compounds in the affected samples may be false negatives. Positive results are likely much higher than reported. These results represent a significant systematic analytical problem.

There were %RSDs or %Ds outside functional guidelines criteria in all 16 SDGs. The %RSD and %D QC limits exceedances and the samples and target analytes affected by these exceedances are given in Table 2-3. The %RSD and %D exceedances may create a bias in the data relative to the other calibration information generated, but it is not evident that an absolute quantifiable bias exists in the data. The data user should, for this reason, regard the qualified results as imprecise rather than inaccurate. The %RSDs and %Ds that exceeded the QC criteria do not suggest any systematic analytical problems with either accuracy or precision.

2.2.4 Conclusion

The QA/QC data suggest a high level of accuracy was attained in the analyses, except for some analyses of the compounds 2-hexanone and 4-methyl-2-pentanone. The MS/MSD and surrogate recovery data suggest that matrix interferences had a minimal effect on accuracy. Interferences were not observed. The low RRFs for 2-hexanone and 4-methyl-2-pentanone indicate in a significant low bias for these compounds in the 10 SDGs with low RRF's.

2.3 Representativeness

Method blanks, equipment or rinsate blanks and trip blanks were collected and analyzed for VOCs to evaluate representativeness. The results of the QA/QC blank analyses are presented in Table 2-4. Methylene chloride, acetone, 2-butanone, 2-hexanone, and 1,1,1-trichloroethane were detected in the various QA/QC blanks. The highest detected concentration for an

individual target analyte in any of the three types of QA/QC blanks was used for data qualification.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation. The corrective action consisted of amending the laboratory reported results for organic analytes based on the following criteria. The validation qualifier codes used in the blank summary tables are described below.

> CRQL Validation Qualifier If a sample result for the blank contaminant was less than the CRQL and less than 5 times the blank value for regular target compounds or 10 times the blank value for common laboratory contaminants (the blank action level), the sample result was rejected and amended as non-detected at the CRQL for the target compound.
>
> U Validation Qualifier If a sample result for the blank contaminant was greater than the sample CRQL and less than the blank action level, the sample result for the blank contaminant was amended as a negative at the concentration reported in the sample results.
>
> No Action (NA) If a sample result for the blank contaminant was greater than the blank action level, the result was not amended.

The following presents a description of VOCs detected in method blanks, equipment rinsate blanks, and trip blanks. Corrective actions made for target analytes detected in the environmental samples are described by SDG in Table 2-4.

2.3.1 Method Blanks

Method blank samples were analyzed with each SDG that was analyzed for VOCs to identify target compounds that may have been introduced through the sample preparation and analytical instrumentation. Acetone was detected in method blanks for SDGs WA003, WA006, WA007, WA008, WA009, WA011, WA012, WA016, WA017, and WA018 at a concentration range between 2 ug/kg and 20 ug/kg. Methylene chloride was detected in method blanks for SDGs WA006, WA008, and WA018 at a concentration range between 2 ug/kg and 250 ug/kg. 2-Butanone was detected in method blanks for SDGs WA006, WA008, WA017, and WA018 at a concentration range between 3 ug/kg and 11 ug/kg. 2-Hexanone was detected in a method blank for SDG WA008 at a concentration of 2 ug/kg. 1,1,1-Trichloroethane was detected in a method blank for SDG WA016 at a concentration of 310 ug/kg.

2.3.2 Equipment Rinsate Blanks

Equipment or rinsate blank samples are used to evaluate target analytes that may have been introduced by the sampling equipment or laboratory handling of the samples. Acetone was detected in rinsate blanks for SDGs WA012, WA015, and WA017 at concentrations between

2 ug/L and 30 ug/L. Methylene chloride was detected in the equipment rinsate blank for SDG WA003 at a concentration of 1 ug/L.

2.3.3 Trip Blanks

Trip blanks were placed in each cooler containing field VOC water or soil samples. Trip blanks are QA/QC samples used to identify possible sampling artifacts originating from storage, shipping, or site conditions. Acetone was detected in the trip blanks for SDGs WA005, WA006, WA008, WA011, WA015, and WA016 at a concentration range between 1 ug/L and 9 ug/L.

2.3.4 Conclusion

The target analytes detected in the QA/QC blanks routinely occur at comparable concentrations in laboratory analysis. The analytical results are considered to be representative. The application of the blank qualification rule does have implications on the completeness of the analytical data, however, which is discussed below.

2.4 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the method detection limits attained were below the contract required quantitation limits. The comparability of the data is regarded as acceptable. Some samples were qualified due to low-level blank contamination (as discussed in Section 2.3), which raised the effective detection limits for the suspected blank contaminants in those samples.

2.5 Completeness

The completeness level attained for project volatile organic field samples was 99.5 percent. This percentage was calculated as the total number of accepted data points divided by the total number of samples collected multiplied by 100. There were 109 data points rejected due to QC limits exceedances. These rejections are given in Table 2-5. Other data were qualified as "estimated" for various reasons. The remaining data were found to be acceptable.

Another type of data qualification affecting data completeness is the application of functional guidelines blank validation rules. When samples are qualified due to contamination in an associated blank, a "5 times" or "10 times" action limit is set such that sample results below the action limit are flagged as "undetected" for the particular compound in question. This flagging procedure effectively rejects the concentration range between zero and the initial reported result, which becomes the new detection limit. It is possible that the levels of blank contamination detected could eliminate data in a necessary concentration range in some instances. In these cases, more data are needed to verify the existence of the compound in question at the site below the revised detection limit.

3.0 SEMIVOLATILE ORGANIC COMPOUNDS

A total of 244 water and soil samples were analyzed for SVOCs. The samples were divided into 16 separate SDGs. This chapter discusses the QC supporting documentation as defined by the PARCC criteria and evaluated based on the DQOs.

3.1 Precision

MS/MSD and field duplicate samples were used to assess precision. MS/MSD samples were analyzed in all SDGs except WA012. Only soil MS/MSDs were analyzed in SDGs WA003, WA005, WA006, WA007, WA008, WA009, WA016, WA017, WA018, and WA019 as the SDGs consisted of soil samples only. Only water MS/MSDs were analyzed in SDGs WA010, WA011, WA013, WA014, and WA015 as the SDGs consisted of water samples only.

Assessment of precision was made by calculating the RPDs of 11 spiking compounds: phenol, 2-chlorophenol, 1,4-dichlorobenzene, n-nitroso-di-n-propylamine, 1,2,4-trichlorobenzene, 4-chloro-3-methylphenol, acenaphthene, 4-nitrophenol, 2,4-dinitrotoluene, pentachlorophenol, and pyrene.

SDGs that contained duplicate sample pairs were evaluated for precision with the understanding that results of the duplicate sample pairs may not be representative of concentrations found in the other samples within the SDG.

3.1.1 MS/MSD Samples

The functional guidelines establish RPD QC criteria for MS/MSD samples as follows:

Compound	Soil RPD	Water RPD
Phenol	35	42
2-Chlorophenol	50	40
1,4-Dichlorobenzene	27	28
n-Nitroso-di-n-propylamine	38	38
1,2,4-Trichlorobenzene	23	28
4-Chloro-3-methylphenol	33	42
Acenaphthene	19	31
4-Nitrophenol	50	50
2,4-Dinitrotoluene	47	38
Pentachlorophenol	47	50
Pyrene	36	31

MS/MSD analytical results for all SDGs and analyses are presented in Table 2-1. The RPD exceedances noted were the following :

SDG No.	Compound	Matrix	RPD	RPD Limit
WA005	1,2,4-Trichlorobenzene	Soil	33	23
	Acenaphthene	Soil	27	19
	4-Chloro-3-methylphenol	Soil	86	33
WA008	Acenaphthene	Soil	23	19
WA011	4-Nitrophenol	Water	132	50
	Acenaphthene	Water	39	31
WA014	4-Nitrophenol	Water	76	50
	Pyrene	Water	44	31
WA016	4-Nitrophenol	Soil	71	50
WA018	Acenaphthene	Soil	25	19
	Pyrene	Soil	89	36
WA019	1,2,4-Trichlorobenzene	Soil	25	23

The RPD exceedances listed for the soil matrix in WA005 reveal a problem obtaining precise results from samples of this matrix. Three of 11 MS/MSD RPDs were outside limits, 1 of which was in the acid fraction and 2 in the base-neutral fraction. A moderate lack of precision affecting both semivolatile acid and base-neutral fractions in the SDG is indicated. The lack of precision is directly proportional to the reported result, such that positive results are affected more than negative results and higher positive results are affected more than lower positive results. The RPD exceedances in the other six SDGs are considered incidental, not indicating a trend in data quality. They do indicate a precision problem in the analysis of the compounds listed, however. Positive results for these particular compounds in the affected SDGs are considered imprecise. Negative results for 4-nitrophenol in SDG WA011 are also considered imprecise due to the high RPD result for this compound.

3.1.2 Duplicate Sample Pairs

Duplicate sample pairs were analyzed with SDGs WA005, WA007, WA009, WA016, WA017, WA018, and WA019 for soil matrices, and SDGs WA010, WA011, WA013, WA014, and WA015 for water samples only. SDGs WA003, WA006, WA008, and WA012 contained no field duplicate samples. RPD results outside QC limits are presented in Table 2-3. The following were the compounds detected in duplicate sample pairs that exceeded QC limits:

SDG No	Duplicate Nos.	Compound	Units	RPD
WA005	CF5BR10S0/	Acenaphthene	ug/kg	200
	CF5BR10S0D	Dibenzofuran	ug/kg	200
		Fluorene	ug/kg	200
		bis(2-Ethylhexyl)phthalate	ug/kg	200

SDG No	Duplicate Nos.	Compound	Units	RPD
WA007	CF5BR9S4/ CF5BR9S4D	Carbazole	ug/kg	62
		Chrysene	ug/kg	67
		Benzo(k)fluoranthene	ug/kg	71
		Indeno(1,2,3-cd)pyrene	ug/kg	79
		Benzo(g,h,i)perylene	ug/kg	88
WA018	CF5SS20/ CF5SS20D	Benzo(a)pyrene	ug/kg	61

There were very high exceedances of the 60 % QC limit for soil in the field duplicate samples for SDG WA005. All positive results in this SDG are considered highly imprecise based on these results. The RPDs outside limits in SDGs WA007 and WA018 indicate a problem obtaining precise results in the quantitations of the compounds listed. Few positive results were detected in the field duplicate pairs. Overall the results suggest acceptable precision. The consistency observed in the non-detect sample results suggests that any lack of precision is less than the IDL in the absence of a low bias.

3.1.3 Conclusion

Both the MS/MSD and the field duplicate results indicate imprecision in SDG WA005. The precision problems with this SDG could be due to sample heterogeneity or improper sample collection for this one SDG as other SDG exceedances were slight or non-existent. The MS/MSD analytical results for the other SDGs were compliant with functional guidelines QC criteria, suggesting acceptable analytical precision was obtained. The low number of detections in the samples suggest precision problems are largely confined to the concentration range at or below the IDL, which is generally below the concentration range of concern to the dater user. It is essential in the case of negative results to carefully evaluate accuracy, particularly low biases, which could cause target analytes that are actually present to be reported as false negatives.

3.2 Accuracy

The %R results of MS/MSDs and surrogate spikes are used to assess accuracy. MS/MSD recovery results are presented in Table 2-1. As previously stated, SDGs WA003, WA005, WA006, WA007, WA008, WA009, WA016, WA017, WA018, and WA019 included soil only, and SDGs WA010, WA011, WA013, WA014, and WA015 contained water only. SDG WA012 contained no MS/MSDs. Assessment of accuracy was made by calculating the percent recoveries of the 11 spiking compounds listed in subsection 3.1.1.

3.2.1 MS/MSD Samples

The %R values for the MS/MSD samples listed below exceeded the functional guidelines recovery criteria:

SDG No.	Compound	Matrix	% R MS/MSD	Recovery Limits (%)
WA005	4-Chloro-3-methylphenol	Soil	22*/48	41-126
	4-Nitrophenol	Soil	0*/0*	26-103
WA006	n-Nitroso-di-n-propylamine	Soil	48/40*	41-126
WA010	4-Nitrophenol	Water	87*/91*	10-80
WA011	4-Nitrophenol	Water	133*/27	10-80
	Pyrene	Water	24*/8*	26-127
	Pentachlorophenol	Water	72/111*	9-103
WA013	4-Chloro-3-methylphenol	Water	85/100*	23-97
	4-Nitrophenol	Water	75/99*	10-80
	2,4-Dinitrotoluene	Water	86*/102	26-96
	Pentachlorophenol	Water	97/116*	9-103
WA014	4-Nitrophenol	Water	109*/49	10-80
WA015	4-Nitrophenol	Water	93*/93*	10-80
	2,4-Dinitrotoluene	Water	102*/104*	24-96
	Pentachlorophenol	Water	109*/104*	9-103
WA017	2,4-Dinitrotoluene	Soil	105*/100*	28-89
WA018	Pyrene	Soil	33*/86	35-142
WA019	4-Chloro-3-methylphenol	Soil	96/124*	26-103
	2,4-Dinitrotoluene	Soil	70/100*	28-89
	Pentachlorophenol	Soil	103/121*	17-109
	Pyrene	Soil	195*/145*	25-142

*These replicates exceeded QC limits.

Of the 352 MS/MSD analyses run in the semivolatile fraction, only 7 (2.0 percent) were below QC limits. % R values below QC limits suggest a low bias in the associated data. This low bias has the potienial to result in false negative detections of target analytes in the same SDG of the same matrix. An extremely low bias was observed for 4-nitrophenol in SDG WA005. A notable number of exceedances above the QC limits (21) occured in SDGs WA010, WA011, WA013, WA014, WA015, WA017, and WA019. A high bias is indicated in the associated data for the particular compounds with high recoveries. The high recoveries do not suggest an analytical trend.

3.2.2 Surrogate Spikes

Eight surrogate compounds were added by the laboratory to each environmental and QA/QC sample submitted for SVOC analysis. Surrogate spike recoveries for SVOC analyses were compared to the QC criteria in the functional guidelines as follows:

Surrogate	Solid Matrix (percent)	Aqueous Matrix (percent)
nitrobenzene-d5	23 to 120	35 to 114
2-fluorobiphenyl	30 to 115	43 to 116
terphenyl-d14	18 to 137	33 to 141
phenol-d6	24 to 113	10 to 94
2-fluorophenol	25 to 121	21 to 100
2,4,6-tribromophenol	19 to 122	10 to 123
2-chlorophenol-d4	20 to 130	33 to 110
1,2-dichlorobenzene-d4	20 to 130	16 to 110

2-Fluorobiphenyl, terphenyl-d14, 2-fluorophenol, and 2,4,6-tribromophenol are not target compounds; nitrobenzene-d5, phenol-d6, 2-chlorophenol-d4, and 1,2-dichlorobenzene-d4 are isotopically labeled target compounds. The use of these compounds as surrogates enables the laboratory to separate the surrogates from compounds of interest and to accurately calculate recoveries. Of the 2,280 surrogate %Rs evaluated, 149 (6.5 percent) were outside QC limits. Surrogate recovery exceedances in SDGs WA005, WA011, WA013, WA014, and WA015 accounted for the majority (96) of that amount. The surrogate results do not suggest an analytical trend.

3.2.3 Initial and Continuing Calibration

The %RSD and %D QC criteria exceedances and the analytes flagged based on those exceedances are given in Table 2-3. There were no RRF exceedances in any SDG for any target analyte, however, there were %RSDs and %Ds outside functional guidelines QC criteria. The %RSD and %D QC exceedances create a bias in the data relative to the other calibration information generated. It is not evident, however, that an absolute bias in the data exists. The data user should, for this reason, regard the qualified results imprecise rather than inaccurate. The %RSDs and %Ds that exceeded QC criteria do not suggest any systematic analytical problems with either accuracy or precision.

3.2.4 Conclusion

The QC data from the MS/MSD results suggest accuracy problems in several SDGs. SDGs WA013, WA015, and WA019 were notably affected by moderately high biases. A strong low bias for 4-nitrophenol was indicated in SDG WA005. Surrogate spike recoveries and initial and continuing calibrations do not indicate any further systematic problems.

3.3 Representativeness

Method blanks and equipment rinsate blanks were analyzed for SVOCs to evaluate representativeness. These results are presented in Table 2-4. Di-n-butylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, phenol, 1,2,4-trichlorobenzene, diethylbutyl-phthalate, and 2-methylphenol were detected at low levels in the various blanks. When more

than one contaminated blank was associated with a given sample, only the highest detected concentration for an individual target analyte in any associated QC blank was used for qualification.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation. The corrective action consisted of amending the laboratory reported results for organic analytes based on the following criteria. The validation qualifier codes used in the blank summary tables are described below.

> CRQL Validation Qualifier. If a sample result for the blank contaminant was less than the CRQL and less than 5 times the blank value for regular target compounds or 10 times the blank value for common laboratory contaminants (the blank action level), the sample result was rejected and amended as negative at the CRQL for the target compound.
>
> U Validation Qualifier. If a sample result for the blank contaminant was greater than the sample CRQL and less than the blank action level, the sample result for the blank contaminant was amended as a negative at the concentration reported in the sample results.
>
> No Action (NA).. If a sample result for the blank contaminant was greater than the blank action level, the result was not amended.

The following presents a description of SVOCs detected in method blanks and equipment or rinsate blanks. Corrective actions made for target analytes detected in the environmental samples are described for each SDG in Table 2-5.

3.3.1 Method Blanks

Method blank samples were analyzed with each SDG to identify compounds that may have been introduced through the analytical instrumentation or sample preparation. Di-n-butylphthalate was detected in method blanks for SDGs WA003, WA005, WA006, WA007, WA008, WA009, WA011, WA013, WA016, WA017, WA018, and WA019 at concentration ranges between 20 ug/kg and 260 ug/kg and 0.5 ug/L to 0.7 ug/L. Bis(2-ethyl-hexyl)phthalate was detected in method blanks for SDGs WA011, WA012, WA015, WA018, and WA019 at a concentration range between 0.5 ug/kg and 66 ug/kg. Di-n-octylphthalate was detected at 0.5 ug/L in a method blank for SDG WA012. 1,2,4-Trichlorobenzene was detected in method blanks for SDGs WA014 and WA015 at 0.6 ug/L. 2-Methylphenol was detected at 2 ug/L in a method blank for WA014.

3.3.2 Equipment Rinsate Blanks

The equipment rinsate blank samples are used to evaluate target analytes that may have been introduced by the sampling equipment or laboratory handling of the samples. Di-n-butylphthalate

was detected in equipment rinsate blanks for SDGs WA003 and WA012 at 0.5 ug/L and 2 ug/L, respectively. Bis(2-ethylhexyl)phthalate was detected at 6 ug/L and 3 ug/L in rinsate blanks for SDGs WA012 and WA018, respectively. Phenol was detected at 0.6 ug/L to 2.0 ug/L in rinsate blanks for SDGs WA012, WA013, WA014, and WA016. 2-Methylphenol was detected at 0.7 ug/L in the rinsate blank for SDG WA014. Diethylphthalate was detected at 0.9 ug/L in the rinsate blank for SDG WA018.

3.3.3 Conclusion

The target analytes detected in the QC blanks routinely occur at comparable concentrations in laboratory analyses. The analytical results are considered to be representative; however, some of the analytical results were qualified (see Table 5-1). The application of blank qualification rules affects the completeness of the analytical data. This is discussed in Section 3.5.

3.4 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the method detection limits attained were below the CRQL. The comparability of the data is regarded as acceptable. Some samples were qualified due to low-level blank contamination (as discussed in Section 3.5), which raised the effective detection limits for the suspected blank contaminants in some samples.

3.5 Completeness

The completeness level attained for project SVOC field samples was 97.6 percent, which met the 96 percent DQO goal. This percentage was calculated as the total number of accepted data points divided by the total number of samples collected multiplied by 100. There were 370 data points rejected due to QC criteria exceedances. These rejections are given in Table 2-5. Other data were qualified as "estimated" for various reasons. The remaining data were found to be acceptable.

The application of functional guidelines blank validation rules also affects data completeness. When samples are qualified due to contamination in an associated blank, a "5 times" or "10 times" action limit is set such that sample results below the action limit are flagged as "undetected" for the particular compound in question. This flagging procedure effectively rejects the concentration range between zero and the initial reported result, which becomes the new detection limit. It is possible that the levels of blank contamination detected could eliminate data in a necessary concentration range in some instances. In these cases, more data are needed to verify the existence of the compound in question at the site below the revised detection limit.

4.0 PESTICIDE/POLYCHLORINATED BIPHENYL ORGANIC COMPOUNDS

A total of 235 water, and soil samples were analyzed for pesticides and PCB organic compounds. The samples were divided into 16 separate SDGs. This chapter discusses the QC supporting documentation as defined by the PARCC criteria, which are evaluated based on the DQOs. Pesticide and PCB column responses are given in table 7-1.

4.1 Precision

MS/MSDs and duplicate sample pairs were used to assess precision. MS/MSD samples were analyzed in all SDGs except WA012. Only soil and sediment MS/MSD samples were analyzed in SDGs WA003, WA005, WA006, WA007, WA008, WA009, WA016, WA017, WA018, and WA019. Only water MS/MSDs were analyzed in SDGs WA010, WA011, WA013, WA014, and WA015. SDGs WA005, WA007, WA009, WA010, WA011, WA013, WA014, WA015, WA016, WA017, WA018, and WA019 contained duplicate sample pairs, which provided an additional measure of precision. SDGs with duplicate sample pairs were evaluated for precision with the understanding that results of the duplicate sample pairs may not be representative of concentrations found in the other samples within the SDG.

4.1.1 MS/MSD Samples

The functional guidelines RPD QC criteria for MS/MSD samples are as follows:

Compound	Soil RPD	Water RPD
Gamma-BHC (lindane)	50	15
Heptachlor	31	20
Aldrin	43	22
Dieldrin	38	18
Endrin	45	21
4,4-DDT	50	27

MS/MSD results for all SDGs are presented in Table 2-1. A total of 192 MS/MSD analyses were conducted. The following RPD QC exceedances were noted:

SDG No.	Compound	Matrix	RPD	RPD Limit
WA007	Heptachlor	Soil	37	31
WA010	Gamma-BHC	Water	21	15
	Heptachlor	Water	24	20
	Aldrin	Water	49	22
	4,4'-DDT	Water	58	27

SDG No.	Compound	Matrix	RPD	RPD Limit
WA014	4,4'-DDT	Water	200	27
WA015	Gamma-BHC	Water	18	15

A high level of imprecision is indicated in the water matrix of SDG WA010. The RPD exceedances in SDGs WA007, WA014, and WA015 are regarded as random anomalies with no appreciable effect on data quality.

4.1.2 Duplicate Sample Pairs

Duplicate sample pairs were analyzed in SDGs WA005, WA007, WA009, WA016, WA017, WA018, and WA019 for the soil matrix, and SDGs WA010, WA011, WA013, WA014, and WA015 for the water matrix. SDGs WA003, WA006, WA008, and WA012 contained no field duplicate samples. The RPD for aldrin was 117 percent for field duplicates CF5BR9S4 and CF5BR9S4D in SDG WA007, which was outside the 60 percent QC criteria limit (Table 2-3). The associated aldrin results were rejected due to column percent differences (Table 2-5) and are considered unusable. The remaining RPD results represent acceptable precision. The majority of duplicate sample pair analytical results were negative. The consistency observed in the negative results suggests that any lack of precision is less than the IDL in magnitude in the absence of a low bias.

4.1.3 Column Percent Differences

Pesticide/PCB analyses are conducted on a dual column gas chromatography system in which separate compound quantitations are performed on two different columns. The percent difference (%D) is then calculated to assess precision. The equation for %D is:

$$\%D = \frac{C(H) - C(L)}{C(L)} \times 100$$

Where: C(H) = The higher measured concentration on either column
C(L) = The lower measured concentration

%Ds approximate the level of precision attained in the quantitations of single analytes. Lower %Ds indicate higher precision while higher percent differences indicate lower precision. The percent differences for all quantitated compounds are given in Table 7. Column percent differences are specific to the particular analyte quantitated and, as such, do not indicate general analytical trends.

4.1.3 Conclusion

The MS/MSD results for SDG WA010 indicated a high level of imprecision in the associated samples affecting both negative and positive results. The other RPD deviations indicate imprecision in sample results for those particualr compounds only. The overall precision attained was high. A low number of detections suggest precision problems are largely confined to the concentration range at or below the IDL, which is generally below the concentration range of concern to the data user. It is essential in the case of negative results to evaluate accuracy, particularly low biases, which could result in target analytes that are actually present being reported as false negatives.

4.2 Accuracy

The percent recovery results of MS/MSDs and surrogate spikes are used to assess accuracy. MS/MSD recovery results are presented in Table 2-1. MS/MSD samples were analyzed in all SDGs except WA012. Only soil MS/MSD samples were analyzed in SDGs WA003, WA005, WA006, WA007, WA008, WA009, WA016, WA017, WA018, and WA019. Only water MS/MSDs were analyzed in SDGs WA010, WA011, WA013, WA014, and WA015. Assessment of accuracy was made by calculating the percent recoveries of the six spiking compounds: alpha-BHC, heptachlor, aldrin, dieldrin, endrin, and 4-4'-DDT.

4.2.1 MS/MSD Samples

Of the 192 MS/MSD analyses run, 18 were outside functional guidelines QC criteria. MS/MSD results for all SDGs are presented in Table 2-1. The following MS/MSD QC exceedances were noted:

SDG No.	Compound	Matrix	%R MS/MSD	QC Limits (percent)
WA003	Gamma-BHC	Water	220/200	56-123
	Heptachlor	Water	168/168	40-131
	Aldrin	Water	158/164	40-120
	Dieldrin	Water	170/170	52-126
	Endrin	Water	170/170	56-121
	4,4'-DDT	Water	170/170	38-127
WA011	Aldrin	Water	32/36	40-120
	Dieldrin	Water	43/46	52-126
WA014	4,4'-DDT	Water	0/9	38-127
WA017	4,4'-DDT	Soil	11/9	23-134

All percent recoveries were above the QC criteria for the water MS/MSD in SDG WA003, indicating a high bias. This high bias has the potential to result in false positive detections of target analytes in the same SDG of the same matrix. Because there were no positive detections

in the water samples, no false positives could exist. The effect of high bias on negative results is that the reported IDL and CRQL may be slightly higher than the actual IDL or CRQL. The remaining %Rs for SDGs WA011, WA014, and WA017 are considered to be anomalous results with no appreciable impact on data quality.

4.2.2 Surrogate Spikes

Two surrogate compounds were added by the laboratory to each environmental and QA/QC sample submitted for pesticides and PCB analysis. The surrogate spike compounds were tetrachloro-m-xylene and decachlorobiphenyl. % Rs of these compounds were evaluated on two gas chromatography columns simultaneously as per the CLP 1990 SOW. Surrogate spike recoveries were compared to the QC criteria stipulated in the functional guidelines, which are:

Surrogate	Solid Matrix (percent)	Aqueous Matrix (percent)
tetrachloro-m-xylene	60 to 150	60 to 150
decachlorobiphenyl	60 to 150	60 to 150

4.3.2 Equipment Rinsate Blanks

The equipment or rinsate blank samples are used to evaluate target analytes that may have been introduced by the sampling equipment or laboratory handling of the samples. Aldrin was detected in the rinsate blanks for SDGs WA015 and WA017 at 0.022 ug/L and 0.008 ug/L, respectively. Beta-BHC was detected in the rinsate blank for SDG WA005 at a concentration of 0.19 ug/L.

4.3.3 Overall Assessment

The target analytes detected in the QA/QC blanks routinely occur at comparable concentrations in laboratory analysis. The analytical results are considered to be representative; however, some of the analytical results were qualified (see Table 2-5). The application of the blank qualification rules affects completeness of the analytical data.

4.4 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the method detection limits attained were below the CRQL. The comparability of the data is regarded as acceptable. Some samples were qualified due to low-level blank contamination, which raised the effective detection limits for the suspected blank contaminants in those samples.

4.5 Completeness

The completeness level attained for project pesticide and PCB organic field samples was 97.8 percent (145 out of 6,636 were rejected). This percentage was calculated as the total number of accepted data points divided by the total number of samples collected multiplied by 100. The

5.0 METALS AND CYANIDE

A total of 351 water, soil and sediment samples were analyzed for metals and cyanide. The samples were divided into 16 separate SDGs. This section discusses the QC supporting documentation as defined by the PARCC criteria, which are evaluated based on the project DQOs.

5.1 Precision

Metals and cyanide analyses are different from organics analyses in that no matrix spike duplicate sample is evaluated to measure precision. Instead, an unspiked laboratory duplicate is analyzed for each SDG. The two unspiked replicate results are then compared using RPD QC criteria for detections at concentrations at least 5 times the CRDL. The RPD QC criteria for laboratory duplicate samples are 20 percent for the water matrix and 35 percent for soil matrices. The RPD limits for water field duplicates are 30 percent and for soil field duplicates are 60 percent. Analytical values less than 5 times the CRDL are evaluated based on a CRDL standard.

5.1.1 Laboratory and Field Duplicates

The following lab and field duplicate results were outside the QC criteria (Table 2-1 and Table 2).

SDG No.	Analyte	Matrix	RPD	RPD Limit
WA006	Iron	Soil	40	35
	Cyanide	Water (total)	69	20
WA007	Calcium	Soil	65	35
	Iron	Soil	90	60
WA008	Zinc	Soil	122	35
WA010	Aluminum	Water (total)	42	20
	Chromium	Water (total)	41	20
	Iron	Water (total)	69	20
	Iron	Water (Diss.)	22	20
	Calcium	Water (total)	35	30
	Iron	Water (total)	65	30
	Lead	Water (total)	35	30
	Zinc	Water (total)	47	30
WA011	Aluminum	Water (total)	54	30
	Chromium	Water (total)	59	30
	Iron	Water (total)	57	30
	Lead	Water (total)	53	30
	Mercury	Water (total)	38	30

SDG No.	Analyte	Matrix	RPD	RPD Limit
WA013	Iron	Water (total)	38	20
	Aluminum	Water (total)	43	30
	Iron	Water (total)	38	30
	Vanadium	Water (Diss.)	22	20
	Zinc	Water (Diss.)	27	20
	Aluminum	Water (Diss.)	44	30
WA014	Lead	Water (total)	38	20
	Zinc	Water (total)	22	20
WA015	Zinc	Water (total)	58	30
	Arsenic	Water (Diss.)	68	30
	Barium	Water (Diss.)	34	30
WA016	Calcium	Soil	58	35
WA018	Manganese	Soil	37	35

These analytical results and RPD exceedances are typical of inorganics analysis and do not indicate an overall or systematic problem with precision. The data associated with each deviant RPD, however, were flagged as estimated in the data validation process. The samples associated with the above SDGs were qualified as estimated for the same metal of the same matrix within the same SDG as the results listed above. The overall precision of the analytical results was 94.0 percent.

5.2 Accuracy

The percent recovery results of matrix spike samples are used to assess accuracy for the inorganics analyses. MS samples were analyzed for each group of samples of a particular matrix type and for each concentration range within each SDG, except for WA012, as the analytical method requires (SOW ILM02.1, September 1991, p. E-19). MS recovery results are presented in Table 2-1.

5.2.1 MS Analysis

The matrix spike recovery limits are 75 to 125 percent. However, spike recovery limits do not apply when the sample concentration exceeds the spike concentration by a factor of four or more (these results are presented in Table 5-1). The following spike recoveries were outside the QC limits:

SDG No.	Analyte	Matrix	Percent Recovery
WA003	Mercury	Soil	27
	Cyanide	Water (total)	157
	Antimony	Soil	69
	Mercury	Soil	130

SDG No.	Analyte	Matrix	Percent Recovery
WA003	Selenium	Soil	73
	Cyanide	Soil	153
WA006	Antimony	Soil	73
	Thallium	water (total)	153
WA007	Mercury	Soil	72
	Selenium	Soil	74
WA009	Arsenic	Soil	72
	Lead	Soil	65
	Arsenic	water (Diss.)	136
WA010	Antimony	water (total)	43
	Arsenic	water (total)	72
	Selenium	water (total)	47
	Cyanide	water (total)	57
WA011	Antimony	water (total)	59
	Selenium	water (total)	150
WA013	Selenium	water (total)	46
	Arsenic	water (Diss.)	73
	Selenium	water (Diss.)	49
WA014	Antimony	water (total)	70
	Selenium	water (total)	50
WA015	Iron	water (total)	25
	Cyanide	water (total)	56
	Selenium	water (Diss.)	137
WA016	Mercury	water (total)	70
	Thallium	water (total)	126
	Selenium	water (Diss.)	138
WA018	Selenium	Soil	70
WA019	Antimony	Soil	71

These %R values suggest a minimal amount of interference from the sample matrix. On an individual analyte basis inaccuracies were introduced in the environmental samples associated with the above matrix spike samples. The environmental samples were flagged accordingly during data validation.

Results listed above for %R exceeding 125 percent suggest a high bias in the data. Positive results for analytes with percent recoveries greater than 125 percent in samples in the same SDG were flagged as estimated. High recoveries of cyanide in SDG WA003, thallium in SDG WA006, and selenium in WA011 suggest a strong high bias in results for these analyses. Results listed with recoveries below 75 percent suggest a low bias in the data. Associated positive and negative results were flagged as estimated. Low recoveries of mercury in SDG WA003 and iron in WA015 suggest a problem detecting these elements in the associated samples. The data validator

"rejected" mercury and iron results in their respective SDGs due to the low biases indicated. These rejected results are presented in Table 2-5. The %R exceedances do not suggest a general analytical trend detrimental to accuracy.

5.2.2 Laboratory Control Samples (LCS)

Laboratory Control Samples (LCSs) provide another means to evaluate accuracy within a particular SDG. The LCS serves as a monitor of the overall performance of all steps in the analysis, including the sample preparation. Twenty-four LCSs were processed and analyzed for the 16 SDGs. Of the 538 percent recoveries evaluated, 16 exceeded the 80 to 120 percent QC limits. The acceptability percentage was 97.0 percent.

5.2.3 Initial and Continuing Calibration

All %RSDs and %Ds were within functional guidelines QC limits for each SDG. The %RSD and %D values do not suggest any systematic analytical problems with either accuracy or precision.

5.2.4 Overall Assessment

Overall, the accuracy percentage (laboratory spike recoveries) of the metals results was 94.0 percent, which was below the DQO goal of 96 percent.

5.3 Representativeness

Preparation blanks, equipment rinsate blanks, and initial and continuing calibration blanks were analyzed for inorganics to evaluate representativeness. Blank analysis results are presented in Table 2-4. The highest detected concentration for an individual target analyte in any associated blank was used for data qualification.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation. The corrective action consisted of amending the laboratory reported results for inorganic analytes based on the following criteria. The validation qualifier codes utilized in the blank summary tables are described below.

U — Undetected If a sample result for the blank contaminant was less than five times the blank value, the sample result was amended as negative.

UJ — Undetected/Estimated If a sample result for the blank contaminant was less than the sample IDL when the absolute value of the negative blank value was greater than the IDL, the sample result for the blank contaminant was amended as estimated negative.

J — Estimated If a sample result for the blank contaminant was greater than the IDL and less than five times the blank value, when the absolute value of the negative

blank value is greater than the IDL the result was amended as estimated at the laboratory reported value.

The following presents a description of analytes detected in the inorganics blanks. Corrective actions made for target analytes detected in the environmental samples are described for each SDG in Table 2-4.

5.3.1 Preparation Blanks

Preparation blank samples were analyzed with each SDG for inorganics samples to identify target analytes that may have been introduced through the analytical instrumentation or sample preparation. Analytes routinely detected in the preparation blanks are aluminum, calcium, manganese, and sodium. Preparation blanks are designated "PBW" for water blanks and "PBS" for soil preparation blanks in Table 2-4.

5.3.2 Equipment Rinsate Blanks

Positive results from the equipment rinsate blank samples identify target analytes that may have been introduced by the sampling equipment or inadequate decontamination procedures. Typically, barium, calcium, iron, magnesium, potassium, and sodium were detected in the equipment or rinsate blanks. Equipment rinsate blanks are designated "rinsate" in Table 2-4.

5.3.3 Initial and Continuing Calibration Blanks

Initial and continuing calibration blanks are used to identify and estimate the effects of carryover contamination and baseline shift. Many analytes were routinely detected in the calibration blanks at low levels including aluminum, barium, calcium, copper, iron, lead, magnesium, manganese, potassium, selenium, sodium, vanadium, and zinc. These results are displayed in Table 2-4 under "ICB" for initial calibration blanks and "CCB" for continuing calibration blanks.

5.3.4 Conclusion

Blank contaminations were detected at concentrations commonly observed in inorganic laboratory analysis. The frequency of these detections, however, was unusually high for the analytical methods used. The data are considered to be representative due to functional guidelines blank qualification. The application of the blank qualification rules does have implications on the completeness of the analytical data, however, which is discussed in Section 5.5.

5.4 Comparability

The laboratory used standard analytical methods for all of the analyses. In all but three cases, the method detection limits attained were below the CRDLs. Some samples were qualified due to blank contamination, which raised the effective detection limits for the suspected blank contaminants in those samples. Otherwise, the comparability of the data is considered acceptable.

5.5 Completeness

The completeness level attained for the project metals and cyanide samples was 99.9 percent (11 out of 8,075 were rejected). This percentage was calculated as the total number of accepted data points divided by the total number of samples collected multiplied by 100. The rejections are given in Table 2-5. The completeness percentage met the 96 percent DQO goal.

Another type of data qualification having a significant effect on completeness was the application of blank validation qualifiers. When samples are qualified due to contamination in an associated blank, a "5 times" action limit is set such that sample results below the action limit are flagged as "undetected" for the particular analyte in question. This flagging procedure effectively rejects the concentration range between zero and the initial reported result, which becomes the new detection limit. It is possible that the levels of blank contamination detected could eliminate data in a necessary concentration range in some instances. In these cases, reanalysis is needed to verify the presence of the compound in question at the site below the revised detection limit.

6.0 Variances in Analytical Performance

The laboratory used standard analytical methods for all of the analyses throughout the project. No systematic variances in analytical performance were noted according to the SOW. One isolated deviation from the method was the lack of MS/MSD analyses in SDG WA012. The SOW states that one MS/MSD pair is to be analyzed for each 20 sample group. This SDG consisted of one environmental sample and four field QC blanks analyzed in continuation of SDG WA011. SDG WA011 contained 18 environmental samples. SDG WA012, therefore, contained the 19th sample, which is associable with the MS/MSD results in SDG WA011 based on sample frequency and matrix type. This back association meets the requirements of the SOW, but it introduces a lack of comparability in the results between the two SDGs. Although matrix effects would be expected to be the same between the two SDGs, analytical conditions are not. The sample results for SDG WA011 were obtained under a different calibration run, which caused a difference in the results obtained. Because MS/MSD results represent a combination of matrix effects and analytical practice, it cannot be determined if analytical practice problems that would normally appear in the MS/MSD results affected the reported results for the environmental sample in SDG WA012. The analytical results for this sample should be used in conjunction with the MS/MSD results in SDG WA011, with the understanding that the laboratory components of precision and accuracy may not be the same and are less defined for SDG WA012.

The quality of analytical results achieved in the pesticide and PCB fraction throughout the project could have been improved with the reanalysis of samples in SDGs with surrogate recoveries consistently outside QC limits. An inordinantly large number of detections were noted in the inorganics blanks. These detections may have been caused by improper instrument maintanance or adjustment or improper evaluation of instrument parameters.

7.0 Summary of PARCC Criteria

Table 7-1 presents a summary of PARCC criteria for all SDGs. Each PARCC criterion is discussed in detail in the following sections.

Precision

The precision results by analytical fraction as follows:

Analyses	Precision Acceptability Percentage
VOCs	96.5
SVOCs	93.2
Pesticides and PCBs	92.7
Metals and cyanide	92.5
Wet chemistry	95.1

The overall precision acceptability was 93.6 percent with 45 of 708 QC analyses exceeding the QC criteria. This result did not meet the 96 percent DQO goal.

Accuracy

By analytical fraction accuracy was as follows:

Analyses	Accuracy Acceptability Percentage
VOCs	99.1
SVOCs	92.0
Pesticides and PCBs	89.6
Metals and cyanide	94.0
Wet chemistry	95.7

The overall accuracy acceptability was 94.6 percent with 78 of 1,445 percent recovery analyses exceeding the QC limits. This result did not meet the 96 percent DQO goal.

Representativeness

A total of 482 blanks were evaluated with an average of 155 analytes per SDG being evaluated. Only three blanks exceeded the CRQLs/CRDLs. The representativeness of the project data is considered acceptable after qualification for blank contamination.

Completeness

Data rejections accounted for only 1.6 percent of 40,736 total analyses with the semivolatile fraction accounting for 57.0 percent of the rejections. By analytical fraction completeness for all SDGs is as follows:

Type	Total Analyses	No. of Rejects	% Completeness
VOCs	9,339	109	98.8
SVOCs	15,616	370	97.6
Pesticides and PCBs	6,636	145	97.8
Metals and cyanide	8,075	11	99.9
Wet chemistry	1,070	14	98.7
Total	40,736	649	98.4

The completeness percentage based on rejected data met the 96 percent project DQO goal. A less quantifiable loss of data occurred in the application of blank qualifications. The amount and type of blank qualifications is considered to be unusually high in the inorganics fraction, which led to the loss of many low-level results.

Comparability

Sampling frequency requirements were met in obtaining duplicates and necessary field blanks. The laboratory used standard analytical methods for their analyses. The analytical results were reported in correct standard units. The overall data comparability is considered acceptable.

Table 7-1

Sample Event PARCC Criteria Summary
Operable Unit 2
NAS Cecil Field

SDG	Precision	Accuracy	Representa-tiveness	Complete-ness	Compara-bility
WA003	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable with qualifica-tion	Acceptable
WA005	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable with qualifica-tion	Acceptable
WA006	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable with qualifica-tion	Acceptable
WA007	Acceptable with qualifica-tion	Acceptable with qualifi-tion	Acceptable with qualifi-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion
WA008	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable with qualifica-tion	Acceptable

Table 7-1 (Continued)

Sample Event PARCC Criteria Summary

SDG	Precision	Accuracy	Representa-tiveness	Complete-ness	Compara-bility
WA003	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable with qualifica-tion	Acceptable
WA005	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable with qualifica-tion	Acceptable
WA006	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable with qualifica-tion	Acceptable
WA007	Acceptable with qualifica-tion	Acceptable with qualifi-tion	Acceptable with qualifi-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion
WA008	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable with qualifica-tion	Acceptable

Table 7-1 (Continued)

Sample Event PARCC Criteria Summary

SDG	Precision	Accuracy	Representa-tiveness	Complete-ness	Compara-bility
WA014	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable
WA015	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable
WA016	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable	Acceptable
WA017	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion
WA018	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable	Acceptable	Acceptable
WA019	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion	Acceptable with qualifica-tion

Table 1-1
LIST OF ENVIRONMENTAL SAMPLES AND SAMPLE DELIVERY GROUP IDENTIFIER
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG Number	Laboratory	Samples
WA003	Wadsworth/Alert Laboratories	CF5MS30S2, CF5MS30S6, CF5MS30S14, CF5MS23S2, CF5MS23S10, CF5MS23S10R, CF5MS29S0, CF5MS29S4, CF5MS29S12, CF5MS29ST, CF2MW8IR, CF2MW11S, CF2MW11SR, CF2MW11ST, CF2MW11SMS, CF2MW11MSD, CF5MS29S0MS, CF5MS29S0MSD, CF5MS30S2MS, CF5MS30S2MSD, CFBBMS9I0S, CFBBMS9I6, CF2MS9I2, CF2MS9I2R, CF2MS9I6, CF2MS9I6D, CF2MW7I, CF2MW7IF, CF2MS9I2RF, CF2MW11SF, CF2MW11SRF, CF2MW8IRF, CF5MS23S10RF, CFBBMS9I0SD, CFBBMS9I0SS, CF2MW11SD, CF2MW11SS, CF2MW11SFD, CF2MW11SFS, CF5MS23S10RD, CF5MS23S10RS, CF5MS23S10RFD, CF5MS23S10RFS, CF5MS29S0D, and CF5MS29S0S
WA005	Wadsworth/Alert Laboratories	CF5BR10S0, CF5BR10S0RE, CF5BR10S0DUP, CF5BR10S4, CF5BR11S0, CF5BR11S6, CF5BR12S4, CF5BR12S6, CF5BR13S2, CF5BR13S4, CF5BR13S4R, CF5BR13S4RF, CF5BR13S4RT, CF5BR18S2, CF5BR18S4, CF5MS24S2, CF5MS24S6, CF5MS24SR, CF5MS24SRF, CF5MS24SRT, CF5MS24S10, CF5BR11S0MS, CF5BR11S0MSD, CF5BR11S0D, CF5BR11S0S, CF5MS24S2MS, and CF5MS24S2MSD
WA006	Wadsworth/Alert Laboratories	CF5BR14S0, CF5BR14S2, CF5BR15S0, CF5BR15S2, CF5BR16S2, CF5BR16S4, CF5BR17S4, CF5BR17S4RE, CF5BR17S6, CF5MS19S0, CF5MS19S4,CF5MS19S4R, CF5MS19S4RF, CF5MS19S4T, CF5MS19S10, CF5MS20S0, CF5MS20S2, CF5MS20S10, CF5MS19S4MS, CF5MS19S4MSD, CF5MS19S4D,CF5MS19S4S, CF519MS4RD, CFDMS19S4RS, CF5MS19S4RFD, CF5MS19S4RFS, CF5MS20S0MS, and CF5MS20MSD
WA007	Wadsworth/Alert Laboratories	CF5MS13S0, CF5MS13S0D, CF5MS13S4, CF5MS13S10, CF5MS8S0,CF5MS8S0 MS, CF5MS8S0 MSD, CF5MS8S0 D, CF5MS8S0 S, CF5MS8S2,CF5MS8S6, CF5BR9S0, CF5BR9S0 DL, CF5BR9S0D, CF5BR9S0D DL, CF5BR9S4, and CF5BR9S4D
WA008	Wadsworth/Alert Laboratories	CF17BR4S0, CF17BR4S2, CF17BR9S0, CF17BR9S2, CF17BR13S0, CF17BR13S0DL, CF17BR13S2, CF17BR6S0, CF17BR6S2,. CF17BR10S0, CF17BR10S2, CF17BR12S0, CF17BR12S2, CF17BR7S0, CF17BR7S2, CF17BR5S0, CF17BR5S2, CF17BR8S0, CF17BR8S2, CF17BR7S2RT, CF17BR7S2R, CF17BR5S0MS, CF17BR5S0MSD, CF17BR7S0MS, CF17BR7S0MSD, CF17BR5S0D, CF17BR5S0S, CF17BR4S2MS, CF17BR4S2MSD, CF17BR11S0, CF17BR11S2, and CF17BR11S2R
WA009	Wadsworth/Alert Laboratories	CF17BR11S0, CF17BR11S2, CF17BR11S2R, CF17BR1S2RT, CF17BR14S0, CF17BR14S0 MS, CF17BR14S0 MSD, CF17BR14S2, CF17BR14S2D, CF17BR15S0, CF17BR15S0D, CF17BR15S2, CF17BR15S2D, CF17BR15S2D MS, CF17BR15S2D MSD, CF17BR15S2DR, CF17BR15S2DRT, CF514I, CF515D, CF513S, CF513SR, CF513ST, CF512D, CF511I, CF511I MS, and CF511I MSD

Table 1-1
LIST OF ENVIRONMENTAL SAMPLES AND SAMPLE DELIVERY GROUP IDENTIFIER
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG Number	Laboratory	Samples
WA010	Wadsworth/Alert Laboratories	CF510S, CF510SF, CF58S, CF58SF, CF526D, CF526DF, CF525I, CF525IF,CF524S, CF524SF, CF527, CF527SF, CF59I, CF59IF, CF59IF, CF59IR,CF59IRF, CF5MW29S, CF5MW29SF, CF5MW29SD, CF5MW29SDF,CF59IT, CF5MW29ST, CF5MW29S(D), CF5MW29S(S), CF5MW29SF(D),CF5MW29SF(S), CF5MW29SMS, CF5MW29SMSD, CF59IRMS, CF59IRMSD,CF510SMS, CF510MSD, CF514I, CF515D, CF513S, CF513SR, CF512D,CF511I, CF17BR14S0, CF17BR14S2, CF17BR14S2D, CF17BR15S0, CF17BR15S0D, CF17BR15S2, CF17BR15S2D, CF17BR15S2DR, CF514IMS, CF514IMSD, CF513SRMS, and CF513SRMSD
WA011	Wadsworth/Alert Laboratories	CF5MW3S, CF5MW3SF, CF5MW4S, CF5MW4SF, CF5MW5S, CF5MW5SF, CF5MW7S, CF5MW7SF, CF5MW16S, CF5MW16SF, CF5MW17I,CF5MW17IF, CF5MW18D, CF5MW18DF, CF5MW19S, CF5MW19SF, CF5MW19S(D)*, CF5MW19S(D)*F, CF5MW20S, CF5MW20SF, CF5MW21I,CF5MW21IF, CF5MW22D, CF5MW22DF, CF5MW23S, CF5MW23SF,CF5MW28D, CF5MW28DF, CF5MW28D(D)*, CF5MW28D(D)*F, CF5MW30S,CF5MW30SF, CF5MW18DR, CF5MW18DRF, CF5MW7ST, CF5MW19ST,CF5MW23ST, CF5MW30SMS, CF5MW30SMSD, CF5MW30S(D)**,CF5MW30S(S)**, CF5MW30SF(D)**, CF5MW30SF(S)**, CF5MW17IMS, CF517IMSD, CF5MW18DMS, CF5MW18DMSD, CF5MW18DRMS, CF5MW18DRMSD, CF5MW20SMS, CF5MW20SMSD, CF5MW22DMS, CF5MW22DMSD, CF5MW28D(D)*MS, CF5MW28D(D)*MSD, CF17MW28DD10, CF17MW28DD35, CF17MW28DD50, CF17MWDD65, CF17MW28DD80, and CF17MW28DD110
WA012	Wadsworth/Alert Laboratories	CF5MW6S, CF5MW6SF, CF5MW6SR, CF5MW6SRF, and CF5MW30ST
WA013	Wadsworth/Alert Laboratories	CF17MW7D, CF17MW7DF, CF17MW8S, CF17MW8SF, CF17MW10D, CF17MW10DF, CF17MW11I, CF17MW11IF, CF17MW12D, CF17MW12DF, CF17MW13S, CF17MW14I, CF17MW14IF, CF17MW15D, CF17MW15DF, CF17MW16S, CF17MW16SF, CF17MW17I, CF17MW17IF, CF17MW18D, CF17MW18DF, CF17MW19S, CF17MW19SF, CF17MW20I, CF17MW20IF, CF17MW20ID, CF17MW20IDF, CF17MW23S, CF17MW23SF, CF17MW11IR, CF17,W11IRF, CF17MW18DR, CF17MW18DRF, CF17MW14IT, CF17MW16ST, CF17MW19ST, CF17MW11IRE, CF17MW12DRE, CF17MW13SRE, CF17MW14IRE, CF17MW15DRE, CF17MW16SRE, CF17MW17IRE, CF17MW18DRE, CF17MW17IRE, CF17MW18DRE, CF17MW19SRE, CF17MW20IRE, CF17MW20IDRE, CF17MW23SRE, CF17MW11IRRE, CF17MW18DRE, CF17MW7DMS, CF17MW7DMSD, CF17MW7DD, CF17MW7DS, CF17MW7DFD, CF17MW7DFS, CF17MW8SMS, CF17MW8SMSD, CF17MW11IRMS, CF17MW11IRMSD, CF17MW17IMS,CF17MW17IMSD, CF17MW19SMS, CF17MW19SMSD, CF17MW20IDMS,and CF17MW20IDMSD

Table 1-1
LIST OF ENVIRONMENTAL SAMPLES AND SAMPLE DELIVERY GROUP IDENTIFIER
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG Number	Laboratory	Samples
WA014	Wadsworth/Alert Laboratories	CF170F, CF170F(F), CF17MW4S, CF17MW4S(F), CF17MW5S, CF17MW5S(F), CF17MW5SDL, CF17MW6S, CF17MW6S(F), CF17MW6S(D)*,CF17MW6S(D)*(F), CF17MW9S, CF17MW9S(F), CF17SC, CF17SCRE,CF17SC(F), CF17MW5SR, CF17MW6ST, CF17MW8ST, CF17MW9ST,CF17MW6SMS, CF17MW6SMSD, CF17MW6S(D)*MS, CF17MW6S(D)*MSD,CF17MW6S(D), CF17MW6S(S), CF17MW6S(F)(D), CF17MW6S(F)(S), CF17MW5SRMS, and CF17MW5SRMSD
WA015	Wadsworth/Alert Laboratories	CF17MW, CF17MW1, CF17MW1RE, CF17MW1F, CF17MW21I, CF17MW21I, CF17MW21IRE, CF17MW21IF, CF17MW22D, CF17MW22DRE,CF17MW22DF, CF17MW24S, CF17MS24SDL, CF17MW24SF, CF17MW24SD,CF17MW25SI, CF17MW25SIF, CF17MW26I, CF17MW26IF, CF17MW27D,CF17MW27DF, CF17MW28DD, CF17MW28DDF, CF17MW22DR,CF17MW22DRRE, CF17MW22DRF. CF17MW26IR, CF17MW1T,CF17MW24ST, CF17MW25SIMS, CF17MW25SIMSD, CF17MW25SID,CF17MW25SIS, CF17MW25SIDF, and CF17MW25SISF
WA016	Wadsworth/Alert Laboratories	CF17SS1, CF17SS2, CF17SS3, CF17SS3D, CF17SS4, CF17SS5, CF17SS6, CF17SS6RE, CF17SS7, CF17SS8, CF17SS9, CF17SS10, CF17SS11, CF17SS12, CF17SS12D, CF17SS13, CF17SS14, CF17SS14R, CF17SS14RF, CF17SS14RT, CF17SS6MS, CF17SS6MSD, CF17SS6REMS, CF17SS6REMSD, CF17SS8MS, CF17SS8MSD, CF17SS6D*, CF17SS6S*, CF17SS14RD*, CF17SS14RS*, CF17SS14RFD*, and CF17SS14RFS*
WA017	Wadsworth/Alert Laboratories	CF5SS1, CF5SS2, CF5SS3, CF5SS11, CF5SS4, CF5SS4 MS, CF5SS4 MSD,CF5SS4 DL, CF5SS5, CF5SS6, CF5SS9, CF5SS8, CF5SS10, CF5SS10 MS,CF5SS10 MSD, CF5SS10D, CF5SS10 S, CF5SS10D, CF5SS10R, CF5SS10R F,CF5SS10RT, CF3MW33DD10, CF3MW33DD20, CF3MW33DD30, CF3MW33DD45, CF3MW33DD50, CF3MW33DD60, CF3MW33DD70, CF3MW33DD90, and CF3MW33DD105
WA018	Wadsworth/Alert Laboratories	CF5SS12, CF5SS13, CF5SS14, CF5SS15, CF5SS16, CF5SS17, CF5SS18,CF5SS19, CF5SS20, CF5SS20D, CF5SS21, CF5SS22, CF5SS23, CF5SS24,CF5SS25, CF5SS26, CF5SS27, CF5SS27R, CF5SS27RF, CF527RT,CF5SS20MS, CF5SS20MSD, CF5SS20D*, and CF5SS20S*
WA019	Wadsworth/Alert Laboratories	CF5SS28, CF5SS7, CF5SS29, CF5SS30, CF5SS30D, CF5SS31, CF5SS31 MS, CF5SS31 MSD, CF5SS31 D, CF5SS31 S, CF5SS31D, CF5SS31R, CF5SS31RF, and CF5SS31RT

Table 2-1
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA003			MSD SDG NO. WA003			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
PESTICIDE/PCB ORGANICS								
CF2MW11S								
gamma-BHC	ug/L	0	1.1	220	0	1.0	200	10
heptachlor	ug/L	0	0.84	168	0	0.84	168	0
aldrin	ug/L	0	0.79	158	0	0.82	164	4
dieldrin	ug/L	0	1.7	170	0	1.7	170	0
endrin	ug/L	0	1.7	170	0	1.7	170	0
4,4'-DDT	ug/L	0	1.7	170	0	1.7	170	0
INORGANICS								
CFBBMS9I0S:								
mercury	mg/kg	0	0.155	27	-	-	-	-
CF2MW11SS:								
cyanide	ug/L	0	157	157	-	-	-	-
CF5MS29S0S:								
antimony	mg/kg	0	81.3	69	-	-	-	-
mercury	mg/kg	0	0.74	130	-	-	-	-
selenium	mg/kg	0	1.77	73	-	-	-	-
cyanide	mg/kg	0	9.08	153	-	-	-	-

%R = percent recovery.
ug/kg = micrograms per kilogram.
RPD = relative percent difference.
ug/l = micrograms per liter.
N/A = not applicable.
- = not analyzed or all criteria met.

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA005			MSD SDG NO. WA005			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS								
4-chloro-3-methylphenol	ug/kg	0	610	22	-	-	-	86
4-nitrophenol		0	0	0	0	0	0	-
1,2,4-trichlorobenzene		-	-	-	-	-	-	33
acenaphthene		-	-	-	-	-	-	19
PESTICIDE/PCB ORGANICS (All criteria were met)		-	-	-	-	-	-	-
INORGANICS (All criteria were met)		-	-	-	-	-	-	-

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA006			MSD SDG NO. WA006			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS n-nitroso-di-n-propylamine	ug/kg	0	960	48	0	800	40	18
PESTICIDE/PCB ORGANICS (All criteria were met)		-	-	-	-	-	-	-
INORGANICS antimony (CF5MS19S4S) thallium (CF5MS19S4RFS)	 mg/kg ug/L	 2.72 0	 82.6 76.5	 73 153	 - -	 - -	 - -	 - -

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA007			MSD SDG NO. WA007			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS (All criteria were met)	-	-	-	-	-	-	-	-
PESTICIDE/PCB ORGANICS								
heptachlor	ug/kg	0	11	55	0	16	80	37
INORGANICS								
mercury	mg/kg	0.119	0.426	72.2	-	-	N/A	-
selenium	mg/kg	0.82	2.56	74.0	-	-	N/A	-

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA008			MSD SDG NO. WA008			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS acenaphthene	ug/kg	0	1200	54	0	1500	68	23
PESTICIDE/PCB ORGANICS (All criteria were met)		-	-	-	-	-	-	-
INORGANICS zinc	mg/kg	11.65	-	-	47.94	-	-	122

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MSD SDG NO. WA009			MSD SDG NO. WA009			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
PESTICIDE/PCB ORGANICS								
heptachlor	ug/kg	0	18	86	0	13	62	32
INORGANICS								
arsenic	mg/kg	0.5	7.26	72.3	-	-	N/A	-
lead	mg/kg	2.96	6.20	64.5	-	-	N/A	-
arsenic	ug/L	67.8	122	136	-	-	N/A	-

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA010			MSD SDG NO. WA010			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS								
(All criteria were met)		-	-	-	-	-	-	
SEMIVOLATILE ORGANIC COMPOUNDS								
4-nitrophenol	ug/L	0	65	87	0	68	91	4
PESTICIDE/PCB ORGANICS								
gamma-BHC	ug/L	0	0.48	96	0	0.59	118	21
heptachlor		0	0.33	66	0	0.26	52	24
aldrin		0	0.38	76	0	0.23	46	49
4,4'-DDT		0	0.78	78	0	0.43	43	58
INORGANICS								
antimony (total)	ug/L	0	217	43	-	-	-	NC
arsenic (total)	ug/L	0	29.4	72	-	-	-	NC
selenium (total)	ug/L	0	4.7	47	-	-	-	NC
cyanide (total)	ug/L	0	56.5	54	-	-	-	NC
aluminum (total)	ug/L	118300	-	-	180400	-	-	42
chromium (total)	ug/L	89.4	-	-	136	-	-	41
iron (total)	ug/L	6433	-	-	13168	-	-	69
iron (dissolved)	ug/L	787	-	-	979	-	-	22

NC = Not Calculated

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA011			MSD SDG NO. WA011			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS								
toluene	ug/L	21	39	72	21	69	192	92
benzene	ug/L	16	41	100	16	47	124	21
SEMIVOLATILE ORGANIC COMPOUNDS								
acenaphthene	ug/L	0	46	92	0	31	62	39
4-nitrophenol	ug/L	0	100	133	0	20	27	132
pyrene	ug/L	0	12	24	0	9	18	28
PESTICIDE/PCB ORGANICS								
aldrin	ug/L	0	0.16	32	0	0.18	36	12
dieldrin	ug/L	0	0.43	43	0	0.46	46	7
INORGANICS								
antimony	ug/L	14.3	308	59	-	-	-	-
selenium	ug/L	0	15.0	150	-	-	-	-

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA013			MSD SDG NO. WA013			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS								
(All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS								
4-chloro-3-methylphenol	ug/L	0	64	85*	0	75	100	16*
4-nitrophenol	ug/L	0	56	75*	0	74	99	27*
2,4-dinitrotoluene	ug/L	0	43	86*	0	51	102	17*
pentachlorophenol	ug/L	0	73	97*	0	87	116	18*
* values within QC limits								
PESTICIDE/PCB ORGANICS								
(All criteria were met)		-	-	-	-	-	-	-
INORGANICS								
selenium (total)	ug/L	0	4.6	46	-	-	-	N/A
arsenic (dissolved)	ug/L	2.6	31.8	73	-	-	-	N/A
selenium (dissolved)	ug/L	0	4.9	49	-	-	-	N/A
iron (total)	ug/L	202	-	N/A	138	-	N/A	38
vanadium (dissolved)	ug/L	3.57	-	N/A	4.47	-	N/A	22
zinc (dissolved)	ug/L	20.4	-	N/A	15.5	-	N/A	27

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA014			MSD SDG NO. WA014			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS								
benzene	ug/L	24	33	90*	24	32	80*	12
toluene	ug/L	14	24	100*	14	22	80*	22
*values within QC limits								
SEMIVOLATILE ORGANIC COMPOUNDS								
4-nitrophenol	ug/L	0	82	109	0	37	49*	76
pyrene	ug/L	0	39	78*	0	25	50*	44
* values within QC limits								
PESTICIDE/PCB ORGANICS								
4,4'-DDT	ug/L	0	0	0	0	0.093	9	200
INORGANICS								
antimony (total)	ug/L	0	351	70	-	-	-	N/A
selenium (total)	ug/L	0	5.00	50	-	-	-	N/A
lead (total)	ug/L	17.9	-	N/A	26.3	-	N/A	38
zinc (total)	ug/L	41.3	-	N/A	33.1	-	N/A	22

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA015			MSD SDG NO. WA015			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS								
(All criteria were met)		-	-	-	-	-	-	
SEMIVOLATILE ORGANIC COMPOUNDS								
4-nitrophenol	ug/L	0	70	93	0	70	93	0*
2,4-dinitrotoluene	ug/L	0	51	102	0	52	104	2*
pentachlorophenol	ug/L	0	82	109	0	93	124	13*
* values within QC limits								
PESTICIDE/PCB ORGANICS								
gamma-BHC	ug/L	0	0.41	82*	0	0.49	98*	18
*values within QC limits								
INORGANICS								
antimony (total)	ug/L	0	386	77	-	-	-	N/A
iron (total)	ug/L	3312	3560	25	-	-	-	N/A
cyanide (total)	ug/L	0	55.5	56	-	-	-	N/A
selenium (dissolved)	ug/L	0	13.7	137	-	-	-	N/A
chromium (total)	ug/L	38.1	-	N/A	27.3	-	-	33

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA016			MSD SDG NO. WA016			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS 4-nitrophenol * value within QC limits	ug/kg	0	900	30*	0	1900	63	71
PESTICIDE/PCB ORGANICS (All criteria were met)		-	-	-	-	-	-	-
INORGANICS mercury thallium calcium	 ug/L ug/L mg/kg	 0 0 5924	 0.70 63 -	 77 126 N/A	 - - 3255	 - - -	 - - N/A	 N/A N/A 58

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANIC COMPOUNDS MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG No. WA017			MSD SDG No. WA017			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS 2,4-dinitrotoluene	ug/kg	0	2100	105	0	2000	100	5
PESTICIDE/PCB ORGANICS 4,4'-DDT	ug/kg	0	4.6	11	0	3.5	9	20
INORGANICS (All criteria were met)		-	-	-	-	-	-	-

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG NO. WA018			MSD SDG NO. WA018			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS (All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS								
pyrene	ug/kg	1400	2100	33	1400	3200	86*	89
acenaphthene	ug/kg	100	1200	52*	100	1500	67*	25
* values within QC limits								
PESTICIDE/PCB ORGANICS (All criteria were met)		-	-	-	-	-	-	-
INORGANICS								
selenium	mg/kg	0	1.71	70	N/A	-	-	-
manganese	mg/kg	75.3	-	-	52.0	-	-	37

Table 2-1 (Continued)
NON-COMPLIANT MATRIX SPIKE/MATRIX SPIKE DUPLICATES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANIC COMPOUNDS MATRIX SPIKE SUMMARY TABLE	UNITS	MS SDG No. WA019			MSD SDG No. WA019			RPD
		UNSPIKED	SPIKED	% R	UNSPIKED	SPIKED	% R	
VOLATILE ORGANIC COMPOUNDS								
(All criteria were met)		-	-	-	-	-	-	-
SEMIVOLATILE ORGANIC COMPOUNDS								
1,2,4-trichlorobenzene	ug/kg	0	1400	70	0	1800	90	25
4-chloro-3-methylphenol	ug/kg	0	2800	96	0	3600	124	25
2,4-dinitrotoluene	ug/kg	0	1400	70	0	2000	100	35
pentachlorophenol	ug/kg	0	3000	103	0	3500	121	16
pyrene	ug/kg	190	4100	195	0	3100	145	29
PESTICIDE/PCB ORGANICS								
(All criteria were met)		-	-	-	-	-	-	-
INORGANICS								
antimony	mg/kg	0	82.0	71.3	N/A	N/A	N/A	N/A

%R = percent recovery.
ug/kg = micrograms per kilogram.
RPD = relative percent difference.
PCB = polychlorinated biphenyls.

ug/l = micrograms per liter.
N/A = not applicable.
- = not analyzed or all criteria met.

Table 2-2
COMPARISON BETWEEN FIELD DUPLICATE SAMPLES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SOIL SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter	Sample Conc. (ug/kg)	Duplicate Conc. (ug/kg)	RPD	RPD Limit
WA005		Organics				
	CRF5BR10S0/ CF5BR10S0D	trichloroethene	ND	560J	200	60
		toluene	ND	590J	200	60
		ethylbenzene	ND	640J	200	60
		xylene (total)	1200	12000	164	60
		acenaphthene	1000J	ND	200	60
		dibenzofuran	1300J	ND	200	60
		fluorene	940J	ND	200	60
		bis(2-ethylhexyl)phthalate	520J	ND	200	60
		Inorganics				
		(All criteria were met)	-	-	-	-

SOIL AND WATER SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter Units	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA006		Organics				
		(All criteria were met)	-	-	-	-
		Inorganics				
	CF5MS19S4D	iron	244 mg/kg	367 mg/kg	40	35
		Organics				
		(No water samples evaluated)	-	-	-	-
		Inorganics				
	CF5MS19S4RD	cyanide	5.08 ug/L	10.4 ug/L	69	20

Table 2-2 (Continued)
COMPARISON BETWEEN FIELD DUPLICATE SAMPLES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SOIL SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter Units	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA007		VOLATILE ORGANICS				
		(All criteria were met)	-	-	-	-
		SEMIVOLATILE ORGANICS				
	CF5BR9S0 D	carbazole	530	280	61.7	60
		chrysene	1800	900	66.7	60
		benzo(k)fluoranthene	690	330	70.6	60
		indeno(1,2,3-cd)pryene	620	340	79.2	60
		benzo(g,h,i)perylene	540	210	88	60
		PESTICIDE/PCB ORGANICS				
	CF5BR9S4 D	aldrin	1.9	0.5	117	60
		INORGANICS				
	CF5MS8S0 D (Lab Dup.)	calcium	2856	1455	65.0	20
	CF5BR9S4 D (Field Dup.)	iron	2710	1030	89.8	60

SOIL SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter Units	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA008		Organics				
	CF17BR5S0	acenaphthene	54	68	23	19
		Inorganics				
	CF17BR5S0	zinc	11.65 mg/kg	47.94 mg/kg	122	35

Table 2-2 (Continued)
COMPARISON BETWEEN FIELD DUPLICATE SAMPLES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SOIL SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter Units	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA009		VOLATILE ORGANICS				
	CF17BR14S2/ CF17BR14S2D	acetone	960	590	47.7	60
	CF17BR15S0/ CF17BR15S0D	acetone	1000	650	42.4	60
	CF17BR15S2/ CF17BR15S2D	acetone	3000	2300	26.4	60
		SEMIVOLATILE ORGANICS				
		(All criteria were met)	-	-	-	-
		PESTICIDE/PCB ORGANICS				
		(All criteria were met)	-	-	-	-
		INORGANICS				
		(All criteria were met)	-	-	-	-

WATER SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter Units	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA010		Organics				
	CF5MW29S	gamma-BHC	0.48	0.59	21	15
		heptachlor	0.33	0.26	24	20
		aldrin	0.38	0.23	49	22
		4,4'-DDT	0.78	0.43	58	27
		Inorganics				
	CF5MW29S	aluminum (total)	118300	180400	42	20
		chromium (total)	89.4	136	41	20
		iron (total)	6433	13168	69	20
		iron (dissolved)	787	979	22	20
		chloride	41 mg/L	26 mg/L	45	30
		Total Dissolved Solids	1200 mg/L	690 mg/L	54	30

Table 2-2 (Continued)
COMPARISON BETWEEN FIELD DUPLICATE SAMPLES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

WATER SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter Units	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA011		Organics				
	CF5MW30S	toluene	72	192	92	13
		benzene	100	124	21	11
		Inorganics				
		(All criteria were met)	-	-	-	-

WATER SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA013		Organics				
		(All criteria were met)	-	-	-	-
		Inorganics				
	CF17MW20I/20ID	aluminum	2960	1930	43	30
	CF17MW20I/20ID	iron	700	476	38	30
	CF17MW20IF/20IDF	aluminum	49.2	77.0	44	30

Table 2-2 (Continued)
COMPARISON BETWEEN FIELD DUPLICATE SAMPLES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

WATER SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA015		Organics				
	CF17MW24S	methylene chloride	20000	28000	33	30
		Inorganics				
	CF17MW24S (total)	zinc	228	126	58	30
	CF17MW24SF (dissolved)	arsenic	5.7	2.8	68	30
	CF17MW24SF (dissolved)	barium	20.9	29.5	34	30

SOIL SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA016		Organics				
	CF17SS3	2-butanone	170	85	67	60
		toluene	76	190	86	60
		4-methylphenol	990	570	71	50
		Inorganics				
	CF17SS6	calcium	5924	3255	58	35

Table 2-2 (Continued)
COMPARISON BETWEEN FIELD DUPLICATE SAMPLES
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SOIL SAMPLE AND DUPLICATE PRECISION						
SDG NO.	Sample ID	Parameter	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA018	CF5SS20 CF5SS20/20D	Organics pyrene benzo(a)pyrene	33	86	89 61	36 60
	CF5SS20D	Inorganics manganese	75.3 mg/kg	52.0 mg/kg	37	35

SOIL SAMPLE AND DUPLICATE PRECISION						
SDG No.	Sample ID	Parameter	Sample Conc.	Duplicate Conc.	RPD	RPD Limit
WA019		VOLATILE ORGANICS (All criteria were met)	-	-	-	-
		SEMIVOLATILE ORGANICS (All criteria were met)	-	-	-	-
		PESTICIDE/PCB ORGANICS (All criteria were met)	-	-	-	-
	CF5SS31 D (Lab Dup.)	INORGANICS calcium	6545	4799	30.8	20

ND = Not Detected
RPD = Relative Percent Diference
ug/l = Micrograms per Liter
ug/kg = Micrograms per Kilogram
mg/kg = Milligrams per Kilogram

Table 2-3
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA003	INITIAL	CONTIN-UING 9/27/93 07:29	CONTIN-UING 9/28/93 07:21	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
VOLATILE ORGANIC COMPOUNDS						
acetone	-	45.0	-	-	-	-
carbon disulfide	-	41.6	-	-	-	-
2-hexanone	-	-	40.3	-	-	-
QUALIFICATION		J (+)	J (+)			
SAMPLES AFFECTED	-	None	None	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA003	INITIAL	CONTIN-UING 9/29/93 21:00	CONTIN-UING 10/2/93 13:35	CONTIN-UING 10/3/93 07:25	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
3-nitroaniline	-	31.2	25.9	-	-	-
pentachlorophenol	-	-	40.0	27.0	-	-
3,3'-dichlorobenzidine	-	-	30.1	28.7	-	-
QUALIFICATION		J (+)	J (+)	J (+)		
SAMPLES AFFECTED	-	None	None	None	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA003	INITIAL 10/12/93	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS						
methyoxychlor	22.1	-	-	-	-	-
QUALIFICATION	J (+)					
SAMPLES AFFECTED	None	-	-	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA005	INITIAL 8/11/93	CONTIN-UING 10/1/93 08:36	CONTIN-UING 10/4/93 12:15	CONTIN-UING 10/5/93 08:28	CONTIN-UING 10/6/93 07:17	CONTIN-UING 10/6/93 08:19
PARAMETER	% RSD	% D	% D	% D	% D	% D
VOLATILE ORGANIC COMPOUNDS						
acetone	31.6	30.0	-	-	-	32.3
bromoform	-	25.4	26.1	-	34.8	-
carbon disulfide	-	-	67.0	-	-	-
2-butanone	-	-	36.1	-	29.8	37.6
2-hexanone	-	-	-	32.8	60.7	28.4
trans-1,3-dichloroporpene	-	-	-	-	31.1	-
QUALIFICATION	J (+)	J (+)	J (+)	J (+)	J (+)	J (+)
SAMPLES AFFECTED	CF5BR 13S4RT	CF5MS 24SRT	CF5BR 13S4RT	None -	None -	CF5BR 24S2
	CF5MS 24SRT	- -	- -	- -	- -	- -

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA005	INITIAL	CONTIN-UING 10/10/93 07:49	CONTIN-UING 10/12/93 10:38	CONTIN-UING 10/14/93 10:13	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
2,4-dinitrophenol	-	39.3	31.0	34.5	-	-
3,3'-dichlorobenzidine	-	37.1	-	-	-	-
QUALIFICATION		J (+)	J (+)	J (+)		
SAMPLES AFFECTED		None	None	None	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA005	INITIAL 10/12/93	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS						
methoxychlor	21.2	-	-	-	-	-
QUALIFICATION	J (+)					
SAMPLES AFFECTED	None	-	-	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG: WA006	INITIAL 8/11/93	CONTIN-UING 10/8/93 08:43	CONTIN-UING 10/11/93 10:06	CONTIN-UING 10/11/93 07:35	CONTIN-UING 10/12/93 15:00	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
VOLATILE ORGANIC COMPOUNDS						
chloromethane		51.5	-	-	-	-
acetone	31.6	26.4	37.7	-	-	-
2-butanone	-	28.7	28.6	-	40.7	-
trans-1,3-dichloropropene	-	-	-	32.6	-	-
bromoform	-	-	-	29.1	-	-
4-methyl-2-pentanone	-	-	-	38.8	-	-
2-hexanone	-	-	-	53.2	-	-
carbon disulfide	-	-	-	-	104	-
QUALIFICATION	J (+)	J (+)	J (+)	J (+)	J (+)	
SAMPLES AFFECTED	None	CF5BR15 S0	CF5MS19 S4	None	None	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG: WA006	INITIAL	CONTIN-UING 10/12/93 10:38	CONTIN-UING 10/17/93 15:25	CONTIN-UING 10/21/93 16:52	CONTIN-UING 10/22/93 11:34	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
2,4-dinitrophenol	-	31.0	45.2	46.4	54.8	-
3-nitroaniline	-	-	26.3	-	28.1	-
QUALIFICATION		J (+)	J (+)	J (+)	J (+)	
SAMPLES AFFECTED	-	None	None	None	None	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY				
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA006	INITIAL 10/27/93	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS				
methoxychlor	21.7	-	-	-
QUALIFICATION	J (+)			
SAMPLES AFFECTED	None	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY				
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA007	INITIAL	CONTIN-UING 10/19/93 10:18	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D
VOLATILE ORGANIC COMPOUNDS				
chloromethane	-	27.3	-	-
vinyl chloride	-	26.9	-	-
chloroethane	-	29.8	-	-
QUALIFICATION	None	J (+)		
SAMPLES AFFECTED	None	None	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY				
INITIAL AND CONTINUING CALIBRATION SUMMARY TABEL SDG WA007 PARAMETER	INITIAL	CONTIN-UING 10/30/93 10:07	CONTIN-UING 10/31/93 11:07	CONTIN-UING
	% RSD	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS				
2,4-dinitrophenol	-	40.5	-	-
3-nitroaniline	-	-	27.2	-
4-nitroaniline	-	32.3	29.9	-
pentachlorophenol	-	-	39.1	-
3-3'-dichlorobenzidine	-	-	28.1	-
bis-(2-ethylhexyl)phthalate	-	-	27.1	-
QUALIFICATION	None	J (+)	J (+) J(All)-bis-(2-ethylhexyl)phthalate	
SAMPLES AFFECTED	None	None	CF5BR9S0	-
	-	-	CF5BR9S0DL	-
	-	-	CF5BR9S0D	-
	-	-	CF5BR9S0DDL	-
	-	-	CF5BR9S4	-
	-	-	CF5BR9S4D	-
	-	-	CF5MS13S0	-
	-	-	CF5MS13S0D	-
	-	-	CF5MS13S4	-
	-	-	CF5MS8S0	-
	-	-	CF5MS8S2	-
	-	-	CF5MS8S0MS	-
	-	-	CF5MS8S0MSD	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG: WA008	INITIAL 10/22/93	CONTIN-UING 11/15/93 08:19	CONTIN-UING 11/19/93 07:55	CONTIN-UING 11/20/93 10:27	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D		
VOLATILE ORGANIC COMPOUNDS						
chloromethane	-	-	-	32.2	-	-
chloroethane	-	27.4	-	-	-	-
acetone	61 3	-	34.1	47.0	-	-
methylene chloride	35.1	-	-	28.6	-	-
carbon disulfide	-	-	-	25.8	-	-
2-butanone	58.0	-	-	93.6	-	-
2-hexanone	-	-	-	43.2	-	-
QUALIFICATION	J (+)	J (+)	J (+)	J (+)		
SAMPLES AFFECTED	None -	None -	CF17BR8S2 CF17BR8S0	CF17BR7S2R -	- -	- -

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG: WA008	INITIAL 10/29/93	CONTIN-UING 11/16/93 08:03	CONTIN-UING 11/17/93 13:09	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
VOLATILE ORGANIC COMPOUNDS						
chloromethane	40.5	-	-	-	-	-
acetone	48.1	26.7	30.2	-	-	-
QUALIFICATION	J (+)	J (+)	J (+)			
SAMPLES AFFECTED	CF17BR5S0 CF17BR8S2 CF17BR13S0 CF17BR13S2	None - - -	None - - -	- - - -	- - - -	- - - -

Table 2-3
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG: WA008	INITIAL	CONTIN-UING 11/20/93 09:49	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
hexachlorobutadiene	-	25.5	-	-	-	-
4-chloro-3-methylphenol	-	31.8	-	-	-	-
2-nitroaniline	-	39.1	-	-	-	-
4-chlorophenyl-phenylether	-	27.8	-	-	-	-
QUALIFICATION		J (+)				
SAMPLES AFFECTED	-	None	-	-	-	-

Table 2-3 (Continued)

INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY							
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA009	INITIAL 10/29/93	INITIAL 10/22/93	CONTIN-UING 11/19/93 9:24	CONTIN-UING 11/19/93 7:55	CONTIN-UING 11/20/93 10:27	CONTIN-UING 11/21/93 10:29	CONTIN-UING 11/22/93 9:04
PARAMETER	% RSD	%RSD RRF	SOIL % D	M SOIL % D	WATER % D	WATER % D	WATER % D
VOLATILE ORGANIC COMPOUNDS							
chloromethane	40.8	-	-	-	32.2	-	
methylene chloride	-	35.1	-	-	28.6	32.7	37.8
acetone	48.1	61.3	36.6	34.1	47	61.7	40.0
carbon disulfide	-	-	-	-	25.8	-	-
2-butanone	-	58.0	31 1	-	93.6	-	25.5
4-methyl-2-pentanone	-	-	-	-	-	27.3	28.4
2-hexanone	-	RRF 0.04	27.2	-	43.2	27.3	29.5
QUALIFICATION	J (+)	J (+) & R	J (+)	J (+)	J (+)	J (+)	J (+)
SAMPLES AFFECTED							
acetone	(*)	CF514I	7BR14S2	7BR15S2	CF514I	CF515D	None
	7BR14S2	CF513S	BR15S0D	BR15S2D	CF513S	CF513ST	-
	BR15S0D	CF512D	-	-	CF512D	-	-
		CF511I	-	-	CF511I	-	-
		CF515D	-	-	-	-	-
		CF513ST	-	-	-	-	-
2-hexanone		All water	-	-	-	-	-
		samples	-	-	-	-	-

* : Only the last seven digits of the sample I.D. were used.

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY				
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA009	INITIAL 11/22/93	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS di-n-octylphthalate	34.7	-	-	-
QUALIFICATION	J (+)			
SAMPLES AFFECTED	None	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY				
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA009	INITIAL 11/24/93	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS methoxychlor	22.1	-	-	-
QUALIFICATION	None	-	-	-
SAMPLES AFFECTED	None	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA010	INITIAL 10/22/93	CONTIN-UING 11/21/93 10:29	CONTIN-UING 11/22/93 09:04	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
VOLATILE ORGANIC COMPOUNDS						
acetone	61.3	61.7	40.0	-	-	-
methylene chloride	35.1	32.7	37.8	-	-	-
2-butanone	58.	-	25.5	-	-	-
4-methyl-2-pentanone	-	27.3	28.4	-	-	-
2-hexanone	-	27.3	29.5	-	-	-
QUALIFICATION	J (+)	J (+)	J (+)			
SAMPLES AFFECTED	CF524S CF525I CF527S	CF527S - -	CF524S CF525I -	- - -	- - -	- - -

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA010	INITIAL 11/22/93	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
di-n-octylphthalate	34.7	-	-	-	-	-
QUALIFICATION	J (+)	-	-	-	-	-
SAMPLES AFFECTED	None	-	-	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA010	INITIAL 10/24/93	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS						
endrin ketone	22.1	-	-	-	-	-
QUALIFICATION	J (+)	-	-	-	-	-
SAMPLES AFFECTED	None	-	-	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA011 PARAMETER	INITIAL	CONTIN-UING 12/6/93 07:32	CONTIN-UING 12/8/93 17:45	CONTIN-UING	CONTIN-UING	CONTIN-UING
	% RSD	% D	% D			
VOLATILE ORGANIC COMPOUNDS						
chloroethane	-	67.6	-	-	-	-
acetone	-	41.2	39.2	-	-	-
carbon tetrachloride	-	89.6	-	-	-	-
2-butanone	-	-	52.8	-	-	-
2-hexanone	-	-	38.1	-	-	-
QUALIFICATION		J (+)	J (+)			
SAMPLES AFFECTED	-	CF5MW4S	CF5MW3S	-	-	-
	-	CF5MW30S	CF5MW5S	-	-	-
	-	CF5MW7ST	-	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA011 PARAMETER	INITIAL 11/22/93	CONTIN-UING 12/7/93 13:46	CONTIN-UING 12/8/93 10:59	CONTIN-UING 12/9/93 07:54	CONTIN-UING 12/11/93 07:31	CONTIN-UING
	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
di-n-octylphthalate	34.7	-	-	-	33.8	-
2-nitroaniline	-	27.6	27.6	-	-	-
2,2'-oxybis(1-chloropropane)	-	-	31.4	38.5	26.5	-
4-nitroaniline	-	-	27.2	34.6	28.4	-
n-nitroso-di-n-propylamine	-	-	-	26.2	-	-
4-nitrophenol	-	-	-	46.8	40.5	-
indeno(1,2,3-cd)pyrene	-	-	27.0	-	-	-
QUALIFICATION	J (+)	J (+)	J (+)	J (+)	J (+)	
SAMPLES AFFECTED	None	None	None	None	None	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA011	INITIAL 12/10/93	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS						
alpha-BHC	20.8	-	-	-	-	-
methoxychlor	21.8	-	-	-	-	-
QUALIFICATION	J (+)					
SAMPLES AFFECTED	None	-	-	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA012	INITIAL	CONTIN-UING 12/8/93 17:45	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	%D	%D	%D
VOLATILE ORGANIC COMPOUNDS						
acetone	-	39.2	-	-	-	-
2-butanone	-	52.8	-	-	-	-
2-hexanone	-	38.1	-	-	-	-
QUALIFICATION		J (+)				
SAMPLES AFFECTED	-	CF5MW6S	-	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA012	INITIAL 11/22/93	CONTIN-UING 12/9/93 07:54	CONTIN-UING 12/11/93 07:31	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
di-n-octylphthalate	34.7	-	33.8	-	-	-
2,2'-oxybis(1-chloropropane)	-	38.5	26.5	-	-	-
n-nitroso-di-n-propylamine	-	26.2	-	-	-	-
4-nitrophenol	-	46.8	40.5	-	-	-
4-nitroaniline	-	34.6	28.4	-	-	-
QUALIFICATION	J (+)	J (+)	J (+)			
SAMPLES AFFECTED	None	None	None	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA012	INITIAL 12/16/93	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS						
alpha-BHC	20.5	-	-	-	-	-
QUALIFICATION	J (+)					
SAMPLES AFFECTED	None	-	-	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA013	INITIAL	CONTIN-UING 1/4/94 08:14	CONTIN-UING 1/5/94 08:02	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D			
VOLATILE ORGANIC COMPOUNDS						
methylene chloride	-	43.9	34.9	-	-	-
2-butanone	-	-	47.2	-	-	-
2-hexanone	-	-	50.0	-	-	-
QUALIFICATION		J (+)	J (+)			
SAMPLES AFFECTED	-	None	None	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA013	INITIAL 11/22/93	CONTIN-UING 1/7/94 07:35	CONTIN-UING 1/9/94 10:10	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
di-n-octylphthalate	34.7	-	-	-	-	-
4-chloroaniline	-	34.-1	27.2	-	-	-
3-nitroaniline	-	68.4	63.2	-	-	-
4-nitrophenol	-	39.2	41.8	-	-	-
n-nitrosodiphenylamine	-	45.2	41.7	-	-	-
carbazole	-	26.0	34.3	-	-	-
3,3'-dichlorobenzidine	-	43.2	31.2	-	-	-
QUALIFICATION	J (+)	J (+)	J (+)			
SAMPLES AFFECTED	None	None	None	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA014	INITIAL	CONTIN-UING 1/5/94 08:02	CONTIN-UING 1/11/94 07:52	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D			
VOLATILE ORGANIC COMPOUNDS						
methylene chloride	-	34.9	-	-	-	-
acetone	-	-	48.0	-	-	-
carbon tetrachloride	-	-	28.4	-	-	-
2-butanone	-	47.2	-	-	-	-
2-hexanone	-	50.0	40.5	-	-	-
QUALIFICATION		J (+)	J (+)			
SAMPLES AFFECTED	-	None	None	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA014	INITIAL 11/22/93	CONTIN-UING 1/10/94 09:45	CONTIN-UING 1/17/94 13:39	CONTIN-UING 1/10/94 07:33	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
di-n-octylphthalate	34.7	-	-	-	-	-
4-chloroaniline	-	26.7	39.5	37.7	-	-
3-nitroaniline	-	-	30.8	71.4	-	-
4-nitrophenol	-	-	35.4	27.8	-	-
n-nitrosodiphenylamine	-	28.8	-	34.0	-	-
carbazole	-	-	37.1	29.7	-	-
3,3'-dichlorobenzidine	-	35.1	66.3	39.3	-	-
QUALIFICATION	J (+)	J (+)	J (+)	J (+)	-	-
SAMPLES AFFECTED	None	None	None	None	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA015	INITIAL	CONTIN-UING 1/19/94 07:48	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D			
VOLATILE ORGANIC COMPOUNDS						
acetone	-	28.9	-	-	-	-
bromoform	-	30.8	-	-	-	-
2-hexanone	-	33.9	-	-	-	-
QUALIFICATION		J (+)				
SAMPLES AFFECTED	-	None	-	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA015	INITIAL 11/22/93	CONTIN-UING 1/17/94 13:39	CONTIN-UING 1/20/94 07:33	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
di-n-octylphthalate	34.7	-	-	-	-	-
4-chloroaniline	-	39.5	37.7	-	-	-
3-nitroaniline	-	30.8	71.4	-	-	-
4-nitrophenol	-	35.4	27.8	-	-	-
n-nitrosodiphenylamine	-	-	34.0	-	-	-
carbazole	-	37.1	29.7	-	-	-
3,3'-dichlorobenzidine	-	66.3	39.3	-	-	-
QUALIFICATION	J (+)	J (+)	J (+)			
SAMPLES AFFECTED	None	None	None	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA015	INITIAL 1/25/94	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS heptachlor	22.1	-	-	-	-	-
QUALIFICATION	J (+)					
SAMPLES AFFECTED	None	-	-	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA016	INITIAL	CONTIN-UING 2/17/94 07:39	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	%D	%D	%D	%D
VOLATILE ORGANIC COMPOUNDS acetone	-	38.8	-	-	-	-
QUALIFICATION		J (+)				
SAMPLES AFFECTED	-	None	-	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA016	INITIAL 2/28/94	CONTIN-UING 3/3/94 14:29	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
3-nitroaniline	39.1	40.2	-	-	-	-
2,4-dinitrophenol	-	33.7	-	-	-	-
3,3'-dichlorobenzidine	-	57.6	-	-	-	-
indeno(1,2,3-cd)pyrene	-	27.5	-	-	-	-
benzo(g,h,i)perylene	-	35.8	-	-	-	-
QUALIFICATION	J (+)	J (+)				
SAMPLES AFFECTED	None	None	-	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA016	INITIAL 3/1/94	INITIAL 3/7/94	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% RSD	% D	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS						
alpha-BHC	20.4 (1)	-	-	-	-	-
alpha-BHC	20.4 (2)	-	-	-	-	-
beta-BHC	21.1 (1)	-	-	-	-	-
methoxychlor	20.3 (1)	-	-	-	-	-
methoxychlor	-	20.3 (1)	-	-	-	-
methoxychlor	-	29.7 (2)	-	-	-	-
QUALIFICATION	J (+)	J (+)				
SAMPLES AFFECTED	None	None	-	-	-	-

(1) = column 1, (2) = column 2

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON- COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA017	CONTIN-UING 3/2/94 7:27	CONTIN-UING 3/3/94 7:34	CONTIN-UING 3/2/94 9:35	CONTIN-UING 3/3/94 8:09	CONTIN-UING	CONTIN-UING
PARAMETER	M SOIL % D	WATER %D	SOIL % D	SOIL % D		
VOLATILE ORGANIC COMPOUNDS						
chloroethane	-	-	-	30.7	-	-
acetone	40.4	49.8	-	47.4	-	-
2-butanone	49.6	44.5	66.7	137.1	-	-
1,2-dichloropropane	29.7	-	-	-	-	-
4-methyl-2-pentanone	47.7	35.1	-	-	-	-
2-hexanone	49.7	38.2	73.2	75.5	-	-
1,1,2,2-tetrachloroethane	28.3	-	-	-	-	-
QUALIFICATION	J (+)	J (+)	J (+)	J (+)		
SAMPLES AFFECTED						
acetone	None	CF5SS4	None	CF5SS10D	-	-
	-	CF5SS10R	-	CF5SS10MS	-	-
	-	CF5SS10RT	-	CF5SS10MSD	-	-
	-	CF5SS4MS	-	-	-	-
	-	CF5SS4MSD	-	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY				
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA017 PARAMETER	INITIAL 2/28/94	CONTIN-UING 3/3/94 14:29	CONTIN-UING 3/9/94 10:25	CONTIN-UING
	% RSD	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS				
3-nitroaniline	39.1	40.2	-	-
2,4-dinitrophenol	-	33.7	-	-
3,3'-dichlorobenzidine	-	57.6	34.7	-
indeno (1,2,3-cd) pyrene	-	27.5	-	-
benzo (g,h,i) perylene	-	35.8	-	-
4-nitroaniline	-	-	25.8	-
QUALIFICATION	J (+)	J (+)	J (+)	
SAMPLES AFFECTED	None		None	
indeno (1,2,3-cd) pyrene	-	CF5SS1	-	-
benzo (g,h,i) perylene	-	CF5SS1	-	-
	-	CF5SS2	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA017	INITIAL 3/11/94 column RTX1701	INITIAL 3/11/94 column RTX5	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% RSD	% D	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS						
alpha-BHC	21.9	22.8	-	-	-	-
methoxychlor		20.3	-	-	-	-
QUALIFICATION	None	None				
SAMPLES AFFECTED	None	None	-	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA018	INITIAL	CONTIN-UING 3/4/94 08:49	CONTIN-UING 3/3/94 08:09	CONTIN-UING 3/4/94 09:18	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	%D	%D	%D	%D
VOLATILE ORGANIC COMPOUNDS						
chloromethane	-	-	30.7	-	-	-
acetone	-	39.6	47.4	-	-	-
carbon tetrachloride	-	29.6	-	-	-	-
2-butanone	-	44.8	137.1	27.9	-	-
4-methyl-2-pentanone	-	41.0	-	-	-	-
2-hexanone	-	41.0	75.5	77.7	-	-
bromoform	-	-	-	27.9	-	-
QUALIFICATION		J (+)	J (+) / UJ (-)	J (+) / UJ (-)		
SAMPLES AFFECTED	-	None	CF5SS12	CF5SS13	-	-
	-	-	CF5SS14	CF5SS15	-	-
	-	-	CF5SS18	CF5SS16	-	-
	-	-	CF5SS19	CF5SS17	-	-
	-	-	CF5SS20	CF5SS25	-	-
	-	-	CF5SS20D	CF5SS26	-	-
	-	-	CF5SS21	CF5SS27	-	-
	-	-	CF5SS22	-	-	-
	-	-	CF5SS23	-	-	-
	-	-	CF5SS24	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA018	INITIAL 2/28/94	CONTIN-UING 3/9/94 10:25	CONTIN-UING 3/10/94 07:34	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS						
3-nitroaniline	39.1	-	52.4	-	-	-
4-nitroaniline	-	25.8	-	-	-	-
3,3'-dichlorobenzidine	-	34.7	37.0	-	-	-
QUALIFICATION	J (+)	J (+)	J (+)			
SAMPLES AFFECTED	None	None	None	-	-	-

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA018	INITIAL 3/19/94	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	% RSD	% D	% D	% D	% D	% D
PESTICIDE/PCB ORGANIC COMPOUNDS						
methoxychlor	22.3 (2)	-	-	-	-	-
QUALIFICATION	J (+)					
SAMPLES AFFECTED	None	-	-	-	-	-

(2)=column 2

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY						
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA019	CONTIN-UING 3/4/94 8:49	CONTIN-UING 3/7/94 7:54	CONTIN-UING	CONTIN-UING	CONTIN-UING	CONTIN-UING
PARAMETER	WATER % D	SOIL %D	%D	%D	%D	%D
VOLATILE ORGANIC COMPOUNDS						
chloroethane	-	-	-	-	-	-
acetone	39.6	49.8	-	-	-	-
2-butanone	44.8	44.5	-	-	-	-
carbon tetrachloride	29.6	-	-	-	-	-
4-methyl-2-pentanone	41.0	35.1	-	-	-	-
2-hexanone	41.0	38.2	-	-	-	-
QUALIFICATION	J (+)	J (+)				
SAMPLES AFFECTED						
acetone	None	CF5SS7	-	-	-	-
	-	CF5SS28	-	-	-	-
	-	CF5SS30	-	-	-	-
	-	CF5SS30D	-	-	-	-
	-	CF5SS31	-	-	-	-
2-butanone	-	CF5SS7	-	-	-	-

Table 2-3 (Continued)
INITIAL AND CONTINUING CALIBRATION SUMMARY OF NON-COMPLIANCE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INITIAL AND CONTINUING CALIBRATION SUMMARY				
INITIAL AND CONTINUING CALIBRATION SUMMARY TABLE SDG WA019 PARAMETER	INITIAL 2/28/94	CONTIN-UING 3/3/94 14:29	CONTIN-UING	CONTIN-UING
	% RSD	% D	% D	% D
SEMIVOLATILE ORGANIC COMPOUNDS				
3-nitroaniline	39.1	42.6	-	-
bis(2-chloroethyl)ether	-	25.3	-	-
bis(2-ethylhexyl)phthalate	-	25.2	-	-
QUALIFICATION	J (+)	J (+)		
SAMPLES AFFECTED	None	None	-	-

Table 2-4
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY

SDG	Blank	Qualified

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA003	-8.2	CF5MS23S10RF	Iron	PBW-1	ug/L	6.0	U	6.0	UJ
	ug/L	CF5MS29S4CF5			mg/kg	30.5		30.5	UJ
	110	MS23S0	Magnesium	CCB-4	mg/kg	23.0	B	23.0	U
	ug/L	CF5MS23S2			mg/kg	36.4	B	36.4	U
		CF5MS29S0			mg/kg	69.4	B	69.4	U
		CF5MS29S4			mg/kg	13.4	B	13.4	U
		CF5MS30S2			mg/kg	34.6	B	34.6	U
		CF5MS30S6			mg/kg	63.1	B	63.1	U
		CF2MW11SR			ug/L	22.1	B	22.1	U
		CF2MW11SRF			ug/L	19.2	B	19.2	U
		CF2MW8IR			ug/L	15.6	B	15.6	U
		CF2MW8IRF			ug/L	15.9	B	15.9	U
	-1.2	CF2MW11S	Lead	PBW-1	ug/L	5.8		5.8	J
	ug/L	CF2MW11SF			ug/L	1.6	B	1.6	J
		CF2MW11SR			ug/L	1.0	U	1.0	UJ
		CF2MW11SRF			ug/L	1.0	U	1.0	UJ
		CF2MW8IR			ug/L	1.0	U	1.0	UJ
		CF2MW8IRF			ug/L	1.0	U	1.0	UJ
		CF5MS23S10R			ug/L	1.0	U	1.0	UJ
		CF5MS23S 10RF			ug/L	1.0	U	1.0	UJ
		CF5MS29S4			mg/kg	0.66	B	0.66	J
	5.53	CF5MS23S0	Manganese	PBW-1	mg/kg	1.4	B	1.4	U
	ug/L	CF5MS23S2			mg/kg	2.0	B	2.0	U
		CF5MS29S0			mg/kg	4.5		4.5	U
		CF5MS29S4			mg/kg	0.72	B	0.72	U
		CF5MS30S2			mg/kg	2.6	B	2.6	U
		CF5MS30S6			mg/kg	2.3	B	2.3	U
		CF2MW11S			ug/L	17.0		17.0	U
		CF2MW11SF			ug/L	4.9	B	4.9	U
	-35.9	CF2MW11SR	Potassium	ICB-1	ug/L	69.2	B	69.2	UJ
	ug/kg	CF2MW11SRF			ug/L	34.0	U	34.0	UJ
		CF2MW8IR			ug/L	34.0	U	34.0	UJ
		CF2MW8IRF			ug/L	35.9	B	35.9	UJ
		CF5MS23S10R			ug/L	34.0	U	34.0	UJ
		CF5MS23S 10RF			ug/l	34.0	U	34.0	UJ
		CF5MS23S0			mg/kg	15.3	B	15.3	UJ
		CF5MS23S2			mg/kg	15.6	B	15.6	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA003	189 ug/L	CF5MS23S0	Sodium	CCB-5	mg/kg	162	B	162	U
		CF5MS29S0			mg/kg	145	B	145	U
		CF5MS29S4			mg/kg	165	B	165	U
		CF5MS30S6			mg/kg	168	B	168	U
		CF2MW11SR			ug//L	129	B	129	U
		CF2MW11SRF			ug/L	238	B	238	U
		CF2MW8IR			ug/L	148	B	148	U
		CF2MW8IRF			ug/L	260	B	260	U
		CF2MS23S10R			ug/L	142	B	142	U
		CF2MS23S 10RF			ug/L	214	B	214	U
	-2.0 ug/L	CF2MW11S	Thallium	CCB-14	ug/L	1.0	U	1.0	UJ
		CF2MWSF			ug/L	1.0	U	1.0	UJ
		CF2MW11SR			ug/L	1.0	U	1.0	UJ
		CF2MW11SRF			ug/L	1.0	U	1.0	UJ
		CF2MW8IR			ug/L	1.0	U	1.0	UJ
		CF2MW8IRF			ug/L	1.0	U	1.0	UJ
		CF5MS23S10R			ug/L	1.0	U	1.0	UJ
		CF5MS23S 10RF			ug/L	1.0	U	1.0	UJ
		CF5MS23S0			mg/kg	0.25	U	0.25	UJ
		CF5MS23S2			mg/kg	0.31	U	0.31	UJ
		CF5MS29S0			mg/kg	0.24	U	0.24	UJ
		CF5MS29S4			mg/kg	0.25	U	0.25	UJ
		CF5NS30S2			mg/kgmg	0.25	U	0.25	UJ
		CF5MS30S6			/kg	0.25	U	O.25	UJ
	-2.6 ug/L	CF2MW11S	Selenium	CCB-8	ug/L	1.0	U	1.0	UJ
		CF2MW11SF			ug/L	1.0	U	1.0	UJ
		CF2MW11SR			ug/L	1.0	U	1.0	UJ
		CF2MW11SRF			ug/L	1.0	U	1.0	UJ
		CF2MW8IR			ug/L	1.0	U	1.0	UJ
		CF2MW8IRF			ug/L	1.0	U	1.0	UJ
		CF5MS23S10R			ug/L	1.0	U	1.0	UJ
		CF5MS23S 10RF			ug/L	1.0	U	1.0	UJ
		CF5MS23S0			mg/kg	0.25	U	0.25	UJ
		CF5MS23S2			mg/kg	0.31	U	0.31	UJ
		CF5MS29S0			mg/kg	0.24	U	0.24	UJ
		CF5MS29S4			mg/kg	0.25	U	0.25	UJ
		CF5MS30S2			mg/kg	0.25	U	0.25	UJ
		CF5MS30S6			mg/kg	0.25	U	0.25	UJ

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY (CONT'D)									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA003	4.1	CF5MS23S0	Vanadium	CCB-1	mg/kg	1.9	B	1.9	U
	ug/L	CF5MS23S2			mg/kg	2.0	B	2.0	U
		CF5MS29S0			mg/kg	2.3	B	2.3	U
		CF5MS29S4			mg/kg	1.9	B	1.9	U
		CF5MS30S2			mg/kg	1.9	B	1.9	U
		CF2MW11SF			ug/L	8.1	B	8.1	U
	8.0	CF5NS23S0	Zinc	CCB-5	mg/kg	4.3	B	4.3	U
	ug/L	CF5MS23S2			mg/kg	3.5	B	3.5	U
		CF5MS29S0			mg/kg	17.0		17.0	U
		CF5MS29S4			mg/kg	3.2	B	3.2	U
		CF5MS30S2			mg/kg	4.3	B	4.3	U
		CF5MS30S6			mg/kg	3.9	B	3.9	U
		CF2MW11S			ug/L	19.5	B	19.5	U
		CF2MW11SF			ug/L	23.3		23.3	U
		CF2MW11SRF			ug/L	18.0	B	18.0	U
		CF2MW8IR			ug/L	4.3	B	4.3	U
		CF2MW8IRF			ug/L	5.7	B	5.7	U
		CF2MS23S10R			ug/L	10.5	B	10.5	U
		CF2MS23S 10RF			ug/L	19.3	B	19.3	U

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA005			VOLATILE ORGANICS						
	7 ug/L	CF5MS24S2	acetone	CF5MS 24SRT	ug/L	7	J	12	U
			SEMIVOLATILE ORGANICS						
	86 ug/kg	CF5BR10S0RE	di-n-butylphthalate	SBLK1B	ug/kg	560	JB	7600	U
		CF5BR10S0D				690	JB	7600	U
		CF5BR10S4				950	JB	8100	U
		CF5BR11S0				350	JB	3600	U
		CF5BR11S6				4900	JB	7800	U
		CF5BR12S4				1800	JB	8000	U
		CF5BR12S6				2100	JB	8000	U
		CF5BR18S2				860	JB	7800	U
		CF5BR18S4				1200	JB	8200	U
		CF5MS24S2				170	JB	380	U
		CF5MS24S6				430	B	430	U
			PESTICIDE/PCB'S						
	6.0 ug/kg	CF5BR10S0	methoxychlor	PBLK2	ug/kg	14	PB	96	U
		CF5BR10S0D				3.4	PB	98	U
		CF5MS24S2				1.1	PB	20	U
		CF5MS24S6				4.3	PB	21	U
	0.18 ug/kg	CF5BR18S2	gamma-chlordane	PBLK2	ug/kg	0.46	JPB	10	U
		CF5BR18S4				0.45	JPB	11	U
		CF5MS24S2				0.37	JB	2.0	U
		CF5MS24S6				0.25	JPB	2.1	U

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA005	75.1 ug/L	CF5BR13S4RF	Aluminum	CF5MS 24SR	ug/L	23.9	B	23.9	U
		CF5MS24SRF				67.1	B	67.1	U
	43.6 ug/L	CF5MS24SRF	Antimony	CCB-4	ug/L	6.8	B	6.8	UJ
	1.5 mg/kg	CF5BR10S0	Barium	CCB-2	mg/kg	2.2	B	2.2	U
		CF5BR10S0D				2.4	B	2.4	U
		CF5BR10S4				2.1	B	2.1	U
		CF5BR11S0				7.1	B	7.1	U
		CF5BR12S4				7.7	B	7.7	U
		CF5BR18S2				3.5	B	3.5	U
		CF5BR18S4				3.1	B	3.1	U
		CF5MS24S2				8.3	B	8.3	U
		CF5MS24SRF			ug/L	2.3	B	2.3	U
	70.4 mg/kg	CF5BR10S0	Calcium	PBS-1	mg/kg	382	B	382	U
		CF5BR10S0D				313	B	313	U
		CF5BR10S4				166	B	166	U
		CF5BR11S6				109	B	109	U
		CF5BR12S4				265	B	265	U
		CF5BR12S6				242	B	242	U
		CF5BR13S2				125	B	125	U
		CF5BR13S4				104	B	104	U
		CF5BR18S2				225	B	225	U
		CF5BR18S4				158	B	158	U
		CF5MS24S2				141	B	141	U
		CF5MS24S6				137	B	137	U
		CF5BR13S4RF			ug/L	20.5	B	20.5	U
		CF5MS24SRF				83.1	B	83.1	U
	1.29 mg/kg	CF5BR10S0	Chromium	PBS-1	mg/kg	3.7	B	3.7	U
		CF5BR10S0D				4.3	B	4.3	U
	1.8 ug/L	CF5BR13S4RF	Lead	CCB-5	ug/L	1.1	B	1.1	U
		CF5MS24SRF				1.4	B	1.4	U
	0.5 mg/kg	CF5BR10S0	Manganese	CCB-2	mg/kg	1.4	B	1.4	U
		CF5BR10S0D				1.4	B	1.4	U
		CF5BR11S0				1.4	B	1.4	U
		CF5BR13S2				2.9	B	2.9	U
		CF5BR18S2				1.8	B	1.8	U
		CF5BR18S4				3.1	B	3.1	U
		CF5MS24S2				2.8	B	2.8	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA005	20.6 mg/kg	CF5BR10S0	Magnesium	CF5MS 24SR	mg/kg	38.5	B	38.5	U
		CF5BR10S0D				44.0	B	44.0	U
		CF5BR10S4				33.9	B	33.9	U
		CF5BR11S0				23.9	B	23.9	U
		CF5BR11S6				123	B	123	U
		CF5BR12S4				133	B	133	U
		CF5BR12S6				184	B	184	U
		CF5BR13S2				123	B	123	U
		CF5BR13S4				180	B	180	U
		CF5BR18S2				48.0	B	48.0	U
		CF5BR18S4				34.3	B	34.3	U
		CF5MS24S2				126	B	126	U
		CF5MS24S6				162	B	162	U
		CF5MS24SRF			ug/L	41.5	B	41.5	U
	26.6 mg/kg	CF5BR10S0	Potassium	CF5MS 24SR	mg/kg	37.6	B	37.6	U
		CF5BR10S0D				39.3	B	39.3	U
		CF5BR10S4				39.5	B	39.5	U
		CF5BR11S0				26.6	B	26.6	U
		CF5BR11S6				103	B	103	U
		CF5BR12S4				101	B	101	U
		CF5BR12S6				175	B	175	U
		CF5BR13S2				104	B	104	U
		CF5BR13S4				194	B	194	U
		CF5BR18S2				37.0	B	37.0	U
		CF5BR18S4				46.1	B	46.1	U
		CF5MS24S2				117	B	117	U
		CF5MS24S6				181	B	181	U
		CF5MS24SRF			ug/L	68.0	B	68.0	U
	0.22 mg/kg	CF5BR10S0	Selenium	CF5MS 24SR	mg/kg	0.28	B	0.28	U
		CF5BR10S0D				0.37	B	0.37	U
		CF5BR10S4				0.80	B	0.80	U
		CF5BR11S0				0.31	B	0.31	U
		CF5BR11S6				0.54	B	0.54	UJ
		CF5BR12S4				0.30	B	0.30	U
		CF5BR12S6				0.26	B	0.26	UJ
		CF5BR13S4				1.1	B	1.1	U
		CF5BR18S2				0.27	B	0.27	U
		CF5BR18S4				0.68	B	0.68	U
		CF5MS24S2				0.54	B	0.54	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA005	112 mg/kg	CF5BR10S0	Sodium	PBS-1	mg/kg	155	B	155	U
		CF5BR10S0D				155	B	155	U
		CF5BR10S4				183	B	183	U
		CF5BR11S0				120	B	120	U
		CF5BR11S6				134	B	134	U
		CF5BR12S4				168	B	168	U
		CF5BR12S6				185	B	185	U
		CF5BR13S2				190	B	190	U
		CF5BR13S6				151	B	151	U
		CF5BR18S2				167	B	167	U
		CF5BR18S4				155	B	155	U
		CF5MS24S2				211	B	211	U
		CF5MS24S6				199	B	199	U
		CF5MS24SRF			ug/L	228	B	228	U
	3.58 mg/kg	CF5BR10S0	Zinc	CF5MS 24SR	mg/kg	3.2	B	3.2	U
		CF5BR10S0D				4.4	B	4.4	U
		CF5BR10S4				7.0		7.0	U
		CF5BR11S0				0.99	B	0.99	U
		CF5BR11S6				3.0	B	3.0	U
		CF5BR12S4				5.7		5.7	U
		CF5BR12S6				3.4	B	3.4	U
		CF5BR13S2				2.3	B	2.3	U
		CF5BR13S4				3.2	B	3.2	U
		CF5BR18S2				3.4	B	3.4	U
		CF5BR18S4				6.1		6.1	U
		CF5MS24S2				3.1	B	3.1	U
		CF5MS24S6				4.7	B	4.7	U
		CF5BR13S4RF				8.9	B	8.9	U
		CF5MS24SRF				36.5		36.5	U

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA006			VOLATILE ORGANICS						
	25 ug/kg	CF5BR14S2	acetone	VBLK3	ug/kg	32	B	32	U
		CF5BR15S2				80	B	80	U
		CF5BR17S6				210	B	210	U
		CF5MS19S0				12	B	12	U
		CF5MS20S0				12	JB	14	U
		CF5MS20S2				77	B	77	U
	11 ug/kg	CF5BR14S2	2-butanone	VBLK3	ug/kg	6	JB	12	U
		CF5BR15S2				6	JB	12	U
		CF5BR17S6				30	JB	60	U
		CF5MS20S2				6	JB	13	U
	250 ug.kg	CF5BR16S2	methylene chloride	VBLK2	ug/kg	300	JB	740	U
		CF5BR16S4				320	JB	780	U
			SEMIVOLATILES						
	260 ug/kg	CF5BR14S2	di-n-butylphthalate	SBLK2	ug/kg	290	JB	4000	U
		CF5BR15S0				220	JB	3800	U
		CF5BR15S2				160	JB	410	U
		CF5MS19S0				150	JB	370	U
		CF5MS19S4				290	JB	380	U
		CF5MS20S0				310	JB	470	U
		CF5MS20S0				120	JB	430	U
			PESTICIDE/PCB'S						
	0.23 ug/kg	CF5BR14S0	aldrin	PBLK2	ug/kg	3.5	PB	11	U
		CF5BR14S2				0.46	PB	2.0	UJ
		CF5MS19S0				0.52	PB	1.9	UJ
		CF5MS19S4				0.48	PB	2.0	UJ
		CF5MS20S0				0.20	PB	2.4	UJ
		CF5MS20S2				0.35	PB	2.2	UJ
	0.65 ug/kg	CF5BR14S2	methoxychlor	PBLK2	ug/kg	1.9	J	20	UJ
		CF5BR15S0				1.7	JP	96	UJ

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA006	39.2 ug/L	CF5MS19S4RF	Aluminum	CCB5	ug/L	37.7	B	37.7	U
	-3.48 mg/kg	CF5BR14S0	Antimony	PBW1	mg/kg	3.0	U	3.0	UJ
		CF5BR14S2				2.8	U	2.8	UJ
		CF5BR15S0				2.8	U	2.8	UJ
		CF5BR15S2				3.0	U	3.0	UJ
		CF5BR16S2				2.9	U	2.9	UJ
		CF5BR16S4				3.0	U	3.0	UJ
		CF5BR17S4				3.0	U	3.0	UJ
		CF5BR17S6				2.9	U	2.9	UJ
		CF5MS19S0				2.9	U	2.9	UJ
		CF5MS19S4				2.7	U	2.7	UJ
		CF5MS20S0				3.4	U	3.4	UJ
		CF5MS20S2				3.1	U	3.1	UJ
		CF5MS19S4RF			ug/L	12.0	U	12.0	UJ
	-0.70 mg/kg	CF5BR14S0	Arsenic	CCB8	mg/kg	0.51	U	0.51	UJ
		CF5BR14S2				0.48	U	0.48	UJ
		CF5BR15S0				0.48	U	0.48	UJ
		CF5BR15S2				0.50	U	0.50	UJ
		CF5BR16S2				0.48	U	0.48	UJ
		CF5BR16S4				0.99	U	0.99	UJ
		CF5BR17S4				1.2	B	1.2	J
		CF5BR17S6				0.94	U	0.94	UJ
		CF5MS19S0				0.48	U	0.48	UJ
		CF5MS19S4				0.47	U	0.47	UJ
		CF5MS20S0				0.56	U	0.56	UJ
		CF5MS20S2				0.52	U	0.52	UJ
		CF5MS19S4RF			ug/L	2.0	U	2.0	UJ
	0.94 mg/kg	CF5BR17S4	Barium	Rinsate	mg/kg	5.3	B	5.3	U
		CF5MS19S4				3.4	B	3.4	U
		CF5MS20S0				1.7	B	1.7	U
		CF5MS20S2				4.5	B	4.5	U
		CF5MS19S4RF			ug/L	2.4	B	2.4	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA006	-4.32 mg/kg	CF5BR14S2	Calcium	CCB3	mg/kg	194	B	194	J
		CF5BR16S2				95.1	B	95.1	UJ
		CF5BR16S4				81.5	B	81.5	UJ
		CF5BR17S4				91.1	B	91.1	UJ
		CF5BR17S6				88.7	B	88.7	UJ
		CF5MS19S4				113	B	113	UJ
		CF5MS20S0				125	B	125	UJ
		CF5MS20S2				1010	B	1010	J
		CF5MS19S4RF			ug/L	9.0	U	9.0	UJ
	33.4 ug/L	CF5MS19S4RF	Iron	Rinsate	ug/L	7.3	B	7.3	U
	-0.36 mg/kg	CF5MS20S0	Lead	CCB6	mg/kg	1.6		1.6	J
		CF5MS19S4RF			ug/L	1.0	U	1.0	UJ
	1.0 mg/kg	CF5BR14S0	Manganese	Rinsate	mg/kg	3.8		3.8	U
		CF5BR14S2				3.5	B	3.5	U
		CF5BR15S0				2.7	B	2.7	U
		CF5BR15S2				4.1		4.1	U
		CF5BR16S2				2.1	B	2.1	U
		CF5BR16S4				4.0		4.0	U
		CF5BR17S4				2.5	B	2.5	U
		CF5BMS9S4				1.4	B	1.4	U
		CF5MS20S0				1.4	B	1.4	U
		CF5MS20S2				1.4	B	1.4	U
		CF5MS19S4RF			ug/L	2.0	B	2.0	U
	11.5 mg/kg	CF5BR14S0	Magnesium	Rinsate	mg/kg	56.2	B	56.2	U
		CF5BR15S0				41.0	B	41.0	U
		CF5MS20S0				18.6	B	18.6	U
	-12.0 mg/kg	CF5MS19S4		ICB1	mg/kg	22.9	B	22.9	J
		CF5MS19S4RF			ug/L	10.0	U	10.0	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA006	-1.10 mg/kg	CF5BR14S0	Nickel	ICB1	mg/kg	1.0	U	1.0	UJ
		CF5BR14S2				1.6	B	1.6	J
		CF5BR15S0				0.92	U	0.92	UJ
		CF5BR15S2				1.0	U	1.0	UJ
		CF5BR16S2				1.0	B	1.0	UJ
		CF5BR16S4				5.4	B	5.4	J
		CF5BR17S4				2.6	B	2.6	J
		CF5BR17S6				3.0	B	3.0	J
		CF5MS19S0				0.97	U	0.97	UJ
		CF5MS19S4				0.91	U	0.91	UJ
		CF5MS20S0				1.1	U	1.1	UJ
		CF5MS20S2				1.0	U	1.0	UJ
		CF5MS19S4RF			ug/L	4.0	U	4.0	UJ
	52.6 mg/kg	CF5BR14S0	Potassium	Rinsate	mg/kg	33.9	B	33.9	U
		CF5BR14S2				78.8	B	78.8	U
		CF5BR15S0				24.3	B	24.3	U
		CF5BR15S2				88.1	B	88.1	U
		CF5BR16S2				59.4	B	59.4	U
		CF5BR16S4				163	B	163	U
		CF5BR17S4				142	B	142	U
		CF5MS19S0				27.0	B	27.0	U
		CF5MS19S4				21.0	B	21.0	U
		CF5MS20S0				11.0	B	11.0	U
		CF5MS20S2				43.1	B	43.1	U
		CF5MS19S4RF			ug/L	43.0	B	43.0	U
	-0.52 mg/kg	CF5BR14S0	Selenium	CCB3	mg/kg	0.25	U	0.25	UJ
		CF5BR14S2				0.24	U	0.24	UJ
		CF5BR15S0				0.28	B	0.28	J
		CF5BR15S2				0.35	B	0.35	J
		CF5BR16S2				0.24	U	0.24	UJ
		CF5BR16S4				0.84	B	0.84	J
		CF5BR17S4				0.50	B	0.50	J
		CF5BR17S6				0.54	B	0.54	J
		CF5MS19S0				0.24	U	0.24	UJ
		CF5MS19S4				0.23	U	0.23	UJ
		CF5MS20S0				0.28	U	0.28	UJ
		CF5MS20S2				1.2	B	1.2	J
		CF5BR19S4RF			ug/L	1.0	U	1.0	UJ
	39.0 mg/kg	CF5BR14S0	Sodium	Rinsate	mg/kg	193	B	193	U
		CF5BR14S2				172	B	172	U

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA006	39.0 mg/kg	CF5BR15S0	Sodium	Rinsate	mg/kg	170	B	170	U
		CF5BR16S2				175	B	175	U
		CF5BR16S4				172	B	172	U
		CF5BR17S4				178	B	178	U
		CF5BR17S6				176	B	172	U
		CF5MS19S0				190	B	190	U
		CF5MS19S4				175	B	175	U
		CF5MS20S0				227	B	227	U
		CF5MS20S2				184	B	184	U
		CF5MS19S4RF			ug/L	171	B	171	U
	-0.52 mg/kg	CF5BR14S0	Thallium	CCB5	mg/kg	0.25	U	0.25	UJ
		CF5BR14S2				0.24	U	0.24	UJ
		CF5BR15S0				0.23	U	0.23	UJ
		CF5BR15S2				0.25	U	0.25	UJ
		CF5BR16S2				0.24	U	0.24	UJ
		CF5BR16S4				0.25	U	0.25	UJ
		CF5BR17S4				0.25	U	0.25	UJ
		CF5BR17S6				0.24	U	0.24	UJ
		CF5MS19S0				0.24	U	0.24	UJ
		CF5MS19S4				0.23	U	0.23	UJ
		CF5MS20S0				0.26	U	0.26	UJ
		CF5MS20S2				0.26	U	0.26	UJ
		CF5MS19S4RF			ug/L	1.0	U	1.0	UJ
	0.66 mg/kg	CF5BR14S0	Vanadium	CCB3	mg/kg	2.6	B	2.6	U
		CF5BR15S0				2.3	B	2.3	U
		CF5MS19S0				3.1	B	3.1	U
		CF5MS19S4				3.6	B	3.6	U
		CF5MS20S0				2.1	B	2.1	U
		CF5MS20S2				2.6	B	2.6	U
	-1.84 mg/kg	CF5BR14S0	Zinc	CCB3	mg/kg	3.0	B	3.0	UJ
		CF5BR14S2				3.6	B	3.6	UJ
		CF5BR15S0				4.0	B	4.0	UJ
		CF5BR15S2				2.8	B	2.8	UJ
		CF5BR16S2				0.48	U	0.48	UJ
		CF5BR16S4				1.3	B	1.3	UJ
		CF5BR17S6				2.7	B	2.7	UJ
		CF5MS19S4				2.2	B	2.2	UJ
		CF5MS20S0				0.96	B	0.96	UJ
		CF5MS20S2				0.52	B	0.52	UJ
		CF5MS19S4RF			ug/L	5.3	B	5.3	UJ
	2.08 mg/kg	CF5BR17S4		Rinsate	mg/kg	9.5		9.5	U

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA007			VOLATILE ORGANICS						
	6 ug/kg	CF5BR9S0	acetone	VBLK1	ug/kg	10	JB	11	U
		CF5BR9S0D				9	JB	12	U
		CF5BR9S4				12	B	12	U
		CF5BR9S4D				9	B	12	U
		CF5MS13S0				6	JB	12	U
		CF5MS13S0D				8	JB	11	U
			SEMIVOLATILE ORGANICS						
	64 ug/kg	CF5BR9S0	di-n-butylphthalate	SBLK1	ug/kg	110	JB	380	U
		CF5BR9S0DL				110	DJB	750	U
		CF5BR9S0D				340	JB	380	U
		CF5BR9S0DDL				300	DJB	1900	U
		CF5BR9S4				190	JB	400	U
		CF5BR9S4D				320	JB	400	U
		CF5MS13S0				210	JB	380	U
		CF5MS13S0D				290	JB	380	U
		CF5MS13S4				57	JB	400	U
		CF5MS8S0				130	JB	390	U
		CF5MS8S2				104	JB	400	U
			PESTICIDE/PCB'S						
	1.2 ug/kg	CF5BR9S0	aldrin	PBLK1	ug/kgug/kg	1.6	PB	1.9	U
		CF5BR9S0D			ug/kg	1.8	PB	1.9	U
		CF5BR9S4			ug/kg	1.9	PB	2.0	U
		CF5BR9S4D			ug/kg	0.5	PB	2.0	U
		CF5MS13S0			ug/kg	2.0	PB	2.0	U
		CF5MS13S0D			ug/kg	1.7	PB	1.9	U
		CF5MS13S4			ug/kg	1.6	PB	2.0	U
		CF5MS8S0			ug/kg	1.7	PB	2.0	U
		CF5MS8S2			ug/kg	1.7	PB	2.0	U
	0.98 ug/kg	CF5MS13S0	methoxychlor	PBLK1	ug/kg	1.3	J	20	U

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA007	28.3 (ug/L)	CF5MS13S0	Antimony	CCB(P1)	mg/kg	2.9	B	2.9	U
		CF5BR9S0			mg/kg	2.7	B	2.7	U
		CF5BR9S0D			mg/kg	3.4	B	3.4	U
	3.4 (ug/L)	CF5MS13S0	Barium	CCB(P1)	mg/kg	2.1	B	2.1	U
		CF5MS13S0D			mg/kg	2.6	B	2.6	U
		CF5MS13S4			mg/kg	3.8	B	3.8	U
		CF5MS8S0			mg/kg	2.6	B	2.6	U
		CF5MS8S2			mg/kg	4.0	B	4.0	U
	3.0 (ug/L)	CF5BR9S4	Beryllium	CCB(P1)	mg/kg	0.28	B	0.28	U
	3.9 (ug/L)	CF5BR9S0	Cadmium	CCB(P1)	mg/kg	0.80	B	0.80	U
		CF5BR9S0D			mg/kg	1.1		1.1	U
	90.9 (mg/kg)	CF5MS13S0	Calcium	PBS	mg/kg	225	B	225	U
		CF5MS13S4			mg/kg	120	B	120	U
		CF5BR9S4			mg/kg	319	B	319	U
		CF5BR9S4D			mg/kg	479	B	479	U
	4.7 (ug/L)	CF5BR9S0	Cobalt	CCB(P1)	mg/kg	4.3	B	4.3	U
		CF5BR9S0D			mg/kg	2.0	B	2.0	U
		CF5BR9S4			mg/kg	2.3	B	2.3	U
		CF5BR9S4D			mg/kg	1.0	B	1.0	U
	4.6 (ug/L)	CF5MS13S0	Copper	CCB(P1)	mg/kg	1.1	B	1.1	U
		CF5MS13S0D			mg/kg	1.1	B	1.1	U
		CF5MS13S4			mg/kg	0.95	B	0.95	U
		CF5MS8S0			mg/kg	0.74	B	0.74	U
		CF5MS8S2			mg/kg	0.59	B	0.59	U
		CF5BR9S0			mg/kg	5.2	B	5.2	U
		CF5BR9S0D			mg/kg	4.9	B	4.9	U
		CF5BR9S4			mg/kg	1.8	B	1.8	U
		CF5BR9S4D			mg/kg	1.3	B	1.3	U
	92.5 (ug/L)	CF5MS8S2	Iron	CCB(P1)	mg/kg	98.5	B	98.5	U
	68.6 (ug/L)	CF5MS13S0	Magnesium	CCB(P1)	mg/kg	35.2	B	35.2	U
		CF5MS13S0D			mg/kg	55.5	B	55.5	U
		CF5MS13S4			mg/kg	80.5	B	80.5	U
		CF5MS8S0			mg/kg	35.2	B	35.2	U
		CF5MS8S2			mg/kg	24.9	B	24.9	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA007	2.8 (ug/L)	CF5MS13S0	Manganese	CCB(P1)	mg/kg	1.5	B	1.5	U
		CF5MS13S4			mg/kg	1.7	B	1.7	U
		CF5MS8S0			mg/kg	2.1	B	2.1	U
		CF5MS8S2			mg/kg	0.71	B	0.71	U
		CF5BR9S4D			mg/kg	1.5	B	1.5	U
	9.4 (ug/L)	CF5MS13S0	Nickel	CCB(P1)	mg/kg	2.2	B	2.2	U
		CF5MS13S0D			mg/kg	2.5	B	2.5	U
		CF5MS13S4			mg/kg	2.5	B	2.5	U
		CF5MS8S2			mg/kg	1.3	B	1.3	U
		CF5BR9S0			mg/kg	2.9	B	2.9	U
		CF5BR9S0D			mg/kg	4.3	B	4.3	U
		CF5BR9S4			mg/kg	8.8	B	8.8	U
		CF5BR9S4D			mg/kg	6.2	B	6.2	U
	66.9 (ug/L)	CF5MS13S0	Potassium	CCB(P1)	mg/kg	13.2	B	13.2	U
		CF5MS13S0D			mg/kg	22.2	B	22.2	U
		CF5MS13S4			mg/kg	27.2	B	27.2	U
		CF5MS8S0			mg/kg	15.4	B	15.4	U
		CF5MS8S2			mg/kg	9.8	B	9.8	U
	0.44 (mg/kg)	CF5MS13S0D	Selenium	PBS	mg/kg	0.26	B	0.26	U
		CF5MS13S4			mg/kg	0.27	B	0.27	U
		CF5MS8S0			mg/kg	0.82	B	0.82	U
	5.3 (ug/L)	CF5MS13S0	Silver	CCB(P1)	mg/kg	0.80	B	0.80	U
		CF5MS13S0D			mg/kg	0.89	B	0.89	U
		CF5BR9S0D			mg/kg	0.80	B	0.80	U
	91.7 (mg/kg)	CF5MS13S0	Sodium	PBS	mg/kg	138	B	138	U
		CF5MS13S0D			mg/kg	161	B	161	U
		CF5MS13S4			mg/kg	128	B	128	U
		CF5MS8S0			mg/kg	139	B	139	U
		CF5MS8S2			mg/kg	170	B	170	U
		CF5BR9S0			mg/kg	191	B	191	U
		CF5BR9S0D			mg/kg	162	B	162	U
		CF5BR9S4			mg/kg	149	B	149	U
		CF5BR9S4D			mg/kg	161	B	161	U

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY (CONT'D)									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA007	2.4 (ug/L)	CF5MS13S0	Vanadium	CC8(P1)	mg/kg	1.3	B	1.3	U
		CF5MS13S0D			mg/kg	1.6	B	1.6	U
		CF5MS8S0			mg/kg	0.96	B	0.96	U
		CF5MS8S2			mg/kg	0.97	B	0.97	U
	2.7 (mg/kg)	CF5MS13S0	Zinc	PBS	mg/kg	3.1	B	3.1	U
		CF5MS13S0D			mg/kg	3.6	B	3.6	U
		CF5MS13S4			mg/kg	2.7	B	2.7	U
		CF5MS8S0			mg/kg	12.9		12.9	U
		CF5MS8S2			mg/kg	3.7	B	3.7	U
		CF5BR9S4			mg/kg	8.1	B	8.1	U
		CF5BR9S4D			mg/kg	5.2	B	5.2	U

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA008			VOLATILE ORGANICS						
	6 ug/kg	CF17BR4S0	acetone	VBLK1	ug/kg	9	JB	12	U
		CF17BR4S2				6	JB	12	U
		CF17BR9S0				5	JB	12	U
		CF17BR9S2				15	B	15	U
	7 ug/kg	CF17BR6S0		VBLK2	ug/kg	13	B	13	U
		CF17BR10S0				30	B	30	U
	10 ug/kg	CF17BR5S2		VBLK3	ug/kg	20	B	20	U
			SEMIVOLATILES						
	41 ug/kg	CF17BR4S0	di-n-butylphthalate	SBLK1	ug/kg	68	JB	400	U
		CF17BR4S2				40	JB	400	U
		CF17BR9S0				27	JB	380	U
		CF17BR13S2				43	JB	400	U
		CF17BR6S0				77	JB	390	U
		CF17BR6S2				80	JB	400	U
		CF17BR10S0				42	JB	410	U
		CF17BR12S0				66	JB	400	U
			PESTICIDE/PCB'S						
	0.54 ug/kg	CF17BR4S0	aldrin	PBLK1	ug/kg	0.98	JPB	2.1	U
		CF17BR4S2				0.50	JPB	2.0	U
		CF17BR9S0				0.78	JPB	2.0	U
		CF17BR9S2				0.70	JPB	2.1	U
		CF17BR13S0				0.54	JPB	2.1	U
		CF17BR13S2				0.41	JPB	2.0	U
		CF17BR6S0				0.23	JPB	2.0	U
		CF17BR6S2				0.43	JPB	2.1	U
		CF17BR10S0				0.09	JPB	2.1	U
		CF17BR12S0				0.28	JPB	2.1	U
		CF17BR12S2				0.14	JPB	2.0	U
		CF17BR7S0				0.48	JPB	2.2	U
	0.33 ug/kg	CF17BR5S0		PBLK2	ug/kg	0.53	JPB	2.2	U
		CF17BR5S2				0.31	JPB	2.0	U
		CF17BR8S0				0.31	JPB	2.8	U

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA008	0.56 mg/kg	CF17BR4S0	Barium	CCB3	mg/kg	3.0	B	3.0	U
		CF17BR4S2				1.6	B	1.6	U
		CF17BR9S0				2.4	B	2.4	U
		CF17BR9S2				0.93	B	0.93	U
		CF17BR13S0				1.1	B	1.1	U
		CF17BR13S2				1.7	B	1.7	U
		CF17BR6S0				2.7	B	2.7	U
		CF17BR10S2				3.4	B	3.4	U
		CF17BR12S0				2.8	B	2.8	U
		CF17BR12S2				1.7	B	1.7	U
		CF17BR7S0				1.6	B	1.6	U
		CF17BR7S2				1.6	B	1.6	U
		CF17BR5S0				2.3	B	2.3	U
		CF17BR5S2				2.5	B	2.5	U
	-1.50 mg/kg	CF17BR4S0	Chromium	CCB1	mg/kg	1.2	U	1.2	UJ
		CF17BR4S2				1.2	U	1.2	UJ
		CF17BR9S0				3.1	-	3.1	J
		CF17BR9S2				5.0	-	5.0	J
		CF17BR13S0				2.7	-	2.7	J
		CF17BR13S2				3.9	-	3.9	J
		CF17BR6S0				2.6	-	2.6	J
		CF17BR6S2				2.5	-	2.5	J
		CF17BR10S0				8.5	-	8.5	J
		CF17BR10S2				7.2	-	7.2	J
		CF17BR12S0				1.2	U	1.2	UJ
		CF17BR12S2				5.0	-	5.0	J
		CF17BR7S0				1.2	U	1.2	UJ
		CF17BR7S2				6.6	-	6.6	J
		CF17BR5S0				1.2	U	1.2	UJ
		CF17BR5S2				3.2	-	3.2	J
		CF17BR8S0				4.8	-	4.8	J
		CF17BR8S2				3.5	-	3.5	J
	0.66 mg/kg	CF17BR9S0	Copper	CCB3	mg/kg	0.54	B	0.54	U
		CF17BR9S2				0.50	B	0.50	U
		CF17BR6S0				3.8	B	3.8	U
		CF17BR10S0				1.9	B	1.9	U
		CF17BR10S2				0.98	B	0.98	U
		CF17BR12S0				0.96	B	0.96	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA008	0.66 mg/kg	CF17BR12S2	Copper	CCB3	mg/kg	0.59	B	0.59	U
		CF17BR7S0				1.2	B	1.2	U
		CF17BR7S2				0.77	B	0.77	U
		CF17BR5S0				1.1	B	1.1	U
		CF17BR8S0				1.9	B	1.9	U
		CF17BR8S2				2.0	B	2.0	U
	11.6 mg/kg	CF17BR4S2	Magnesium	CCB5	mg/kg	28.9	B	28.9	UJ
		CF17BR9S2				26.6	B	26.6	UJ
		CF17BR13S0				12.2	B	12.2	UJ
		CF17BR13S2				32.4	B	32.4	UJ
		CF17BR6S0				60.2	B	60.2	UJ
		CF17BR10S0				23.2	B	23.2	UJ
		CF17BR10S2				22.9	B	22.9	UJ
		CF17BR12S2				25.1	B	25.1	UJ
		CF17BR7S0				38.5	B	38.5	UJ
		CF17BR7S2				42.2	B	42.2	UJ
		CF17BR5S0				33.4	B	33.4	UJ
		CF17BR5S2				36.6	B	36.6	UJ
		CF17BR8S2				55.2	B	55.2	UJ
	0.62 mg/kg	CF17BR4S2	Manganese	CCB3	mg/kg	1.0	B	1.0	U
		CF17BR9S2				1.2	B	1.2	U
		CF17BR13S0				0.56	B	0.56	U
		CF17BR13S2				1.1	B	1.1	U
		CF17BR6S0				2.4	B	2.4	U
		CF17BR5S0				1.6	B	1.6	U
		CF17BR5S2				1.1	B	1.1	U
		CF17BR8S2				2.0	B	2.0	U
	1.60 mg/kg	CF17BR9S2	Nickel	CCB4	mg/kg	2.6	B	2.6	U
		CF17BR6S0				1.1	B	1.1	U
		CF17BR6S2				3.5	B	3.5	U
		CF17BR5S0				1.2	B	1.2	U
	13.0 mg/kg	CF17BR4S0	Potassium	CCB3	mg/kg	31.9	B	31.9	UJ
		CF17BR4S2				23.6	B	23.6	UJ
		CF17BR9S0				11.9	B	11.9	UJ
		CF17BR13S2				11.7	B	11.7	UJ
		CF17BR6S0				6.4	B	6.4	UJ
		CF17BR6S2				14.2	B	14.2	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA008	13.0	CF17BR10S2	Potassium	CCB3	mg/kg	11.7	B	11.7	UJ
	mg/kg	CF17BR12S0				21.7	B	21.7	UJ
		CF17BR12S2				5.7	B	5.7	UJ
		CF17BR7S0				9.2	B	9.2	UJ
		CF17BR7S2				19.1	B	19.1	UJ
	-5.70	CF17BR5S0				35.3	B	35.3	UJ
	mg/kg	CF17BR5S2				8.8	B	8.8	UJ
		CF17BR8S0				44.2	B	44.2	UJ
		CF17BR8S2				14.2	B	14.2	UJ
		CF17BR9S2				5.7	U	5.7	UJ
		CF17BR13S0				5.6	U	5.6	UJ
		CF17BR10S0				5.6	U	5.6	UJ
	-0.56	CF17BR4S0	Selenium	CCB3	mg/kg	0.48	U	0.48	UJ
	mg/kg	CF17BR4S2				0.48	U	0.48	UJ
		CF17BR9S0				0.48	U	0.48	UJ
		CF17BR9S2				0.49	U	0.49	UJ
		CF17BR13S0				0.49	U	0.49	UJ
		CF17BR13S2				0.47	U	0.47	UJ
		CF17BR6S0				0.47	U	0.47	UJ
		CF17BR6S2				0.48	U	0.48	UJ
		CF17BR10S0				0.50	U	0.50	UJ
		CF17BR10S2				0.50	U	0.50	UJ
		CF17VR12S0				0.49	U	0.49	UJ
		CF17BR12S2				0.49	U	0.49	UJ
		CFBR7S0				0.50	U	0.50	UJ
		CFBR7S2				0.49	U	0.49	UJ
		CF17BR5S0				0.51	U	0.51	UJ
		CF17BR5S2				0.47	U	0.47	UJ
		CF17BR8S0				0.68	U	0.68	UJ
		CF17BR8S2				0.57	U	0.57	UJ

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA009			VOLATILE ORGANICS						
	3 ug/kg	CF17BR14S0	acetone	VBLK5	ug/kg	6	JB	13	U
			SEMIVOLATILE ORGANICS						
	45 ug/kg	CF17BR14S2	di-n-butylphthalate	SBLK4	ug/kg	210	JB	390	U
		CF17BR14S2D			ug/kg	250	JB	400	U
		CF17BR15S0			ug/kg	290	JB	420	U
		CF17BR15S0D			ug/kg	460	B	460	U
		CF17BR15S2			ug/kg	410	JB	420	U
		CF17BR15S2D			ug/kg	310	JB	330	U
		CF17BR14S0			ug/kg	440	B	440	U
		CF17BR14S0 MS			ug/kg	290	JB	420	U
		CF17BR14S0 MSD			ug/kg	410	JB	420	U
			PESTICIDE/PCB'S						
	0.21 ug/kg	CF17BR11S0	aldrin	PBLK1	ug/kg	0.42	JPB	2.5	U
		CF17BR11S2			ug/kg	0.21	JPB	2.6	U

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA009	153 (ug/L)	CF17BR11S2R	Aluminum	CCB(P1)	ug/L	46.5	B	46.5	U
		CF17BR15S2DR			ug/L	51.2	B	51.2	U
		CF514IF			ug/L	155	B	155	U
		CF515DF			ug/L	701	B	701	U
		CF513SR			ug/L	41.2	B	41.2	U
		CF512DF			ug/L	470	B	470	U
		CF511IF			ug/L	267	B	267	U
	4.6 (ug/L)	CF17BR14S0	Barium	CCB(P1)	mg/kg	4.6	B	4.6	U
		CF17BR14S2			mg/kg	3.2	B	3.2	U
		CF17BR14S2D			mg/kg	3.7	B	3.7	U
		CF17BR15S0			mg/kg	2.2	B	2.2	U
		CF17BR15S0D			mg/kg	2.3	B	2.3	U
		CF17BR15S2			mg/kg	2.3	B	2.3	U
		CF17BR15S2D			mg/kg	2.5	B	2.5	U
		CF514IF			ug/L	13.6	B	13.6	U
		CF512DF			ug/L	20.0	B	20.0	U
		CF511IF			ug/L	14.2	B	14.2	U
	152 (ug/L)	CF17BR11S2R	Calcium	CCB(P1)	ug/L	49.7	B	49.7	U
		CF17BR15S2			ug/L	183	B	183	U
		CF17BR15S2DR			ug/L	39.2	B	39.2	U
		CF514IF			ug/L	314	B	314	U
		CF513SR			ug/L	46.6	B	46.6	U
		CF511IF			ug/L	583	B	583	U
	5.4 (ug/L)	CF17BR11S0	Chromium	CCB(P1)	mg/kg	4.1	-	4.1	U
		CF17BR11S2			mg/kg	6.5	-	6.5	U
		CF17BR14S0			mg/kg	3.6	-	3.6	U
		CF17BR14S2			mg/kg	4.9	-	4.9	U
		CF17BR15S0			mg/kg	3.2	-	3.2	U
		CF17BR15S0D			mg/kg	3.7	-	3.7	U
		CF17BR15S2			mg/kg	3.0	-	3.0	U
		CF17BR15S2D			mg/kg	3.9	-	3.9	U
		CF514I			ug/L	8.3	B	8.3	U
		CF515D			ug/L	22.4	-	22.4	U
		CF513S			ug/L	25.0	-	25.0	U
		CF512D			ug/L	5.7	B	5.7	U
		CF511I			ug/L	25.0	-	25.0	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA009	4.6 (ug/L)	CF17BR11S0	Copper	CCB(P1)	mg/kg	2.3	B	2.3	U
		CF17BR11S2			mg/kg	1.2	B	1.2	U
		CF17BR14S0			mg/kg	1.6	B	1.6	U
		CF17BR14S2			mg/kg	0.88	B	0.88	U
		CF17BR14S2D			mg/kg	1.1	B	1.1	U
		CF17BR15S0			mg/kg	0.89	B	0.89	U
		CF17BR15S0D			mg/kg	0.75	B	0.75	U
		CF17BR15S2			mg/kg	0.80	B	0.80	U
		CF17BR15S2D			mg/kg	0.75	B	0.75	U
		CF17BR15S2DR			ug/L	2.7	B	2.7	U
		CF514I			ug/L	7.8	B	7.8	U
		CF515D			ug/L	9.3	B	9.3	U
		CF513S			ug/L	9.5	B	9.5	U
		CF512D			ug/L	3.5	B	3.5	U
		CF511I			ug/L	8.9	B	8.9	U
	72.1 (ug/L)	CF17BR11S2R	Iron	CCB(P1)	ug/L	35.6	B	35.6	U
		CF17BR15S2DR			ug/L	29.0	B	29.0	U
		CF513SR			ug/L	8.0	B	8.0	U
	-1.3 (ug/L)	CF17BR11S2R	Lead	CCB(F1)	ug/L	1.0	U	1.0	UJ
		CF17BR15S0			mg/kg	1.6	-	1.6	J
		CF17BR15S0D			mg/kg	1.6	-	1.6	J
		CF17BR15S2			mg/kg	1.6	-	1.6	J
		CF17BR15S2DR			ug/L	1.0	U	1.0	UJ
		CF514IF			ug/L	1.0	U	1.0	UJ
		CF515D			ug/L	6.5	-	6.5	J
		CF515DF			ug/L	1.0	U	1.0	UJ
		CF513SF			ug/L	1.0	U	1.0	UJ
		CF513SR			ug/L	1.0	U	1.0	UJ
		CF513SRF			ug/L	1.0	U	1.0	UJ
		CF512D			ug/L	4.6	-	4.6	J
		CF512DF			ug/L	1.0	U	1.0	UJ
		CF511IF			ug/L	1.0	U	1.0	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA009	147 (ug/L)	CF17BR11S0	Magnesium	CCB(P1)	mg/kg	112	B	112	U
		CF17BR11S2			mg/kg	125	B	125	U
		CF17BR11S2R			ug/L	21.4	B	21.4	U
		CF17BR14S0			mg/kg	85.3	B	85.3	U
		CF17BR14S2			mg/kg	60.4	B	60.4	U
		CF17BR14S2D			mg/kg	78.4	B	78.4	U
		CF17BR15S0			mg/kg	54.2	B	54.2	U
		CF17BR15S0D			mg/kg	56.3	B	56.3	U
		CF17BR15S2			mg/kg	58.5	B	58.5	U
		CF17BR15S2D			mg/kg	75.3	B	75.3	U
		CF514IF			ug/L	693	B	693	U
		CF513SR			ug/L	23.1	B	23.1	U
		CF511IF			ug/L	655	B	655	U
	4.6 (ug/L)	CF17BR11S0	Manganese	CCB(P1)	mg/kg	4.7		4.7	U
		CF17BR11S2			mg/kg	3.0	B	3.0	U
		CF17BR14S0			mg/kg	2.8	B	2.8	U
		CF17BR14S2			mg/kg	1.5	B	1.5	U
		CF17BR14S2D			mg/kg	1.7	B	1.7	U
		CF17BR15S0			mg/kg	1.5	B	1.5	U
		CF17BR15S0D			mg/kg	1.5	B	1.5	U
		CF17BR15S2			mg/kg	1.3	B	1.3	U
		CF17BR15S2D			mg/kg	1.6	B	1.6	U
		CF514I			ug/L	4.7	B	4.7	U
		CF514IF			ug/L	2.1	B	2.1	U
		CF515D			ug/L	14.2	B	14.2	U
		CF515DF			ug/L	5.9	B	5.9	U
		CF513S			ug/L	21.0	-	21.0	U
		CF513SF			ug/L	18.0	-	18.0	U
		CF512D			ug/L	14.4	-	14.4	U
		CF512DF			ug/L	12.3	B	12.3	U
		CF511I			ug/L	16.4	-	16.4	U
		CF511IF			ug/L	3.9	B	3.9	U
	15.2 (ug/L)	CF17BR14S2D	Nickel	CCB(P1)	mg/kg	2.7	B	2.7	U
		CF515D			ug/L	12.1	B	12.1	U
		CF515DF			ug/L	18.8	B	18.8	U
		CF513SF			ug/L	13.6	B	13.6	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA009	84.1 (ug/L)	CF17BR11S0	Potassium	CCB(P1)	mg/kg	60.7	B	60.7	U
		CF17BR11S2			mg/kg	69.1	B	69.1	U
		CF17BR11S2R			ug/L	37.9	B	37.9	U
		CF17BR14S0			mg/kg	49.3	B	49.3	U
		CF17BR14S2			mg/kg	42.4	B	42.4	U
		CF17BR14S2D			mg/kg	51.1	B	51.1	U
		CF17BR15S0			mg/kg	34.2	B	34.2	U
		CF17BR15S0D			mg/kg	37.6	B	37.6	U
		CF17BR15S2			mg/kg	39.9	B	39.9	U
		CF17BR15S2D			mg/kg	63.2	B	63.2	U
		CF17BR15S2DR			ug/L	37.9	B	37.9	U
		CF514IF			ug/L	358	B	358	U
		CF513SR			ug/L	44.5	B	44.5	U
		CF513SRF			ug/L	42.9	B	42.9	U
	-2.6 (ug/L)	CF17BR11S0	Selenium	CCB(F1)	mg/kg	0.60	U	0.60	UJ
		CF17BR11S2			mg/kg	0.61	U	0.61	UJ
		CF17BR11S2R			ug/L	2.0	U	2.0	UJ
		CF17BR14S0			mg/kg	0.50	U	0.50	UJ
		CF17BR14S2			mg/kg	0.47	U	0.47	UJ
		CF17BR14S2D			mg/kg	0.49	U	0.49	UJ
		CF17BR15S0			mg/kg	0.50	U	0.50	UJ
		CF17BR15S0D			mg/kg	0.49	U	0.49	UJ
		CF17BR15S2			mg/kg	0.50	U	0.50	UJ
		CF17BR15S2D			mg/kg	0.49	U	0.49	UJ
		CF17BR15S2DR			ug/L	2.0	U	2.0	UJ
		CF514I			ug/L	2.0	U	2.0	UJ
		CF514IF			ug/L	2.0	U	2.0	UJ
		CF515D			ug/L	2.0	U	2.0	UJ
		CF515DF			ug/L	2.0	U	2.0	UJ
		CF513S			ug/L	2.0	U	2.0	UJ
		CF513SF			ug/L	2.0	U	2.0	UJ
		CF513SR			ug/L	2.0	U	2.0	UJ
		CF513SRF			ug/L	2.0	U	2.0	UJ
		CF512D			ug/L	2.0	U	2.0	UJ
		CF512DF			ug/L	2.0	U	2.0	UJ
		CF511I			ug/L	2.0	U	2.0	UJ
		CF511IF			ug/L	2.0	U	2.0	UJ
	64.1 (ug/L)	CF17BR11S2R	Sodium	CCB(P1)	ug/L	132	B	132	U
		CF17BR15S2DR			ug/L	74.4	B	74.4	U
		CF513SR			ug/L	148	B	148	U
		CF513SRF			ug/L	128	B	128	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA009	3.3 (ug/L)	CF17BR11S0	Vanadium	CCB(P1)	mg/kg	2.4	B	2.4	U
		CF17BR11S2			mg/kg	2.7	B	2.7	U
		CF17BR14S0			mg/kg	1.9	B	1.9	U
		CF17BR14S2			mg/kg	1.0	B	1.0	U
		CF17BR14S2D			mg/kg	1.5	B	1.5	U
		CF17BR15S0			mg/kg	1.4	B	1.4	U
		CF17BR15S0D			mg/kg	1.2	B	1.2	U
		CF17BR15S2			mg/kg	1.2	B	1.2	U
		CF17BR15S2D			mg/kg	1.2	B	1.2	U
		CF514I			ug/L	6.5	B	6.5	U
		CF515DF			ug/L	3.0	B	3.0	U
		CF513SF			ug/L	4.8	B	4.8	U
		CF512D			ug/L	5.1	B	5.1	U
	-7.7 (ug/L)	CF17BR11S0	Zinc	CCB(P1)	mg/kg	1.4	B	1.4	J
		CF17BR11S2			mg/kg	2.3	B	2.3	J
		CF17BR11S2R			ug/L	3.0	U	3.0	UJ
		CF17BR14S0			mg/kg	6.8		6.8	J
		CF17BR14S2			mg/kg	0.70	U	0.70	UJ
		CF17BR14S2D			mg/kg	0.71	U	0.71	UJ
		CF17BR15S0			mg/kg	0.76	U	0.76	UJ
		CF17BR15S0D			mg/kg	0.74	U	0.74	UJ
		CF17BR15S2			mg/kg	0.75	U	0.75	UJ
		CF17BR15S2D			mg/kg	1.7	B	1.7	J
		CF17BR15S2DR			ug/L	3.0	U	3.0	UJ
		CF514IF			ug/L	21.4		21.4	J
		CF515DF			ug/L	12.8	B	12.8	J
		CF513S			ug/L	8.0	B	8.0	J
		CF513SF			ug/L	4.2	B	4.2	J
		CF513SR			ug/L	3.0	U	3.0	UJ
		CF513SRF			ug/L	15.8	B	15.8	J
		CF512DF			ug/L	27.3	-	27.3	J
		CF511IF			ug/L	15.9	B	15.9	J

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA010			VOLATILE ORGANICS (All criteria were met)	-	-	-	-	-	-
			SEMIVOLATILE ORGANICS (All criteria were met)	-	-	-	-	-	-
	0.016 ug/L	CF524S	PESTICIDE/PCB'S beta-BHC	PBLK2	ug/L	0.016	JPB	0.05	UJ

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA010	56.6 ug/L	CF525IF	Aluminum	PBW1	ug/L	157	B	157	UJ
		CF524SF				98.2	B	98.2	UJ
		CF59IF				74.8	B	74.8	UJ
		CF5MW29SF				216		216	UJ
		CF5MW29SDF				195	B	195	UJ
	-59.9 ug/L	CF59IRF	Aluminum	ICB2	ug/L	38.0	U	38.0	UJ
	-117 ug/L	CF510SF	Calcium	PBW1	ug/L	554	B	554	UJ
	6.70 ug/L	CF510S	Copper	Rinsate CF59IR	ug/L	29.1		29.1	U
		CF58SF				4.7	B	4.7	UJ
		CF526D				8.4	B	8.4	UJ
		CF525I				21.9	B	21.9	U
		CF525IF				2.9	B	2.9	UJ
		CF524S				9.1	B	9.1	UJ
		CF524SF				9.7	B	9.7	UJ
		CF527S				9.1	B	9.1	UJ
	-2.07 ug/L	CF59I				5.2	B	5.2	UJ
		CF5MW29S				26.6		26.6	U
		CF5MW29SD				14.6	B	14.6	U
		CF5MW29SDF				10.7	B	10.7	U
	186 ug/L	CF510SF	Copper	PBW1	ug/L	2.0	U	2.0	UJ
		CF526DF				2.0	U	2.0	UJ
		CF5MW29SF				2.0	U	2.0	UJ
		CF59IRF				2.0	U	2.0	UJ
		CF58SF	Iron	Rinsate CF59IR	ug/L	537	-	537	UJ
		CF526DF				770	-	770	UJ
		CF525IF				404	-	404	UJ
		CF524S				724	-	724	UJ
		CF524SF				128	-	128	UJ
		CF527SF				735	-	735	UJ
		CF59IF				340	-	340	UJ
		CF5MW29SF				787	-	787	UJ
		CF5MW29SDF				772	-	772	UJ
		CF59IRF				22.8	B	22.8	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA010	1.30 ug/L	CF510SF	Lead	ICB1	ug/L	1.3	B	1.3	U
		CF58SF				2.0	B	2.0	U
		CF526DF				1.3	B	1.3	U
		CF59IF				1.2	B	1.2	U
		CF5MW29SF				1.4	B	1.4	U
	-34.0 ug/L	CFCF591RF	Magnesium	PBW1	ug/L	20.0	U	20.0	UJ
	-159 ug/L	CF510SF	Potassium	CCB5	ug/L	28.0	B	28.0	UJ
		CF526DF				738	B	738	UJ
		CF525IF				325	B	325	UJ
		CF524S				278	B	278	UJ
		CF524SF				87.4	B	87.4	UJ
		CF527S				440	B	440	UJ
		CF527SF				246	B	246	UJ
		CF59IF				545	B	545	UJ
		CF5MW29SF				236	B	236	UJ
		CF5MW29SDF				180	B	180	UJ
		CF59IRF				18.0	U	18.0	UJ
	2.00 ug/L	CF525I	Selenium	CCB12	ug/L	7.5	-	7.5	UJ
		CF524S				3.3	B	3.3	UJ
		CF5MW29SD				2.6	B	2.6	UJ
	-223 ug/L	CF59IRF	Sodium	CCB5	ug/L	47.0	U	47.0	UJ
	1.00 ug/L	CF510S	Thallium	CCB4	ug/L	1.4	B	1.4	U
		CF58S				1.3	B	1.3	U
	3.20 ug/L	CF510SF	Vanadium	CCB4	ug/L	2.7	B	2.7	UJ
		CF58SF				3.5	B	3.5	UJ
		CF526DF				3.1	B	3.1	UJ
		CF27SF				8.0	B	8.0	UJ
		CF59I				9.2	B	9.2	UJ
		CF5MW29SF				3.8	B	3.8	UJ
	8.60 ug/L	CF510S	Zinc	Rinsate CF59IR	ug/L	39.4	-	39.4	U
		CF510SF				12.3	B	12.3	UJ
		CF58SF				24.3	-	24.3	U
		CF526F				17.1	B	17.1	UJ
		CF525I				23.3	-	23.3	UJ
		CF525IF				14.0	B	14.0	UJ
		CF524S				21.9	-	21.9	UJ
		CF524SF				8.6	B	8.6	UJ
		CF527S				10.5	B	10.5	UJ
		CF59I				23.2	-	23.2	UJ
		CF59IF				18.0	B	18.0	UJ
		CF5MW29S				40.5	-	40.5	UJ
		CF5MW29SF				36.0	-	36.0	UJ
		CF5MW29SD				25.1	-	25.1	U
		CF5MW29SDF				14.6	B	14.6	UJ
		CF59IRF				4.1	B	4.1	UJ

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA011			VOLATILE ORGANICS						
	6 ug/L	CF5MW7S	acetone	Trip CF5MW7ST	ug/L	8	-	8	U
			SEMIVOLATILE ORGANICS						
	0.5 ug/L	CF5MW16S CF5MW17I CF5MW18D	bis(2-ethylhexyl)phthalate	SBLK2	ug/L	2 0.6 0.8	JB JB JB	10 10 10	U U U
			PESTICIDE/PCB'S						
			(All criteria were met)			-	-	-	-

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA011	66.5	CF5MW17IF	aluminum	PBW1	ug/L	150	B	150	U
	ug/L	CF5MW18DF				105	B	105	U
		CF5MW19SF				140	B	140	U
		CF5MW19SDF				215		215	U
		CF5MW20SF				174	B	174	U
		CF5MW21IF				162	B	162	U
		CF5MW23SF				99.4	B	99.4	U
		CF5MW28DF				70.2	B	70.2	U
		CF5MW28DDF				107	B	107	U
	16.4	CF5MW30S	antimony	CCB5	ug/L	14.3	B	14.3	U
	ug/L	CF5MW21IF				14.2	B	14.2	U
	-3.60	CF5MW3S	arsenic	CCB13	ug/L	17.6	-	17.6	J
	ug/L	CF5MW3SF				18.0	-	18.0	J
		CF5MW4S				7.5	B	7.5	J
		CF5MW4SF				9.0	B	9.0	J
		CF5MW5S				10.2	-	10.2	J
		CF5MW5SF				8.5	B	8.5	J
		CF5MW7S				15.4	B	15.4	J
		CF5MW7SF				2.0	U	2.0	UJ
		CF5MW16S				10.8	B	10.8	J
		CF5MW16SF				2.0	U	2.0	UJ
		CF5MW17I				15.0	-	15.0	J
		CF5MW17IF				14.2	-	14.2	J
		CF5MW18D				11.0	-	11.0	J
		CF5MW18DF				13.5	-	13.5	J
		CF5MW19S				2.0	U	2.0	UJ
		CF5MW19SF				2.0	U	2.0	UJ
		CF5MW19SD				2.0	U	2.0	UJ
		CF5MW19SDF				2.0	U	2.0	UJ
		CF5MW20S				2.0	U	2.0	UJ
		CF5MW20SF				2.0	U	2.0	UJ
		CF5MW21I				3.8	B	3.8	J
		CF5MW21IF				2.2	B	2.2	J
		CF5MW22D				6.0	B	6.0	J
		CF5MW22DF				6.0	B	6.0	J
		CF5MW23S				2.0	U	2.0	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA011	-3.60 ug/L	CF5MW23SF	arsenic	CCB13	ug/L	2.0	U	2.0	UJ
		CF5MW28D				2.0	U	2.0	UJ
		CF5MW28DF				2.0	U	2.0	UJ
		CF5MW28DD				2.0	U	2.0	UJ
		CF5MW28DDF				2.0	U	2.0	UJ
		CF5MW30S				2.3	B	2.3	J
		CF5MW30SF				4.1	B	4.1	J
		CF5MW18DR				2.0	U	2.0	UJ
		CF5MW18DRF				2.0	U	2.0	UJ
	1.90 ug/L	CF5MW7SF	barium	CCB2	ug/L	9.1	B	9.1	U
	1.80 ug/L	CF5MW16S	beryllium	CCB1	ug/L	1.2	B	1.2	U
		CF5MW30S				1.3	B	1.3	U
		CF5MW4S				1.3	B	1.3	U
		CF5MW7S				1.9	B	1.9	U
	54.5 ug/L	CF5MW20SF	calcium	CF5MW 18DRF	ug/L	227	B	227	U
	2.60 ug/L	CF5MW3S	copper	CCB5	ug/L	12.4	B	12.4	U
		CF5MW4SF				6.0	B	6.0	U
		CF5MW5S				3.6	B	3.6	U
		CF5MW17I				5.1	B	5.1	U
		CF5MW18D				5.9	B	5.9	U
		CF5MW18DF				2.2	B	2.2	U
		CF5MW19S				11.1	B	11.1	U
		CF5MW19SDF				2.8	B	2.8	U
		CF5MW20S				10.3	B	10.3	U
		CF5MW21I				4.5	B	4.5	U
		CF5MW22D				4.5	B	4.5	U
		CF5MW28D				4.0	B	4.0	U
		CF5MW28DF				2.3	B	2.3	U
		CF5MW28DD				5.1	B	5.1	U
		CF5MW28DDF				3.0	B	3.0	U
	2.10 ug/L	CF5MW7SF	manganese	CCB6	ug/L	7.4	B	7.4	U
		CF5MW17I				4.0	B	4.0	U
		CF5MW18D				6.6	B	6.6	U
		CF5MW18DF				4.5	B	4.5	U
		CF5MW19SF				5.9	B	5.9	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA011	2.10 ug/L	CF5MW19SDF	manganese	CCB6	ug/L	6.7	B	6.7	U
		CF5MW20S				6.5	B	6.5	U
		CF5MW21I				7.9	B	7.9	U
		CF5MW21IF				3.6	B	3.6	U
		CF5MW22DF				8.2	B	8.2	U
		CF5MW28D				10.5	B	10.5	U
		CF5MW28DD				9.4	B	9.4	U
		CF5MW28DDF				8.8	B	8.8	U
		CF5MW30SF				10.3	B	10.3	U
	-1.90 ug/L	CF5MW3SF	lead	CCB17	ug/L	1.0	U	1.0	UJ
		CF5MW4SF				1.8	B	1.8	J
		CF5MW5S				1.8	B	1.8	J
		CF5MW5SF				1.3	B	1.3	J
		CF5MW7SF				1.0	U	1.0	UJ
		CF5MW16SF				1.0	U	1.0	UJ
		CF5MW17I				2.7	B	2.7	J
		CF5MW17IF				1.0	U	1.0	UJ
		CF5MW18D				2.0	B	2.0	J
		CF5MW18DF				1.0	U	1.0	UJ
		CF5MW19SF				1.0	U	1.0	UJ
		CF5MW19SDF				1.0	U	1.0	UJ
		CF5MW20SF				2.2	B	2.2	J
		CF5MW21I				3.9	-	3.9	J
		CF5MW21IF				1.0	U	1.0	UJ
		CF5MW22D				1.4	B	1.4	J
		CF5MW22DF				1.0	U	1.0	UJ
		CF5MW23SF				1.0	U	1.0	UJ
		CF5MW28D				4.2	-	4.2	J
		CF5MW28DF				1.0	U	1.0	UJ
		CF5MW28DD				5.0	-	5.0	J
		CF5MW28DDF				1.3	B	1.3	J
		CF5MW30SF				1.6	B	1.6	J
		CF5MW18DR				1.0	U	1.0	UJ
		CF5MW18DRF				1.0	U	1.0	UJ
	6.50 ug/L	CF5MW3S	nickel	CCB2	ug/L	20.3	B	20.3	U
		CF5MW3SF				12.2	B	12.2	U
		CF5MW4SF				32.0	B	32.0	U
		CF5MW5S				11.2	B	11.2	U
		CF5MW5SF				13.3	B	13.3	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA011	6.50 ug/L	CF5MW17I	nickel	CCB2	ug/L	6.1	B	6.1	U
		CF5MW17IF				4.1	B	4.1	U
		CF5MW18D				5.3	B	5.3	U
		CF5MW19S				16.1	B	16.1	U
		CF5MW19SD				24.9	B	24.9	U
		CF5MW19SDF				5.8	B	5.8	U
		CF5MW20S				6.1	B	6.1	U
		CF5MW20SF				4.5	B	4.5	U
		CF5MW21I				4.6	B	4.6	U
		CF5MW21IF				6.5	B	6.5	U
	43.1 ug/L	CF5MW22D	potassium	CCB2	ug/L	11.3	B	11.3	U
		CF5W22DF				11.5	B	11.5	U
		CF5MW23S				13.0	B	13.0	U
		CF5MW28D				6.3	B	6.3	U
		CF5MW28DD				4.8	B	4.8	U
		CF5MW28DDF				4.3	B	4.3	U
		CF5MW30S				22.5	B	22.5	U
	-4.70 ug/L	CF5MW4SF	selenium	CCB24	ug/L	1050	B	1050	U
		CF5MW5S				717	B	717	U
		CF5MW5SF				815	B	815	U
		CF5MW7SF				1250	B	1250	U
		CF5MW17I				420	B	420	U
		CF5MW19SF				122	B	122	U
		CF5MW19SDF				136	B	136	U
		CF5MW3S				2.0	B	2.0	J
		CF5MW3SF				2.0	U	2.0	UJ
		CF5MW4S				2.0	U	2.0	UJ
		CF5MW4SF				2.0	U	2.0	UJ
		CF5MW5S				2.0	U	2.0	UJ
		CF5MW5SF				2.0	U	2.0	UJ
		CF5MW7S				4.1	B	4.1	J
		CF5MW7SF				2.0	U	2.0	UJ
		CF5MW16S				4.7	B	4.7	J
		CF5MW16SF				2.0	U	2.0	UJ
		CF5MW17I				2.0	U	2.0	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA011	-4.70 ug/L	CF5MW17IF	selenium	CCB24	ug/L	2.0	U	2.0	UJ
		CF5MW18D				2.0	U	2.0	UJ
		CF5MW18DF				2.0	U	2.0	UJ
		CF5MW19S				10.0	U	10.0	UJ
		CF5MW19SF				2.0	U	2.0	UJ
		CF5MW19SD				16.0	B	16.0	J
		CF5MW19SDF				2.0	U	2.0	UJ
	1.60 ug/L	CF5MW20S	thallium	CCB8	ug/L	7.7	U	7.7	J
		CF5MW20SF				2.0	U	2.0	UJ
		CF5MW21I				2.0	U	2.0	UJ
		CF5MW21IF				2.0	U	2.0	UJ
		CF5MW22D				2.0	U	2.0	UJ
		CF5MW22DF				2.0	-	2.0	UJ
		CF5MW23S				13.4	U	13.4	J
		CF5MW23SF				2.0	U	2.0	UJ
		CF5MW28D				2.0	U	2.0	UJ
		CF5MW28DF				2.0	U	2.0	UJ
		CF5MW28DD				2.0	U	2.0	UJ
		CF5MW28DDF				2.0	U	2.0	UJ
		CF5MW30S				2.0	U	2.0	UJ
		CF5MW30SF				2.0	U	2.0	UJ
		CF5MW18DR				2.0	U	2.0	UJ
		CF5MW18DRF				2.0	-	2.0	UJ
	15.4 ug/L	CF5MW3S	zinc	CF5MW 18DRF	ug/L	1.5	B	1.5	U
		CF5MW3SF				1.5	B	1.5	U
		CF5MW4S				1.2	B	1.2	U
		CF5MW5SF				1.0	B	1.0	U
		CF5MW16S				1.0	B	1.0	U
		CF5MW17IF				1.2	B	1.2	U
		CF5MW18D				1.2	B	1.2	U
		CF5MW19S				1.1	B	1.1	U
		CF5MW19SD				1.3	B	1.3	U
		CF5MW19SDF				1.0	B	1.0	U
		CF5MW20S				1.2	B	1.2	U
		CF5MW20SF				1.0	B	1.0	U
		CF5MW28D				1.1	B	1.1	U
		CF5MW28DF				1.3	B	1.3	U
		CF5MW28DD				1.4	B	1.4	U
		CF5MW30S				1.4	B	1.4	U

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA012	1.50 ug/L	CF5MW6SF	lead	ICB1	ug/L	3.70	-	3.70	U
	-31.5 ug/L	CF5MW6SR	potassium	PBW1	ug/L	23.0	U	23.0	UJ
		CF5MW6SRF				23.0	U	23.0	UJ
	-178 ug/L	CF5MW6SR	sodium	CCB2	ug/L	52.0	U	52.0	UJ
		CF5MW6SRF				52.0	U	52.0	UJ
	-2.80 ug/L	CF5MW6S	selenium	PBW1	ug/L	2.0	U	2.0	UJ
		CF5MW6SF				2.0	U	2.0	UJ
		CF5MW6R				2.0	U	2.0	UJ
		CF5MW6RF				2.0	U	2.0	UJ
	4.20 ug/L	CF5MW6S	vanadium	CCB2	ug/L	8.5	B	8.5	U
		CF5MW6SF				7.1	B	7.1	U
	3.70 ug/L	CF5MW6S	zinc	PBW1	ug/L	12.2	B	12.2	U
		CF5MW6SF				17.3	B	17.3	U

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA013			VOLATILE ORGANICS						
			(No positive detections)			-	-	-	-
			SEMIVOLATILE ORGANICS						
			phenol						
	0.6ug/L	CF17MW7D		CF17MW18DR (rinsate)	ug/L	2.0	J	10	U
		CF17MW10D				1.0	J	10	U
		CF17MW11I				0.9	J	10	U
		CF17MW12D				0.8	J	10	U
		CF17MW13S				2.0	J	10	U
		CF17MW14I				0.8	J	10	U
		CF17MW15D				0.7	J	10	U
		CF17MW16S				1.0	J	10	U
		CF17MW19S				0.5	J	10	U
		CF17MW20I				2.0	J	10	U
		CF17MW20ID				1.0	J	10	U
			PESTICIDE/PCB'S						
			(No positive detections)			-	-	-	-

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA013	3.10 ug/L	CF17MW8SF	barium	CCB4	ug/L	12.3	B	12.3	U
		CF17MW11IF				5.5	B	5.5	U
		CF17MW14I				13.7	B	13.7	U
		CF17MW14IF				9.0	B	9.0	U
		CF17MW19SF				10.7	B	10.7	U
		CF17MW20I				11.2	B	11.2	U
		CF17MW20IF				8.8	B	8.8	U
		CF17MW20ID				9.8	B	9.8	U
		CF17MW10IDF				3.6	B	3.6	U
	102 ug/L	CF17MW11IF	calcium	CF17MW 18DRF	ug/L	415	B	415	U
		CF17MW14IF				369	B	369	U
		CF17MW20IF				416	B	416	U
		CF17MW20IDF				340	B	340	U
	7.90 ug/L	CF17MW8SF	chromium	CCB4	ug/L	5.8	B	5.8	U
		CF17MW10D				17.7	-	17.7	U
		CF17MW11I				9.3	B	9.3	U
		CF17MW12D				12.9	-	12.9	U
		CF17MW13S				22.4	-	22.4	U
		CF17MW15D				5.8	B	5.8	U
		CF17MW15DF				6.2	B	6.2	U
		CF17MW16SF				5.9	B	5.9	U
		CF17MW17I				5.5	B	5.5	U
		CF17MW18DF				5.0	B	5.0	U
		CF17MW19S				20.3	-	30.3	U
		CF17MW20I				7.7	B	7.7	U
		CF17MW20IF				6.9	B	6.9	U
		CF17MW23SF				5.2	B	5.2	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA013	4.90 ug/L	CF17MW7D	copper	CCB6	ug/L	3.6	B	3.6	U
		CF17MW7DF				4.1	B	4.1	U
		CF17MW8S				23.0	B	23.0	U
		CF17MW8SF				3.4	B	3.4	U
		CF17MW10D				6.7	B	6.7	U
		CF17MW10DF				5.2	B	5.2	U
		CF17MW11I				5.0	B	5.0	U
		CF17MW11IF				2.5	B	2.5	U
		CF17MW12D				5.5	B	5.5	U
		CF17MW13S				15.4	B	15.4	U
		CF17MW14I				7.3	B	7.3	U
		CF17MW15D				3.6	B	3.6	U
		CF17MW16S				22.7	B	22.7	U
		CF17MW17I				5.6	B	5.6	U
		CF17MW18D				3.1	B	3.1	U
		CF17MW19S				6.2	B	6.2	U
		CF17MW20I				5.4	B	5.4	U
		CF17MW20ID				4.8	B	4.8	U
		CF17MW20IDF				2.0	B	2.0	U
		CF17MW23SF				2.3	B	2.3	U
	-30.1 ug/L	CF17MW7DF	iron	PBW1	ug/L	8.0	U	8.0	UJ
		CF17MW15DF				22.2	B	22.2	UJ
		CF19MW19SF				49.4	B	49.4	UJ
	1.70 ug/L	CF17MW7D	lead	CF17MW 18DRF	ug/L	1.4	B	1.4	UJ
		CF17MW7DF				1.7	B	1.7	UJ
		CF17MW8SF				2.1	B	2.1	UJ
		CF17MW10D				2.7	B	2.7	UJ
		CF17MW10DF				2.0	B	2.0	UJ
		CF17MW11I				3.6	-	3.6	UJ
		CF17MW11IF				1.3	B	1.3	UJ
		CF17MW12D				3.0	-	3.0	UJ
		MC17MW13SF				1.5	B	1.5	UJ
		CF17MW14I				1.4	B	1.4	UJ
		CF17MW14IF				1.2	B	1.2	UJ
		CF17MW15D				1.8	B	1.8	UJ
		CF17MW15DF				1.1	B	1.1	UJ
		CF17MW19SF				2.3	B	2.3	UJ
		CF17MW20I				2.9	B	2.9	UJ
		CF17MW20IF				1.6	B	1.6	UJ
		CF17MW20ID				2.8	B	2.8	UJ
		CF17MW23SF				1.8	B	1.8	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA013	-2.30 ug/L	CF17MW12DF	lead	CCB1	ug/L	1.0	U	1.0	UJ
		CF17MW13S				10.8	-	10.8	J
		CF17MW16SF				1.0	U	1.0	UJ
		CF17MW17I				1.0	U	1.0	UJ
		CF17MW17IF				1.0	U	1.0	UJ
		CF17MW18D				1.0	U	1.0	UJ
		CF17MW18DF				1.0	U	1.0	UJ
		CF17MW20IDF				1.0	U	1.0	UJ
	5.00 ug/L	CF17MW7D	manganese	CCB6	ug/L	13.2	B	13.2	U
		CF17MW7DF				12.8	B	12.8	U
		CF17MW8S				16.6	-	16.6	U
		CF17MW8SF				5.4	B	5.4	U
		CF17MW10DF				23.0	-	23.0	U
		CF17MW11I				6.5	B	6.5	U
		CF17MW11IF				3.4	B	3.4	U
		CF17MW12D				22.6	-	22.6	U
		CF17MW12DF				17.1	-	17.1	U
		CF17MW13S				20.4	-	20.4	U
		CF17MW13SF				20.1	-	20.1	U
		CF17MW14I				5.4	B	5.4	U
		CF17MW14IF				2.6	B	2.6	U
		CF17MW15D				22.1	-	22.1	U
		CF17MW15DF				21.3	-	21.3	U
		CF17MW16SF				17.1	-	17.1	U
		CF17MW17I				4.0	B	4.0	U
		CF17MW17IF				3.4	B	3.4	U
		CF17MW18D				14.2	B	14.2	U
		CF17MW18DF				14.2	B	14.2	U
		CF17MW19S				6.0	B	6.0	U
		CF17MW19SF				4.4	B	4.4	U
		CF17MW20I				5.1	B	5.1	U
		CF17MW20IF				2.9	B	2.9	U
		CF17MW20ID				3.1	B	3.1	U
		CF17MW23SF				14.9	B	14.9	U
	21.9 ug/L	CF17MW16SF	potassium	CCB2	ug/L	56.9	B	56.9	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA013	-2.60 ug/L	CF17MW7D	selenium	CCB12	ug/L	2.0	U	2.0	UJ
		CF17MW7DF				2.0	U	2.0	UJ
		CF17MW8SF				2.0	U	2.0	UJ
		CF17MW10D				2.0	U	2.0	UJ
		CF17MW10DF				2.0	U	2.0	UJ
		CF17MW11I				2.0	U	2.0	UJ
		CF17MW11IF				2.0	U	2.0	UJ
		CF17MW12D				2.0	U	2.0	UJ
		CF17MW12D				2.0	U	2.0	UJ
		CF17MW12DF				2.0	U	2.0	UJ
		CF17MW13S				2.0	U	2.0	UJ
		CF17MW13SF				2.0	U	2.0	UJ
		CF17MW14I				2.0	U	2.0	UJ
		CF17MW14IF				2.0	U	2.0	UJ
		CF17MW15D				2.0	U	2.0	UJ
		CF17MW15DF				2.0	U	2.0	UJ
		CF17MW16S				2.0	U	2.0	UJ
		CF17MW16SF				2.0	U	2.0	UJ
		CF17MW17I				2.0	U	2.0	UJ
		CF17MW17IF				2.0	U	2.0	UJ
		CF17MW18D				2.0	U	2.0	UJ
		CF17MW18DF				2.0	U	2.0	UJ
		CF17MW19S				2.0	U	2.0	UJ
		CF17MW19SF				2.0	U	2.0	UJ
		CF17MW20I				2.0	U	2.0	UJ
		CF17MW20IF				2.0	U	2.0	UJ
		CF17MW20ID				2.0	U	2.0	UJ
		CF17MW23S				10.0	U	10.0	UJ
		CF17MW23SF				2.0	U	2.0	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA013	4.80 ug/L	CF17MW7DF	silver	CCB1	ug/L	10.6	-	10.6	U
		CF17MW8S				2.5	B	2.5	U
		CF17MW8SF				3.0	B	3.0	U
		CF17MW10D				3.1	B	3.1	U
		CF17MW11IF				2.4	B	2.4	U
		CF17MW13S				2.7	B	2.7	U
		CF17MW14I				2.7	B	2.7	U
		CF17MW14IF				2.1	B	2.1	U
		CF17MW17I				2.1	B	2.1	U
		CF17MW17IF				14.5	-	14.5	U
		CF17MW18DF				5.2	B	5.2	U
		CF17MW20I				3.0	B	3.0	U
		CF17MW20IF				2.9	B	2.9	U
		CF17MW20ID				2.4	B	2.4	U
		CF17MW23SF				2.3	B	2.3	U
	6.70 ug/L	CF17MW7D	vanadium	CCB1	ug/L	4.2	B	4.2	U
		CF17MW7DF				3.6	B	3.6	U
		CF17MW8SF				5.6	B	5.6	U
		CF17MW10D				14.1	B	14.1	U
		CF17MW10DF				6.5	B	6.5	U
		CF17MW11I				6.8	B	6.8	U
		CF17MW11IF				3.8	B	3.8	U
		CF15MW12D				11.2	B	11.2	U
		CF15MW12DF				4.1	B	4.1	U
		CF17MW13S				21.8	B	21.8	U
		CF17MW13SF				7.4	B	7.4	U
		CF17MW14I				2.6	B	2.6	U
		CF17MW14IF				2.9	B	2.9	U
		CF14MW15D				5.7	B	5.7	U
		CF17MW15DF				2.6	B	2.6	U
		CF17MW16SF				4.1	B	4.1	U
		CF17MW17I				3.6	B	3.6	U
		CF17MW17IF				2.3	B	2.3	U
		CF17MW18D				2.8	B	2.8	U
		CF17MW18DF				3.8	B	3.8	U
		CF17MW19S				21.6	B	21.6	U
		CF17MW19SF				10.6	B	10.6	U
		CF17MW20I				4.2	B	4.2	U
		CF17MW20IF				4.4	B	4.4	U
		CF17MW20ID				2.8	B	2.8	U
		CF17MW20IDF				2.0	B	2.0	U
		CF17MW23SF				3.3	B	3.3	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA013	26.9 ug/L	CF17MW7D	zinc	CF17MW 18DRF	ug/L	20.1	-	20.1	U
		CF17MW7DF				20.4	-	20.4	U
		CF17MW8S				38.6	-	38.6	U
		CF17MW8SF				30.3	-	30.3	U
		CF17MW10D				35.9	-	35.9	U
		CF17MW10DF				27.7	-	27.7	U
		CF17MW11I				54.3	-	54.3	U
		CF17MW11IF				34.2	-	34.2	U
		CF17MW12D				27.0	-	27.0	U
		CF17MW12DF				19.3	B	19.3	U
		CF17MW13S				49.1	-	49.1	U
		CF17MW13SF				24.1	-	24.1	U
		CF17MW14I				32.3	-	32.3	U
		CF17MW14IF				26.1	-	26.1	U
		CF17MW15D				19.0	B	19.0	U
		CF17MW15DF				33.1	-	33.1	U
		CF17MW16S				28.0	-	26.0	U
		CF17MW16SF				14.0	B	14.0	U
		CF17MW17I				29.0	-	29.0	U
		CF17MW17IF				16.6	B	16.6	U
		CF17MW18D				14.3	B	14.3	U
		CF17MW18DF				7.2	B	7.2	U
		CF17MW19S				19.8	B	19.8	U
		CF17MW19SF				29.0	-	29.0	U
		CF17MW20I				43.8	-	43.8	U
		CF17MW20IF				25.9	-	25.9	U
		CF17MW201D				33.3	-	33.3	U
		CF17MW20IDF				46.0	-	46.0	U
		CF17MW23S				43.8	-	43.8	U
		CF17MW23SF				25.1	-	25.1	U

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA014			VOLATILE ORGANICS						
			(No positive detections)		-	-	-	-	-
			SEMIVOLATILE ORGANICS						
	0.6ug/L	CF17SCRE	1,2,4-trichlorobenzene	SBLK4R	ug/L	0.5	JB	10	U
	0.8ug/L	CF17MW5SDL	phenol	CF17MW5SR (rinsate)	ug/L	170	DJ	10	U
			PESTICIDE/PCB'S						
			(No positive detections)		-	-	-	-	-

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA014	71.6 ug/L	CF17OF	aluminum	CCB1	ug/L	73.8	B	73.8	U
		CF170FF				44.3	B	44.3	U
		CF17MW9SF				283	-	283	U
		CF17SC				58.7	B	59.7	U
		CF17SCF				76.9	B	76.9	U
		CF17MWSRF				106	B	106	U
	6.4 ug/L	CF170FF	barium	CCB2	ug/L	2.3	B	2.3	U
		CF17MW4SF				17.7	B	17.7	U
		CF17MW9SF				24.3	B	24.3	U
		CF17SC				17.4	B	17.4	U
		CF17SCF				18.0	B	18.0	U
		CF17MW5SR				8.5	B	8.5	U
		CF17MWSRF				3.8	B	3.8	U
	164.5 ug/L	CF170F	calcium	CCB2	ug/L	55.2	B	55.2	U
		CF17MW6SF				45.9	B	45.9	U
		CF17MW6SDF				45.9	B	45.9	U
		CF17MW5SR				84.3	B	84.3	U
	3.1 ug/L	CF17MW4S	copper	CCB2	ug/L	10.6	B	10.6	U
		CF17MW5S				8.3	B	8.3	U
		CF17MW9S				10.2	B	10.2	U
		CF17SC				3.6	B	3.6	U
		CF17SCF				3.2	B	3.2	U
	106.8 ug/L	CF17SC	iron	CCB4	ug/L	31.7	B	31.7	UJ
		CF17MW5SR				32.9	B	32.9	UJ
		CF17MW5SRF				20.3	B	20.3	UJ
	-19.4 ug/l	CF170F	iron	ICB3	ug/L	8.0	U	8.0	UJ
		CF170FF				8.0	U	8.0	UJ
	-1.9 ug/L	CF17MW6SF	lead	CCB7	ug/L	1.0	U	1.0	UJ

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA014	1.9	CF170F	lead	CCB6	ug/L	1.2	B	1.2	UJ
	ug/L	CF170FF				1.3	B	1.3	UJ
		CF17MW4SF				1.8	B	1.6	UJ
		CF17MW5SF				1.5	B	1.5	UJ
		CF17MW6SDF				1.6	B	1.6	UJ
		CF17MW9SF				1.4	B	1.4	UJ
		CF17MW17SC				1.9	B	1.9	UJ
		CF17SCF				2.3	B	2.3	UJ
		CF17MW5SR				1.2	B	1.2	UJ
		CF17MW5SRF				1.7	B	1.7	UJ
	92.6	CF170F	magnesium	CCB2	ug/L	38.2	B	38.2	U
	ug/L	CF170FF				21.1	B	21.1	U
		CF17MW5SR				37.8	B	37.8	U
	5.3	CF17MW5S	manganese	CCB4	ug/L	22.2	-	22.2	U
	ug/L	CF17MW6SD				18.9	-	18.9	U
		CF17MW6SDF				2.5	B	2.5	U
		CF17SCF				2.0	B	2.0	U
	38.9	CF17MW5SF	potassium	CCB2	ug/L	151	B	151	U
	ug/L	CF17MW6SF				154	B	154	U
	-19.4	CF170F	potassium	PBW1	ug/L	18.0	U	18.0	UJ
	ug/L	CF170FF				18.0	U	18.0	UJ
		CF17MW5SR				18.0	U	18.0	UJ
		CF17MW5SRF				18.0	U	18.0	UJ
	5.0	CF17MW9S	silver	CCB2	ug/L	2.7	B	2.7	U
	ug/L	CF17MW5S				2.3	B	2.3	U
	253.7	CF170F	sodium	CCB2	ug/L	86.0	B	86.0	U
	ug/L	CF170FF				63.1	B	63.1	U
		CF17MW5SR				87.7	B	87.7	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA014	-5.00 ug/L	CF170F	selenium	PBW1	ug/L	2.0	U	2.0	UJ
		CF170FF				2.0	U	2.0	UJ
		CF17MW4S				2.0	U	2.0	UJ
		CF17MW4SF				2.0	U	2.0	UJ
		CF17MW5S				2.0	U	2.0	UJ
		CF17MW5SF				2.0	U	2.0	UJ
		CF17MW6S				2.0	U	2.0	UJ
		CF17MW6SF				2.0	U	2.0	UJ
		CF17MW6SD				2.0	U	2.0	UJ
		CF17MW6SDF				2.0	U	2.0	UJ
		CF17MW9S				2.0	U	2.0	UJ
		CF17MW9SF				2.0	U	2.0	UJ
		CF17SC				2.0	U	2.0	UJ
		CF17SCF				2.0	U	2.0	UJ
		CF17MW5SR				2.0	U	2.0	UJ
		CF17MW5SRF				2.0	U	2.0	UJ
	1.3 ug/L	CF170FF	thallium	CCB2	ug/L	1.1	B	1.1	U
		CF17MW6S				1.0	B	1.0	U
		CF17MW9S				1.0	B	1.0	U
		CF17MW9SF				1.0	B	1.0	U
		CF17SC				1.3	B	1.3	U
		CF17SCF				1.2	B	1.2	U
		CF17MW5SR				1.2	B	1.2	U
	4.7 ug/L	CF170F	vanadium	CCB2	ug/L	2.7	B	2.7	U
		CF17MW4SF				10.7	B	10.7	U
		CF17MW5SF				10.6	B	10.6	U
		CF17MW6SF				11.6	B	11.6	U
		CF17MW6SDF				11.6	B	11.6	U
		CF17MW9SF				2.6	B	2.6	U
		CF17MW5SR				3.8	B	3.8	U

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY (CONT'D)									
SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA014	18.4 ug/L	CF170FF	zinc	CF17MW5SR (insate)	ug/L	12.1	B	12.1	U
		CF17MW4S				38.9	-	38.9	U
		CF17MW4SF				24.1	-	24.1	U
		CF17MW5S				47.7	-	47.7	U
		CF17MW5SF				24.7	-	24.7	U
		CF17MW6S				41.3	-	41.3	U
		CF17MW6SF				15.1	B	15.1	U
		CF17MW6SD				48.2	-	48.2	U
		CF17MW6SDF				35.0	-	35.0	U
		CF17MW9S				29.3	-	29.3	U
		CF17MW9SF				26.7	B	26.7	U
		CF17SC				83.9	-	83.9	U
		CF17SCF				80.4	-	80.4	U
		CF17MW5SRF				8.4	B	8.4	U

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA015	8 ug/L		VOLATILE ORGANICS						
		CF17MW	acetone	CF17MW24ST (trip)	ug/L	7	-	7	U
		CF17MW1				8	-	8	U
		CF17MW22I				8	-	8	U
		CF17MW22D				11	-	11	U
		CF17MW24S				1700	-	1700	U
		CF17MW24SD				1800	-	1800	U
		CFMW25SI				2	-	2	U
		CF17MW28DD				6	-	6	U
			SEMIVOLATILE ORGANICS						
			bis(2ethylhexyl)phthalate						
	66 ug/L	CF17MW1		SBLK1	ug/L	0.7	JB	10	U
		CF17MW22D				0.6	JB	10	U
			bis(2-ethylhexyl)phthalate						
	1.0 ug/L	CF17MW27D		SBLK3	ug/L	2.0	J	10	U
		CF17MW28DD				6.0	-	10	U
			PESTICIDE/PCB'S						
	0.048 ug/L	CF17MW22D	aldrin	PBLK1	ug/L	0.015	JPB	0.05	U
	0.028 ug/L	CF17MW27D	aldrin	PBLK3	ug/L	0.018	JPB	0.05	U
		CF17MW28DD				0.02	JPB	0.05	U

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA015	47.9 ug/L	CF17MW21IF	aluminum	CCB5	ug/L	138	B	138	U
		CF17MW22DF				56.3	B	56.3	U
		CF17MW25SIF				102	B	102	U
		CF17MW26IF				57.7	B	57.7	U
		CF17MW28DD				51.9	B	51.9	U
		CF17MW28DDF				48.0	B	48.0	U
	4.1 ug/L	CF17MW21I	barium	CCB2	ug/L	20.1	B	20.1	U
		CF17MW21IF				8.6	B	8.6	U
		CF17MW25SIF				5.5	B	5.5	U
		CF17MW26I				13.6	B	13.6	U
		CF17MW26IF				5.2	B	5.2	U
		CF17MW27DF				16.7	B	16.7	U
	313 ug/L	CF17MW25SI	calcium	CCB1	ug/L	1510	B	1510	U
		CF17MW25SIF				481	B	481	U
		CF17MW26IF				562	B	562	U
	5.1 ug/L	CF17MW21I	chromium	CCB4	ug/L	8.7	B	8.7	U
		CF17MW22D				16.3	-	16.3	U
		CF17MW24SF				9.8	B	9.8	U
		CF17MW24SDF				9.0	B	9.0	U
		CF17MW28DDF				9.2	B	9.2	U
	5.0 ug/L	CF17MW1	copper	CCB1	ug/L	2.3	B	2.3	U
		CF17MW21I				3.9	B	3.9	U
		CF17MW22D				6.5	B	6.5	U
		CF17MW24S				16.8	B	16.8	U
		CF17MW24SD				15.0	B	15.0	U
		CF17MW25SI				10.7	B	10.7	U
		CF17MW26I				3.8	B	3.8	U
		CF17MW27D				5.2	B	5.2	U
	191 ug/L	CF17MW21I	magnesium	CCB4	ug/L	766	B	766	U
		CF17MW21IF				425	B	425	U
		CF17MW22SIF				761	B	761	U
		CF17MW26I				512	B	512	U
		CF17MW26IF				298	B	298	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA015	-92.2 ug/L	CF17MW21IF	iron	PBW1	ug/L	79.8	B	79.8	J
		CF17MW22DF				8.0	U	8.0	UJ
		CF17MW25SIF				443	-	443	J
		CFMW26IF				245	-	245	J
		CF17MW27D				410	-	410	J
		CF17MW27DF				8.0	U	8.0	UJ
		CF17MW28DD				8.0	U	8.0	UJ
		CF17MW28DDF				8.0	U	8.0	UJ
	-1.2 ug/L	CF17MW1	lead	PBW1	ug/L	1.1	B	1.1	J
		CF17MW1F				1.0	U	1.0	UJ
		CF17MW21I				3.3		3.3	J
		CF17MW21IF				1.0	U	1.0	UJ
		CF17MW22D				2.1	B	2.1	J
		CF17MW22DF				1.0	U	1.0	UJ
		CF17MW24SF				1.0	U	1.0	UJ
		CF17MW24SDF				1.0	U	1.0	UJ
		CF17MW25SIF				1.0	U	1.0	UJ
		CF17MW26I				1.0	U	1.0	UJ
		CF17MW26IF				1.0	U	1.0	UJ
		CF17MW27D				1.0	U	1.0	UJ
		CF17MW27DF				1.0	U	1.0	UJ
		CF17MW28DD				1.0	U	1.0	UJ
		CF17MW28DDF				1.0	U	1.0	UJ
	3.1 ug/L	CF17MW1	manganese	CCB1	ug/L	2.4	B	2.4	U
		CF17MW1F				2.5	B	2.5	U
		CF17MW21I				6.0	B	6.0	U
		CF17MW21IF				3.2	B	3.2	U
		CF17MWSI				8.3	B	8.3	U
		CF17MWSIF				2.6	B	2.6	U
		CF17MW26I				10.9	B	10.9	U
		CF17MW26IF				7.7	B	7.7	U
		CF17MW27DF				12.6	B	12.6	U
		CF17MW28DD				13.2	B	13.2	U
		CF17MW28DDF				11.3	B	11.3	U
	13.3 ug/L	CF17MW24S	nickel	ICB1	ug/L	24.9	B	24.9	U
		CF17MW24SD				20.7	B	20.7	U
		CF17MW24SDF				13.5	B	13.5	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA015	85.2 ug/L	CF17MW1	potassium	CCB2	ug/L	227	B	227	U
		CF17MW1F				213	B	213	U
		CF1MW21IF				294	B	294	U
		CF17MW25SIF				358	B	358	U
		CF17MW26IF				334	B	334	U
	2.9 ug/L	CF17MW24S	silver	CCB4	ug/L	2.4	B	2.4	U
		CF17MW24SF				2.1	B	2.1	U
		CF17MW24SD				2.7	B	2.7	U
		CF17MWSDF				2.3	B	2.3	U
	885 ug/L	CF17MW21IF	sodium	CCB4	ug/L	3940	B	3940	U
	1.0 ug/L	CF17MW1F	thallium	CCB3	ug/L	1.2	B	1.2	U
	6.0 ug/L	CF17MW1	vanadium	CCB2	ug/L	6.0	B	6.0	U
		CF17MW1F				3.6	B	3.6	U
		CF17MW21I				9.2	B	9.2	U
		CF17MW21IF				5.4	B	5.4	U
		CF17MW22D				20.0	B	20.0	U
		CF17MW22DF				4.8	B	4.8	U
		CF17MW24SF				17.9	B	17.9	U
		CF17MW24SDF				20.6	B	20.6	U
		CF17MW25SI				27.8	B	27.8	U
		CF17MW25SIF				4.2	B	4.2	U
		CF17MW26I				5.8	B	5.8	U
		CF17MW26IF				3.7	B	3.7	U
		CF17MW27D				5.2	B	5.2	U
		CF17MW27DF				4.3	B	4.3	U
		CF17MW28DD				19.0	B	19.0	U
	20.6 ug/l	CF17MW1	zinc	CF17MW22DRF (rinsate)	ug/L	14.5	B	14.5	U
		CF17MW1F				13.1	B	13.1	U
		CF17MW21I				16.0	B	16.0	U
		CF17MW21IF				14.1	B	14.1	U
		CF17MW22D				20.0	B	20.0	U
		CF17MW22DF				15.2	B	15.2	U
		CF17MW24SF				31.0	-	31.0	U
		CF17MW24SDF				11.6	B	11.6	U
		CF17MW25SI				27.8	-	27.8	U
		CF17MW25SIF				45.1	-	45.1	U
		CF17MW26I				33.6	-	33.6	U
		CF17MW26IF				40.0	-	40.0	U
		CF17MW27D				17.4	B	17.4	U
		CF17MW27DF				30.9	-	30.9	U
		CF17MW28DD				19.0	B	19.0	U
		CF17MW28DDF				19.5	B	19.5	U

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA016			VOLATILE ORGANICS						
	9 ug/L	CF17SS1	acetone	CF17SS14ST (trip)	ug/kg	11	JB	13	U
		CF17SS2				8	JB	14	U
		CF17SS4				12	JB	14	U
		CF17SS5				14	B	14	U
		CF17SS6				8	JB	12	U
		CF17SS7				8	JB	14	U
		CF17SS9				12	JB	16	U
		CF17SS10				11	JB	12	U
		CF17SS11				10	JB	14	U
			SEMIVOLATILE ORGANICS						
	51 ug/kg	CF17SS1	di-n-butylphthalate	SBLK2	ug/kg	120	JB	420	U
		CF17SS2				74	JB	460	U
		CF17SS3				210	JB	420	-
		CF17SS3D				120	JB	420	U
		CF17SS4				120	JB	460	U
		CF17SS5				140	JB	410	-
		CF17SS6				51	JB	400	-
		CF17SS7				140	JB	450	-
		CF17SS8				87	JB	450	-
		CF17SS9				270	JB	530	-
		CF17SS10				290	JB	400	-
		CF17SS11				88	JB	450	-
		CF17SS12				190	JB	440	-
		CF17SS12D				120	JB	430	-
		CF17SS13				170	JB	450	-
		CF17SS14				71	JB	440	-
			PESTICIDE/PCB'S						
			(All criteria were met)			-	-	-	-

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA016	3.1 ug/L	CF17SS1	barium	RINSATE CF17 SS14R	mg/kg	3.5	B	3.5	U
		CF17SS2				2.1	B	2.1	U
		CF17SS3				2.1	B	2.1	U
		CF17SS3D				2.1	B	2.1	U
		CF17SS4				2.8	B	2.8	U
		CF17SS5				2.6	B	2.6	U
		CF17SS7				2.0	B	2.0	U
		CF17SS11				3.5	B	3.5	U
		CF17SS12				2.2	B	2.2	U
		CF17SS12D				1.6	B	1.6	U
		CF17SS14				2.8	B	2.8	U
	18.5 ug/L	CF17SS1	copper	RINSATE CF17 SS14R	mg/kg	0.66	B	0.66	U
		CF17SS2				0.63	B	0.63	U
		CF17SS3				0.58	B	0.58	U
		CF17SS3D				0.57	B	0.57	U
		CF17SS4				0.57	B	0.57	U
		CF17SS5				1.70	B	1.7	U
		CF17SS6				0.91	B	0.91	U
		CF17SS8				1.30	B	1.30	U
		CF17SS9				1.50	B	1.50	U
		CF17SS10				0.86	B	0.86	U
		CF17SS13				0.96	B	0.96	U
		CF17SS14				0.77	B	0.77	U
	-16.3 mg/kg	CF17SS2	calcium	PBS1	mg/kg	97.8	B	97.8	J
	63.5 ug/L	CF17SS1	magnesium	RINSATE CF17 SS14R	mg/kg	45.5	B	45.5	U
		CF17SS2				52.0	B	52.0	U
		CF17SS3				56.2	B	58.2	U
		CF17SS3D				52.7	B	52.7	U
		CF17SS4				42.1	B	42.1	U
		CF17SS7				33.8	B	33.8	U
		CF17SS11				62.5	B	62.5	U
		CF17SS12				53.1	B	53.1	U
		CF17SS12D				40.8	B	40.8	U
		CF17SS14				42.6	B	42.6	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA016	3.0 ug/L	CF17SS1	manganese	CCB2	mg/kg	2.1	B	2.1	U
		CF17SS2				2.0	B	2.0	U
		CF17SS3				2.4	B	2.4	U
		CF17SS3D				2.2	B	2.2	U
		CF17SS4				1.7	B	1.7	U
		CF17SS7				1.6	B	1.6	U
		CF17SS9				4.8	B	4.8	U
		CF17SS11				2.3	B	2.3	U
		CF17SS12				1.8	B	1.8	U
		CF17SS12D				1.2	B	1.2	U
		CF17SS14				2.1	B	2.1	U
	110 ug/L	CF17SS1	potassium	RINSATE CF17 SS14R	mg/kg	32.7	B	32.7	U
		CF17SS2				32.5	B	32.5	U
		CF17SS3				32.1	B	32.1	U
		CF17SS3D				23.8	B	23.8	U
		CF17SS4				31.3	B	31.3	U
		CF17SS5				28.3	B	28.3	U
		CF17SS6				42.3	B	42.3	U
		CF17SS7				35.6	B	35.6	U
		CF17SS8				88.6	B	88.6	U
		CF17SS9				56.1	B	56.1	U
		CF17SS10				30.8	B	30.8	U
		CF17SS11				17.3	B	17.3	U
		CF17SS13				32.7	B	32.7	U
		CF17SS14				30.9	B	30.9	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA016	229 ug/L	CF17SS1	sodium	RINSATE CF17 SS14R	mg/kg	137	B	137	U
		CF17SS2				156	B	156	U
		CF17SS3				123	B	123	U
		CF17SS3D				138	B	138	U
		CF17SS4				148	B	148	U
		CF17SS5				130	B	130	U
		CF17SS6				147	B	147	U
		CF17SS7				122	B	122	U
		CF17SS8				132	B	132	U
		CF17SS9				150	B	150	U
		CF17SS10				121	B	121	U
		CF17SS11				126	B	126	U
		CF17SS12				130	B	130	U
		CF17SS12D				128	B	128	U
		CF17SS13				126	B	126	U
		CF17SS14				150	B	150	U
	10.4 ug/L	CF17SS1	zinc	RINSATE CF17 SS14R	mg/kg	1.0	U	1.0	UJ
		CF17SS2				1.1	U	1.1	UJ
		CF17SS3				1.0	U	1.0	UJ
		CF17SS3D				1.3	B	1.3	UJ
	-7.4 ug/L	CF17SS4		CCB4	mg/kg	1.1	B	1.1	UJ
		CF17SS5				5.2	-	5.2	UJ
		CF17SS6				5.2	-	5.2	UJ
		CF17SS7				1.1	U	1.1	UJ
		CF17SS8				4.4	B	4.4	UJ
		CF17SS9				9.5	-	9.5	UJ
		CF17SS10				5.5	-	5.5	UJ
		CF17SS11				1.3	B	1.3	UJ
		CF17SS12				1.1	U	1.1	UJ
		CF17SS12D				2.0	B	2.0	UJ
		CF17SS13				6.7	-	6.7	UJ
		CF17SS14				1.1	U	1.1	UJ

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG No.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA017			VOLATILE ORGANICS						
	20 ug/kg	CF5SS1	acetone	VBLK3	ug/kg	22	B	22	U
		CF5SS2				23	B	23	U
		CF5SS3				10	JB	12	U
		CF5SS5				22	B	22	U
		CF5SS6				6	JB	13	U
		CF5SS8				18	B	18	U
		CF5SS9				6	JB	12	U
		CF5SS10				11	JB	12	U
		CF5SS11				10	JB	13	U
	7 ug/kg	CF5SS10D	acetone	VBLK4	ug/kg	13	B	13	U
	30 ug/L	CF5SS4	acetone	CF5SS-10R	ug/kg	1400	J	2000	U
			SEMIVOLATILE ORGANICS						
	130 ug/kg	CF5SS1	di-n-butylphthalate	SBLK1	ug/kg	290	JB	420	U
		CF5SS2			ug/kg	220	JB	390	U
		CF5SS3			ug/kg	87	JB	380	U
		CF5SS5			ug/kg	350	JB	400	U
		CF5SS6			ug/kg	270	JB	420	U
		CF5SS8			ug/kg	230	JB	390	U
		CF5SS9			ug/kg	390	B	390	U
		CF5SS10			ug/kg	350	JB	400	U
		CF5SS10D			ug/kg	79	JB	400	U
		CF5SS11			ug/kg	240	JB	440	U
	0.7 ug/L	None	di-n-butylphthalate	SBLK2	ug/L	-	-	-	-

ORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG No.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
			PESTICIDE/PCB'S						
	0.36 ug/kg	CF5SS1	aldrin	PBLK1	ug/kg	1.1	JPB	2.2	U
		CF5SS2			ug/kg	1.8	JPB	2.0	U
		CF5SS3			ug/kg	0.69	JPB	2.0	U
		CF5SS4			ug/kg	0.24	JPB	2.6	U
		CF5SS5			ug/kg	9.8	PB	9.8	
		CF5SS6			ug/kg	0.38	JPB	2.2	U
		CF5SS8			ug/kg	0.40	JPB	2.0	U
		CF5SS9			ug/kg	3.0	JPB	8.1	U
		CF5SS10			ug/kg	1.4	JPB	4.1	U
		CF5SS10D			ug/kg	3.5	JPB	8.3	U
	0.008 ug/L	none	aldrin	PBLK2	ug/L	-	-	-	-
	0.19 ug/kg	none	aldrin	PBLK3	ug/kg	-	-	-	-

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG No.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA017	2.5 (ug/L)	CF5SS3	barium	EB	mg/kg	1.7	B	1.7	U
		CF5SS5			mg/kg	2.4	B	2.4	U
		CF5SS10			mg/kg	1.7	B	1.7	U
		CF5SS10D			mg/kg	2.1	B	2.1	U
	6.1 (ug/L)	CF5SS1	copper	CCB(P1)	mg/kg	1.6	B	1.6	U
		CF5SS2			mg/kg	1.5	B	1.5	U
		CF5SS3			mg/kg	1.6	B	1.6	U
		CF5SS11			mg/kg	2.4	B	2.4	U
		CF5SS4			mg/kg	2.7	B	2.7	U
		CF5SS5			mg/kg	0.96	B	0.96	U
		CF5SS6			mg/kg	1.1	B	1.1	U
		CF5SS9			mg/kg	1.1	B	1.1	U
		CF5SS8			mg/kg	2.4	B	2.4	U
		CF5SS10			mg/kg	1.6	B	1.6	U
		CF5SS10D			mg/kg	1.6	B	1.6	U
	71.9 (ug/L)	CF5SS2	magnesium	EB	mg/kg	65.3	B	65.3	U
		CF5SS3			mg/kg	24.0	B	24.0	U
		CF5SS11			mg/kg	40.9	B	40.9	U
		CF5SS4			mg/kg	69.3	B	69.3	U
		CF5SS5			mg/kg	20.9	B	20.9	U
		CF5SS6			mg/kg	49.4	B	49.4	U
		CF5SS9			mg/kg	24.7	B	24.7	U
		CF5SS8			mg/kg	41.8	B	41.8	U
		CF5SS10			mg/kg	31.6	B	31.6	U
	2.1 (ug/L)	CF5SS11	manganese	CCB(P1)	mg/kg	2.7	B	2.7	U
		CF5SS10			mg/kg	2.5	B	2.5	U
	13.1 (ug/L)	CF5SS1	nickel		mg/kg	2.7	B	2.7	U
		CF5SS3			mg/kg	3.0	B	3.0	U
		CF5SS11			mg/kg	3.0	B	3.0	U
		CF5SS4			mg/kg	2.8	B	2.8	U
		CF5SS9			mg/kg	2.0	B	2.0	U
		CF5SS8			mg/kg	2.9	B	2.9	U
		CF5SS10			mg/kg	2.2	B	2.2	U
		CF5SS10D			mg/kg	2.4	B	2.4	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG No.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA017	105 (ug/L)	CF5SS1	potassium	EB	mg/kg	41.0	B	41.0	U
		CF5SS2			mg/kg	24.8	B	24.8	U
		CF5SS3			mg/kg	18.5	B	18.5	U
		CF5SS11			mg/kg	34.0	B	34.0	U
		CF5SS4			mg/kg	39.1	B	39.1	U
		CF5SS5			mg/kg	13.8	B	13.8	U
		CF5SS6			mg/kg	31.3	B	31.3	U
		CF5SS9			mg/kg	18.0	B	18.0	U
		CF5SS8			mg/kg	22.2	B	22.2	U
		CF5SS10			mg/kg	18.8	B	18.8	U
		CF5SS10D			mg/kg	38.4	B	38.4	U
	8.0 (ug/L)	CF5SS1	silver	CCB(P1)	mg/kg	1.5	B	1.5	U
		CF5SS3			mg/kg	1.7	B	1.7	U
		CF5SS11			mg/kg	1.9	B	1.9	U
		CF5SS4			mg/kg	2.2	B	2.2	U
		CF5SS8			mg/kg	1.6	B	1.6	U
		CF5SS10D			mg/kg	1.7	B	1.7	U
	-2.2 (ug/L)	CF5SS1	thallium	CCB(P1)	mg/kg	0.26	U	0.26	UJ
		CF5SS2			mg/kg	0.24	U	0.24	UJ
		CF5SS3			mg/kg	0.23	U	0.23	UJ
		CF5SS11			mg/kg	0.26	U	0.26	UJ
		CF5SS4			mg/kg	0.31	U	0.31	UJ
		CF5SS5			mg/kg	0.24	U	0.24	UJ
		CF5SS6			mg/kg	0.26	U	0.26	UJ
		CF5SS9			mg/kg	0.24	U	0.24	UJ
		CF5SS8			mg/kg	0.23	U	0.23	UJ
		CF5SS10			mg/kg	0.25	U	0.25	UJ
		CF5SS10D			mg/kg	0.24	U	0.24	UJ

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA018			VOLATILE ORGANICS						
	7 ug/kg	CF5SS12	acetone	VBLK2	ug/kg	11	B	11	U
		CF5SS14				5	JB	11	U
		CF5SS18				5	JB	11	U
		CF5SS19				6	JB	12	U
		CF5SS20				4	JB	12	U
		CF5SS20D				8	JB	12	U
		CF5SS21				26	B	26	U
		CF5SS22				13	B	13	U
		CF5SS24				40	B	40	U
	8 ug/kg	CF5SS13	acetone	VBLK3	ug/kg	18	B	18	U
		CF5SS15				4	JB	11	U
		CF5SS16				76	B	76	U
		CF5SS17				14	B	14	U
		CF5SS25				18	B	18	U
		CF5SS26				3	JB	12	U
		CF5SS27				3	JB	11	U
	3 ug/kg	CF5SS16	2-butanone	VBLK3	ug/kg	11	JB	12	U
		CF5SS25				4	JB	10	U

ORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (Cont'd)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA018			SEMIVOLATILE ORGANICS						
	140 ug/kg	CF5SS12	di-n-butylphthalate	SBLK1	ug/kg	48	JB	370	U
		CF5SS13				250	JB	380	U
		CF5SS14				160	JB	380	U
		CF5SS16				160	JB	390	U
		CF5SS17				130	JB	380	U
		CF5SS18				250	JB	380	U
		CF5SS19				320	JB	390	U
		CF5SS20				160	JB	410	U
		CF5SS20D				180	JB	410	U
		CF5SS21				500	JB	520	U
		CF5SS22				440	B	-	U
		CF5SS23				120	JB	390	U
		CF5SS24				290	JB	440	U
		CF5SS25				130	JB	340	U
		CF5SS26				250	JB	410	U
		CF5SS27				490	B	-	U
	130 ug/kg	CF5SS12	bis(2-ethylhexyl)phthalate	SBLK1	ug/kg	26	JB	370	U
		CF5SS13				24	JB	380	U
		CF5SS16				59	JB	390	U
		CF5SS20				38	JB	410	U
		CF5SS20D				33	JB	410	U
	90 ug/kg	CF5SS15	di-n-butylphthalate	SBLK3	ug/kg	100	JB	380	U
WA018			PESTICIDE/PCB'S						
			(All criteria were met)			-	-	-	-

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK DATA QUALIFICATION SUMMARY

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual
WA018	18.2 ug/L	CF5SS12	antimony	PBW1	mg/kg	4.4	B	4.4	U
		CF5SS14				3.5	B	3.5	U
		CF5SS19				4.4	B	4.4	U
		CF5SS20				4.9	B	4.9	U
		CF5SS20D				5.6	B	5.6	U
		CF5SS21				6.5	B	6.5	U
		CF5SS22				4.6	B	4.6	U
		CF5SS23				4.4	B	6.4	U
		CF5SS24				4.9	B	4.9	U
		CF5SS25				5.0	B	5.0	U
	3.10 ug/L	CF5SS17	barium	RINSATE	mg/kg	1.5	B	1.5	U
	5.30 ug/L	CF5SS12	copper	CCB4	mg/kg	3.6	B	3.6	UJ
		CF5SS13				1.3	B	1.3	UJ
		CF5SS14				1.2	B	1.2	UJ
		CF5SS15				4.5	B	4.5	UJ
		CF5SS16				3.0	B	3.0	UJ
		CF5SS18				1.8	B	1.8	UJ
		CF5SS19				2.6	B	2.6	UJ
		CF5SS21				4.5	B	4.5	UJ
		CF5SS22				1.9	B	1.9	UJ
		CF5SS24				2.5	B	2.5	UJ
		CF5SS25				1.1	B	1.1	UJ
		CF5SS26				2.4	B	2.4	UJ
		CF5SS27				5.5	B	5.5	UJ
	-5.53 mg/kg	CF5SS17	copper	PBS1	mg/kg	0.45	U	0.45	UJ
		CF5SS20				11.5	-	11.5	J
		CF5SS20D				12.1	-	12.1	J
		CF5SS23				7.9	-	7.9	J
	57.6 ug/L	CF5SS12	magnesium	RINSATE	mg/kg	32.6	B	32.6	U
		CF5SS17				13.7	B	13.7	U
		CF5SS21				76.4	B	76.4	U
		CF5SS22				34.9	B	34.9	U
	4.63 ug/L	CF5SS12	manganese	PBW1	mg/kg	2.4	B	2.4	U
		CF5SS13				3.8	-	3.8	U
		CF5SS14				4.8	-	4.8	U
		CF5SS17				1.0	B	1.0	U
		CF5SS21				2.2	B	2.2	U
		CF5SS22				2.4	B	2.4	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA018	8.50 ug/L	CF5SS12	nickel	CCB4	mg/kg	2.0	B	2.0	U
		CF5SS13				2.0	B	2.0	U
		CF5SS14				2.0	B	2.0	U
		CF5SS18				1.8	B	1.8	U
		CF5SS19				3.0	B	3.0	U
		CF5SS20				4.9	B	4.9	U
		CF5SS20D				5.9	B	5.9	U
		CF5SS21				4.6	B	4.6	U
		CF5SS22				2.3	B	2.3	U
		CF5SS23				5.8	B	5.8	U
		CF5SS24				7.1	B	7.1	U
		CF5SS25				1.7	B	1.7	U
		CF5SS27				2.9	B	2.9	U
	544 ug/L	CF5SS12	potassium	RINSATE	mg/kg	45.6	B	45.6	U
		CF5SS13				50.1	B	50.1	U
		CF5SS14				93.5	B	93.5	U
		CF5SS15				73.9	B	73.9	U
		CF5SS16				142	B	142	U
		CF5SS17				30.1	B	30.1	U
		CF5SS18				75.1	B	75.1	U
		CF5SS19				77.0	B	77.0	U
		CF5SS20				42.3	B	42.3	U
		CF5SS20D				171	B	171	U
		CF5SS21				72.6	B	72.6	U
		CF5SS22				40.3	B	40.3	U
		CF5SS23				505	B	505	U
		CF5SS24				133	B	133	U
		CF5SS25				49.4	B	49.4	U
		CF5SS26				109	B	109	U
		CF5SS27				304	B	304	U
	2.00 ug/L	CF5SS23	selenium	ICB2	mg/kg	0.54	B	0.54	U
	6.90 ug/L	CF5SS19	silver	RINSATE	mg/kg	1.2	B	1.2	U
		CF5SS21				2.1	B	2.1	U
		CF5SS22				1.5	B	1.5	U
		CF5SS23				1.5	B	1.5	U
		CF5SS24				1.9	B	1.9	U
		CF5SS25				1.2	B	1.2	U

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY (CONT'D)

SDG NO.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA018	159 ug/L	CF5SS12	sodium	RINSATE	mg/kg	149	B	149	U
		CF5SS13				141	B	141	U
		CF5SS14				149	B	149	U
		CF5SS16				162	B	162	U
		CF5SS17				119	B	119	U
		CF5SS18				156	B	156	U
		CF5SS19				168	B	168	U
		CF5SS20D				169	B	169	U
		CF5SS21				193	B	193	U
		CF5SS22				152	B	152	U
		CF5SS23				180	B	180	U
		CF5SS24				170	B	170	U
		CF5SS25				135	B	135	U
		CF5SS26				193	B	193	U
	5.6 ug/L	CF5SS12	zinc	CCB1	mg/kg	3.5	B	3.5	U
		CF5SS13				6.3	-	6.3	U
		CF5SS14				2.8	B	2.8	U
		CF5SS16				5.9	-	5.9	U
		CF5SS17				1.1	B	1.1	U
		CF5SS21				2.7	B	2.7	U
		CF5SS22				2.6	B	2.6	U

Table 2-4 (Continued)
ORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

ORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG No.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported		Validated	
						Conc.	Qual.	Conc.	Qual.
WA019			VOLATILE ORGANICS						
	3 ug/kg	CF5SS7	methylene chloride	VBLK2	ug/kg	15	B	15	U
		CF5SS28			ug/kg	12	B	12	U
		CF5SS29			ug/kg	21	B	21	U
		CF5SS30			ug/kg	16	B	16	U
		CF5SS30D			ug/kg	16	B	16	U
		CF5SS31			ug/kg	19	B	19	U
		CF5SS31D			ug/kg	16	B	16	U
			SEMIVOLATILE ORGANICS						
	67 ug/kg	CF5SS7	di-n-butylphthalate	SBLK2	ug/kg	150	JB	390	U
		CF5SS28			ug/kg	93	JB	370	U
		CF5SS29			ug/kg	190	JB	460	U
		CF5SS30			ug/kg	200	JB	460	U
		CF5SS30D			ug/kg	180	JB	350	U
		CF5SS31			ug/kg	91	JB	380	U
		CF5SS31D			ug/kg	370	JB	620	U
	19 ug/kg	CF5SS30	bis(2-ethylhexyl)-phthalate		ug/kg	34	JB	460	U
		CF5SS30D			ug/kg	20	JB	350	U
		CF5SS31			ug/kg	21	JB	380	U
		CF5SS31D			ug/kg	38	JB	620	U
			PESTICIDE/PCB'S						
			None.			-	-	-	-

Table 2-4 (Continued)
INORGANICS LABORATORY AND FIELD BLANK SUMMARY
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

INORGANICS LABORATORY AND FIELD BLANK
DATA QUALIFICATION SUMMARY

SDG No.	Blank Conc.	Qualified Samples	Parameter	Blank ID	Units	Reported Conc.	Reported Qual.	Validated Conc.	Validated Qual.
WA019	2.7 (ug/L)	CF5SS30	barium	EB	mg/kg	2.5	B	2.5	U
		CF5SS30D			mg/kg	2.4	B	2.4	U
		CF5SS7			mg/kg	1.8	B	1.8	U
	66.9 (ug/L)	CF5SS30	magnesium	EB	mg/kg	37.5	B	37.5	U
		CF5SS30D			mg/kg	37.4	B	37.4	U
		CF5SS7			mg/kg	26.8	B	26.8	U
	2.3 (ug/L)	CF5SS29	manganese	EB	mg/kg	3.0	B	3.0	U
		CF5SS30			mg/kg	2.2	B	2.2	U
		CF5SS7			mg/kg	0.8	B	0.8	U
	160 (ug/L)	CF5SS28	potassium	EB	mg/kg	58.8	B	58.8	U
		CF5SS29			mg/kg	51.0	B	51.0	U
		CF5SS30			mg/kg	23.2	B	23.2	U
		CF5SS30D			mg/kg	23.8	B	23.8	U
		CF5SS31			mg/kg	50.3	B	50.3	U
		CF5SS31D			mg/kg	91.8	B	91.8	U
		CF5SS7			mg/kg	23.4	B	23.4	U
	194 (ug/L)	CF5SS29	sodium	EB	mg/kg	203	B	203	U
		CF5SS30			mg/kg	182	B	182	U
		CF5SS30D			mg/kg	170	B	170	U
		CF5SS31			mg/kg	147	B	147	U
		CF5SS31D			mg/kg	277	B	277	U
		CF5SS7			mg/kg	149	B	149	U
	-2.2 (ug/L)	CF5SS28	thallium	CCB(P1)	mg/kg	0.23	U	0.23	UJ
		CF5SS29			mg/kg	0.28	U	0.28	UJ
		CF5SS30			mg/kg	0.27	U	0.27	UJ
		CF5SS30D			mg/kg	0.21	U	0.21	UJ
		CF5SS31			mg/kg	0.23	U	0.23	UJ
		CF5SS31D			mg/kg	0.39	U	0.39	UJ
		CF5SS7			mg/kg	0.23	U	0.23	UJ
	12.1 (ug/L)	CF5SS28	zinc	EB	mg/kg	3.7	B	3.7	U
		CF5SS29			mg/kg	8.1	-	8.1	U
		CF5SS30			mg/kg	7.9	-	7.9	U
		CF5SS30D			mg/kg	3.0	B	3.0	U
		CF5SS7			mg/kg	8.7	-	8.7	U

Table 2-5
REJECTED DATA
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG NO.	FRACTION	SAMPLE	ANALYTE	REASON
WA003	VOC	CF2MW8IR	2-hexanone	Low RRF (.038)
		CF5MS29ST	2-hexanone	Low RRF (.038)
	Metals	CFBBMS9I0S	mercury	Low spike recovery 26.7%
		CFBBMS9I6	mercury	
		CF2MS9I2	mercury	
WA005	VOC	CF5BR13S4R	2-hexanone	Low RRF (.038)
		CF5BR13S4RT	2-hexanone	Low RRF (.038)
		CF5MS24SR	2-hexanone	Low RRF (.038)
		CF5MS24SRT	2-hexanone	Low RRF (.038)
	SVOC	CF5BR13S4	All compounds except 2-methyl-naphthalene and naphthalene	Surrogate % R = 0 for 2-fluorobiphenyl
WA006	VOC	CF5BR14S0	2-hexanone	Low RRF (.038)
		CF5BR16S2	2-hexanone	Low RRF (.038)
		CF5BR16S4	2-hexanone	Low RRF (.038)
		CF5BR17S4	2-hexanone	Low RRF (.038)
WA007	Pest/PCB	CF5BR9S0	aldrin	Pesticide Identification Summary (PIS) Column %D's >300%
		CF5BR9S0D	aldrin	
		CF5BR9S4	aldrin	
		CF5BR9S4D	beta-BHC, aldrin	
		CF5MS13S0	beta-BHC, aldrin	
		CF5MS13S0D	aldrin	
		CF5MS13S4	aldrin	
		CF5MS8S0	aldrin	
		CF5MS8S2	beta-BHC, aldrin	
WA008	SVOC	CF17BR12S2	All except 1,2-dichlorobenzene naphthalene 2-methynaphthalene	Surrogate %R = 5% for nitrobenzene

Table 2-5 (Continued)
REJECTED DATA
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG NO.	FRACTION	SAMPLE	ANALYTE	REASON
WA009	VOC	All water samples (11)	2-hexanone	Low RRF (.044)
WA010	VOC	All samples (11)	2-hexanone	Low RRF (.044)
WA011	VOC SVOC	All samples (20) CF5MW4S	2-hexanone All compounds except phenol 1,2-dichoioro-benzene 4-methylphenol 2,4-dimethylphenol naphthalene 2-methylnaphthalene	Low RRF (.042) Surrogate %R = 0% for terphenyl - d14
WA012	VOC	CF5MW6S CF5MW6SR CF5MWS0ST	2-hexanone 4-methyl-2-pentanone	Low RRF (.026) Low RRF (.042) Low RRF (.042)
WA013	VOC Pest/PCB	All samples (22) CF17MW8S CF17MW10D CF17MW20ID	2-hexanone 4-methyl-2-pentanone All compounds	Low RRF (.021) Low RRF (.042) Low surrogate DCB = 8%

Table 2-5 (Continued)
REJECTED DATA
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG NO.	FRACTION	SAMPLE	ANALYTE	REASON
WA014	VOC	All samples (12)	2-hexanone	Low RRF (042)
		CF170F CF17MW5S CF17MW9S CF17SC CF17SCRE CF17MW5SR CF17MW8ST CF17MW9ST	4-methyl-2-pentanone	Low RRF (.043)
	SVOC	CF17SC CF17SCRE	All compounds except di-n-butylphthalate bis(2-ethylhexyl) phthalate	0% recovery for phenol-d5 surrogate in both samples
	Pest/PCB	All samples (8)	4,4'-DDT	Low MS (0%) and MSD (9%) %R's
WA015	VOC	CF17MW CF17MW25SI	2-hexanone	Low RRF (.037)
	SVOC	CFMW24S	All compounds	0% Recovery for phenol-d5 and terphenyl-d4 surrogates
	Pest/PCB	CF17MW24S CF17MW24SD CF17MW25SI	All compounds	0% Recovery for surrogate TCX in all 3 samples

Table 2-5 (Continued)
REJECTED DATA
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG NO.	FRACTION	SAMPLE	ANALYTE	REASON
WA015	Metals	CF17MW22DR CF17MW26IR CF17MW28DD	Non-detect iron	Low %R's (25%) in total metal spike
WA016		no rejects		
WA017	Pest/PCB	All soil samples except CF5SSI (11)	4,4'-DDT non-detect results	Low MS/MSD Recoveries 9%, 11% for 4,4'-DDT
WA018		no rejects		
WA019		no rejects		

Table 4-1
PESTICIDE/PCB COLUMN RESPONSE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG	SAMPLE NO.	COMPOUND	C1* (ug/L)	C2* (ug/L)	%D *1
WA003	CF5MS23S2	aldrin	0.64	8.4	1210
	CF5MS23S0	aldrin	0.45	4.1	811
		methoxychlor	1.8	3.0	66.7
	CF5MS29S0	aldrin	0.7	0.002	34900
	CF5MS29S4	aldrin	0.62	3.3	432
	CF5MS30S2	aldrin	0.41	1.2	193
		endosulfan I	1.2	3.0	253
		4,4'-DDT	25	2.5	900
		methoxychlor	3.6	5.2	44
		aroclor-1260	170	160	6.2
	CF5MS30S6	aldrin	0.36	1.4	289
WA005	CF5BR10S0	aldrin	1.8	66	3570
		dieldrin	1.2	2.7	125
		4,4'-DDD	110	11	900
		methoxychlor	14	24	71
	CF5BR10S0D	aldrin	1.9	67	3427
		dieldrin	0.82	2.5	205
		4,4'-DDD	100	9.7	931
		methoxychlor	3.4	15	341
	CF5BR11S0	aldrin	1.0	51	5000
	CF5BR12S4	aldrin	2.5	58	2220
		dieldrin	1.1	4	264
		4,4'-DDD	110	3.7	2870
	CF5BR12S6	aldrin	2	68	3300
		4,4'-DDD	98	3.3	2870

Table 4-1 (Cont'd)
PESTICIDE/PCB COLUMN RESPONSE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG	SAMPLE NO.	COMPOUND	C1* (ug/L)	C2* (ug/L)	%D
WA005	CF5BR13S2	aldrin	2.3	92	3900
	CF5BR13S4	aldrin	2.3	110	4680
	CF5BR13S4R	alpha-chlordane	0.008	0.009	15
	CF5BR18S2	aldrin	2.5	53	2020
		alpha-chlordane	0.67	26	3780
		gamma-chlordane	0.46	2.6	465
	CF5BR18S4	aldrin	2.7	50	1750
		gamma-chlordane	0.45	1.6	256
	CF5MS24S2	methoxychlor	1.1	2.2	100
		gamma-chlordane	0.37	0.4	8.1
	CF5MS24S6	methoxychlor	4.3	6.8	58
		gamma-chlordane	0.25	0.32	28
	CF5MS24SR	beta-BHC	0.068	0.019	258
	*CF5BR10S0	aroclor-1260	780	830	6.4
	CF5BR10S0D	aroclor-1260	700	740	5.7
	CF5BR10S4	aroclor-1260	210	210	0
	CF5BR11S0	aroclor-1260	100	110	10
	CF5BR11S6	aroclor-1260	91	93	2.2
	CF5BR12S4	aroclor-1260	760	750	1.3
	CF5BR12S6	aroclor-1260	700	690	1.4
	CF5BR13S2	aroclor-1260	320	320	0
	CF5BR13S4	aroclor-1260	280	280	0
	CF5BR18S2	aroclor-1260	210	200	5
	CF5BR18S4	aroclor-1260	290	290	0

Table 4-1 (Cont'd)
PESTICIDE/PCB COLUMN RESPONSE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG NO.	SAMPLE NO.	COMPOUND	C1* (ug/L)	C2* (ug/L)	%D
WA006	CF5BR14SO	aldrin	3.5	6.3	80
		4,4'-DDD	80	3.5	2190
	CF5BR14S2	aldrin	0.46	9.2	1900
		methoxychlor	1.9	2.3	21
	CF5BR15S0	4,4'-DDD	140	3.7	3680
		methoxychlor	1.7	18	959
	CF5BR17S4	alpha-chlordane	1.2	3	150
	CF5BR17S6	delta-BHC	0.68	2.2	224
		endrin ketone	0.22	0.87	296
		endrin aldehyde	3.5	1.1	218
	CF5MS19S0	aldrin	0.52	5.6	977
		4,4'-DDD	19	22	16
		4,4'-DDT	11	13	18
	CF5MS19S4	aldrin	0.48	7.4	1440
		alpha-chlordane	0.77	0.33	133
		gamma-chlordane	0.084	0.43	412
	CF5MS20S0	aldrin	0.2	5.3	2550
		alpha-chlordane	0.32	0.65	103
	CF5MS20S2	aldrin	0.35	6.2	1670
	CF5BR14S0	aroclor-1260	660	570	16
	CF5BR14S2	aroclor-1260	51	50	2
	CF5BR15S0	aroclor-1260	1100	1000	10
	CF5BR15S2	aroclor-1260	23	24	4.3
	CF5BR16S2	aroclor-1260	420	410	2.4
	CF5BR16S4	aroclor-1260	300	300	0
	CF5BR17S4	aroclor-1260	430	420	2.4
	CF5BR17S6	aroclor-1260	87	84	3.6
	CF5BR19S0	aroclor-1260	8.4	8.1	3.7
	CF5MS20S0	aroclor-1260	120	79	52

Table 4-1 (Cont'd)
PESTICIDE/PCB COLUMN RESPONSE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG NO.	SAMPLE NO.	COMPOUND	C1* (ug/L)	C2* (ug/L)	%D
WA007	CF5BR9S0	aldrin	1.8	86	5280
		4,4'-DDE	1.9	1.4	36
		alpha-chlordane	0.52	0.45	16
	CF5BR9S0D	aldrin	1.8	95	5180
		dieldrin	0.67	0.8	19
		4,4'-DDE	1.7	0.73	133
		4,4'-DDT	4.5	5.2	16
		alpha-chlordane	0.57	0.64	12
	CF5BR9S4	aldrin	1.9	100	5160
	CF5BR9S4D	beta-BHC	160	0.57	27600
		aldrin	0.5	95	18900
		gamma-chlordane	0.17	0.38	124
	CF5MS13S0	beta-BHC	140	0.96	14500
		aldrin	2	120	5900
		methoxychlor	1.3	1.3	0
		gamma-chlordane	0.2	0.41	105
	CF5MS13S0D	aldrin	1.7	65	3720
	CF5MS13S4	aldrin	1.6	74	4530
	CF5MS8S0	aldrin	1.7	44	2490
		gamma-chlordane	0.13	0.32	146
	CF5MS8S2	beta-BHC	140	0.58	24000
		aldrin	1.7	110	3670

Table 4-1 (Cont'd)
PESTICIDE/PCB COLUMN RESPONSE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG	SAMPLE NO.	COMPOUND	C1* (ug/L)	C2* (ug/L)	%D
WA0C8	CF17BR10S0	aldrin	0.09	1.4	1460
		methoxychlor	1.5	15	900
		alpha-chlordane	0.14	1.1	686
		gamma-chlordane	0.23	0.51	122
	CF17BR10S2	heptachlor epoxide	0.36	0.95	164
		dieldrin	0.14	0.55	293
		alpha-chlordane	0.22	5.9	2580
	CF17BR12S0	aldrin	0.28	4.2	1400
		endosulfan II	0.69	0.44	57
		alpha-chlordane	0.23	0.4	74
		gamma-chlordane	0.21	0.94	348
	CF17BR12S2	aldrin	0.14	2.7	1830
		heptachlor epoxide	0.83	0.35	137
		alpha-chlordane	0.21	4.6	2090
	CF17BR13S0	aldrin	0.54	2.8	419
		methoxychlor	3.4	3.9	15
	CF17BR13S2	aldrin	0.41	2.7	559
		methoxychlor	1.6	2.7	69
	CF17BR4S0	aldrin	0.98	3	206
	CF17BR4S2	aldrin	0.5	2.5	400
		methoxychlor	0.62	1.3	110
	CF17BR5S0	aldrin	0.53	1.4	164
	CF17BR5S2	aldrin	0.31	1.2	287
	CF17BR6S0	aldrin	0.23	1.6	596
		4,4'-DDD	0.62	1.2	94
	CF17BR6S2	aldrin	0.43	1.4	226
		4,4'-DDD	0.41	1.1	168
		alpha-chlordane	0.11	0.32	191
		gamma-chlordane	0.08	0.34	325

Table 4-1 (Cont'd)
PESTICIDE/PCB COLUMN RESPONSE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG	SAMPLE NO.	COMPOUND	C1* (ug/L)	C2* (ug/L)	%D
WA009	CF17BR7S0	aldrin	0.48	3	525
		4,4'-DDE	0.55	0.67	22
		alpha-chlordane	0.15	0.71	373
		gamma-chlordane	0.14	0.57	307
	CF17BR7S2	heptachlor epoxide	0.24	1.3	442
		alpha-chlordane	0.093	4.3	4520
	CF17BR8S0	aldrin	0.31	2.7	771
		4,4'-DDE	0.6	0.8	33
		methoxychlor	0.97	8.7	797
		gamma-chlordane	0.31	0.57	84
	CF17BR8S2	aldrin	2.3	2.5	8.7
	CF17BR9S0	aldrin	0.78	2	156
		4,4'-DDE	0.44	0.53	21
		4,4'-DDT	0.21	0.57	171
	CF17BR9S2	beta-BHC	3.8	0.55	591
		aldrin	0.7	2.6	271

Table 4-1 (Cont'd)
PESTICIDE/PCB COLUMN RESPONSE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG	SAMPLE NO.	COMPOUND	C1* (ug/L)	C2* (ug/L)	%D
WA009	CF17BR11S0	alpha-BHC	0.62	0.84	36
		aldrin	0.42	4.2	900
		gamma-chlordane	0.88	0.47	87
	CF17BR11S2	beta-BHC	6.2	0.72	761
		aldrin	0.21	6.9	3190
	CF17BR11S2R	beta-BHC	0.064	0.025	156
	CF17BR14S2	beta-BHC	6	0.58	935
		aldrin	0.36	5.2	1340
	CF17BR14S2D	beta-BHC	11	0.54	1940
		aldrin	0.41	10	2340
	CF17BR15S0D	beta-BHC	3.3	0.57	479
		aldrin	0.42	3.3	686
	CF17BR15S2	beta-BHC	2.5	0.65	285
		aldrin	0.35	2.3	557
	CF17BR15S2D	beta-BHC	2.6	0.59	341
		aldrin	0.23	2.5	987
		gamma-chlordane	0.13	0.42	223
	CF512D	beta-BHC	0.069	0.021	229
	F17BR14S0	beta-BHC	6.8	0.58	1070
		aldrin	1	3	200
WA010	CF524S	beta-BHC	0.052	0.016	225

Table 4-1 (Cont'd)
PESTICIDE/PCB COLUMN RESPONSE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG NO.	SAMPLE NO.	COMPOUND	C1* (ug/L)	C2* (ug/L)	%D
WA011	CF5MW18D	beta-BHC	0.091	0.022	314
	CF5MW18DR	beta-BHC	0.096	0.016	500
	CF5MW20S	dieldrin	0.002	0.017	750
	CF5MW3S	endosulfan II	0.19	0.085	124
		gamma-chlordane	0.023	0.18	683
	CF5MW5S	endosulfan II	0.22	0.21	4.8
WA012	CF5MW6S	beta-BHC	0.27	0.18	50
		4,4'-DDT	0.051	0.34	567
		alpha-chlordane	0.17	0.15	13
	CF5MW6SR	beta-BHC	0.14	0.016	775
WA013	CF17MW11I	beta-BHC	0.045	0.084	87
	CF17MW13S	beta-BHC	0.026	0.018	44
		aldrin	0.028	0.06	114
		endrin	0.065	0.012	442
	CF17MW14I	beta-BHC	0.062	0.16	158
	CF17MW16S	beta-BHC	0.037	0.051	38
	CF17MW20I	beta-BHC	0.045	0.11	144
	CF17MW20ID	beta-BHC	0.035	0.016	119
	CF17MW23S	beta-BHC	0.044	0.046	4.5
	CF17MW8S	beta-BHC	0.029	0.054	86

Table 4-1 (Cont'd)
PESTICIDE/PCB COLUMN RESPONSE
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG NO.	SAMPLE NO.	COMPOUND	C1* (ug/L)	C2* (ug/L)	%D
WA014	CF17MW4S	beta-BHC	0.01	0.09	800
		endrin	0.37	0.012	2980
	CF17MW5S	aldrin	0.019	0.079	316
	CF17MW6S	alpha-BHC	0.008	0.11	1280
		aldrin	0.007	0.047	571
	CF17MW6SD	aldrin	0.008	0.034	325
		heptachlor epoxide	0.004	0.03	650
	CF17MW9S	beta-BHC	0.038	0.044	16
	CF17SC	beta-BHC	0.11	0.021	424
	CF17MW4S	aroclor-1248	0.22	1.6	627
WA015	17MW25SI	beta-BHC	0.035	0.11	214
	CF17MW1	beta-BHC	0.054	0.23	326
	CF17MW21I	beta-BHC	0.1	0.41	310
	CF17MW22D	aldrin	0.015	0.08	433
	CF17MW24S	heptachlor	0.035	0.049	40
		dieldrin	0.007	0.2	2760
		endosulfan II	0.09	0.17	89
	CF17MW24SD	dieldrin	0.063	0.26	313
		endosulfan II	0.11	0.46	318
	CF17MW26I	beta-BHC	0.035	0.072	106
	CF17MW26IR	aldrin	0.022	0.037	68
	CF17MW27D	aldrin	0.018	0.041	128
	CF17MW28DD	aldrin	0.02	0.057	185
	CF17MW24S	aroclor-1242	0.4	4.3	975
	CF17MW24SD	aroclor-1242	0.86	4.0	365

Table 8
METAL AND CYANIDE SAMPLES
WITH CONCENTRATIONS GREATER THAN
4 TIMES THE SPIKE ADDED
OPERABLE UNIT 2
NAS CECIL FIELD JACKSONVILLE, FLORIDA

SDG NO.	SPIKED SAMPLE NO.	ANALYSES	SAMPLE CONC. mg/L	SPIKE ADDED mg/L	%R
WA003	None	-	-	-	-
WA005	None	-	-	-	-
WA006	None	-	-	-	-
WA007	None	-	-	-	-
WA008	None	-	-	-	-
WA009	None	-	-		-
WA010	CF5MW29SS	Aluminum Iron	118280 6433	2000 1000	483 166
WA011	CFMW30SFS CFMW30SS	Iron Aluminum Iron	4491 119600 12900	1000 2000 1000	103 987 429
WA012	None	-	-	-	-
WA013	None	-	-	-	-
WA014	CF17MW6SS	Aluminum Iron	113400 11410	2000 1000	0 0
WA015	CF17MW25SIS	Aluminum	29000	2000	0
WA016	None	-	-	-	-
WA017	None	-	-	-	-
WA018	CF5SS20S	Lead	111	4.87	0
WA019	CF5SS31S	Lead	31.9	4.65	82

APPENDIX S

COMPARISON WITH FLORIDA CRITERIA

Available criteria and guidance for groundwater (USEPA, 1994; FDEP, 1994a), surface soil (FDEP, 1994b), and subsurface soil (FDEP, 1994b) were considered in the human health risk assessment (HHRA) for OU 2, Sites 5 and 17, (Tables S-1 through S-6). The maximum detected concentrations for each chemical detected in the groundwater, surface soil, and subsurface soil at Sites 5 and 17 were compared to the available criteria as a part of the baseline risk assessment (BRA).

Site 5

Soil. The concentration of benzo(a)pyrene and benzo(b)fluoranthene, detected in Site 5 surface soil exceeded the available FDEP guidance concentrations for direct contact and inhalation exposures (Table S-1). Both of these analytes were included as human health chemicals of potential concern (HHCPCs) in the risk assessment for OU 2.

In subsurface soil (Table S-2), the maximum concentrations of acetone, benzene, ethylbenzene, trichloroethene, xylenes (total), acenaphthene, naphthalene, phenanthrene, and dieldrin exceeded their available FDEP guidance concentrations for leaching to groundwater. This comparison was conducted because subsurface soils may be contributing to the contamination in the surficial aquifer. Of these nine compounds, three (acenaphthene, naphthalene, and phenanthrene) were included as HHCPCs in the human health risk assessment for Site 5. The exclusion of the remaining six analytes could potentially underestimate the risk associated with leaching to groundwater.

Groundwater. In the groundwater, the maximum detected concentration of acetone, benzene, trichloroethene, bis(2-ethylhexyl)phthalate, 4-methylphenol, naphthalene, phenol, beta-HCH, aluminum, antimony, arsenic, beryllium, cadmium, chromium, iron, lead, manganese, and vanadium exceeded the respective Federal MCL, Florida Standard, or Florida Guidance value (Table S-3). All of these chemicals, except phenol and arsenic, were retained as HHCPCs in the groundwater because they were detected at concentrations that exceeded background (upgradient) or risk-based screening concentrations.

Arsenic was excluded as a HHCPC because the maximum detected concentration was less than two times the background concentration. Phenol was excluded as a HHCPC because the maximum detected concentration was less than the corresponding risk-based concentration.

Site 17

Soil. There were no analytes in Site 17 surface soil which exceeded the available FDEP guidance concentrations for direct contact and inhalation exposures (Table S-4).

In subsurface soil (Table S-5), the maximum concentrations of acetone, ethylbenzene, methylene chloride, trichloroethene, xylenes (total), naphthalene, and pentachlorophenol exceeded their available FDEP guidance concentrations for leaching to groundwater. This comparison was conducted because subsurface soils may be contributing to the contamination in the surficial aquifer. None of these seven compounds were included as HHCPCs in the human health risk assessment for

Site 17. The exclusion these analytes as HHCPCs could potentially underestimate the risk associated with leaching to groundwater at Site 17.

Groundwater. In the groundwater, the maximum detected concentration of benzene, methylene chloride, 1,1,1-trichloroethane, trans-1,3-dichloropropene, trichloroethene, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, naphthalene, phenol, aluminum, chromium, iron, lead, manganese, and vanadium exceeded the respective Federal MCL, Florida Standard, or Florida Guidance value (Table S-6). All of these chemicals, except 1,1,1-trichloroethane, were retained as HHCPCs in the groundwater because they were detected at concentrations that exceeded background (upgradient) or risk-based screening concentrations.

1,1,1-Trichloroethane was excluded as a HHCPC because it was detected in less than 5% of the samples (1/26) and was not detected in any other media at Site 17.

REFERENCES

Florida Department of Environmental Protection (FDEP), 1994a. "Florida Ground Water Guidance Concentrations"; Division of Water Facilities, Bureau of Ground Water Protection; June.

Florida Department of Environmental Protection (FDEP), 1994b. "Cleanup Goals for the Military Sites in Florida"; Memorandum from Ligia Mora-Applegate, Technical Review Section, Bureau of Waste Cleanup; Tallahassee, FL; July 5.

USEPA, 1994, Drinking Water Regulations and Health Advisories; Office of Water; Washington, DC; May.

Table S-1
Comparison with Criteria
Site 5 Surface Soils

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals[6]	Exceedance? (Yes/No)[7]
Volatile Organic Compounds (µg/kg)								
Acetone	4/31	11 - 2,000	2 - 33	11.3	No	NA	2,290,000	No
2-Butanone	3/31	10 - 2,000	3 - 9	5.7	No	NA	6,770,000	NA
2-Hexanone	1/31	10 - 2,000	2	2	Yes	NA	NP	NA
Methylene chloride	5/31	5 - 980	3 - 6	3.6	No	NA	20,700	No
Toluene	1/31	5 - 980	6	6	No	NA	NP	NA
Semivolatile Organic Compounds (µg/kg)								
Acenaphthene	5/31	340 - 10,000	43 - 135*	85.2	Yes	NA	4,000,000	No
Acenaphthylene	4/31	340 - 10,000	25 - 118*	52.5	Yes	NA	ND	NA
Anthracene	8/31	340 - 10,000	28 - 230	138	Yes	NA	1,830,000	No
Benzo(a)anthracene	9/31	340 - 10,000	75.5* - 1,200	470	Yes	NA	1,480	No
Benzo(a)pyrene	12/31	340 - 10,000	25 - 765*	311	Yes	NA	148	Yes
Benzo(b)fluoranthene	15/31	340 - 10,000	20 - 1,550*	481	Yes	NA	1,480	Yes
Benzo(g,h,i)perylene	13/31	340 - 10,000	27 - 650	208	Yes	NA	ND	NA
Benzo(k)fluoranthene	12/31	340 - 10,000	22 - 590*	217	Yes	NA	1,470	No
Butylbenzylphthalate	1/31	340 - 10,000	150	150	No	NA	15,300,000	No
Carbazole	4/31	340 - 10,000	87 - 170	128	No	NA	58,100	No
Chrysene	11/31	340 - 10,000	33 - 1,035*	368	Yes	NA	14,800	No
Dibenz(a,h)anthracene	10/31	340 - 10,000	30 - 170.5*	76.5	Yes	NA	148	No
Dibenzofuran	3/31	340 - 10,000	34 - 40	37.8	Yes	NA	290,000	No
Diethylphthalate	7/31	340 - 10,000	25 - 120	59 2	No	NA	NP	NA

See notes at end of page.

Table S-1 (Continued)
Comparison with Criteria
Site 5 Surface Soils

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals[6]	Exceedance? (Yes/No)[7]
Volatile Organic Compounds (µg/kg) (Continued)								
bis(2-Ethylhexyl)phthalate	3/31	340 - 10,000	20 - 1,200	418	No	NA	NP	NA
Fluoranthene	12/31	340 - 10,000	22 - 1,900	636	Yes	NA	2,990,000	No
Fluorene	5/31	340 - 10,000	36 - 110	71.2	Yes	NA	2,780,000	No
Indeno(1,2,3-cd)pyrene	13/31	340 - 10,000	24 - 420*	179	Yes	NA	1,480	No
2-Methylnaphthalene	1/31	340 - 10,000	113.5*	113.5	Yes	NA	ND	NA
Naphthalene	3/31	340 - 10,000	22 - 122.5*	58.9	Yes	NA	2,290,000	No
Phenanthrene	9/31	340 - 10,000	52 - 920	395	Yes	NA	ND	NA
Pyrene	12/31	340 - 10,000	32 - 1,500	483	Yes	NA	2,240,000	No
Pesticides and PCBs (µg/kg)								
4,4-DDD	3/31	0.6 - 30	2.3* - 8.2	5.5	No	NA	4,740	No
4,4-DDE	11/31	1 - 16	0.19 - 20	6.5	No	NA	3,340	No
4,4-DDT	7/22**	0.3 - 20	2.1 - 48	17.2	No	NA	3,180	No
Aroclor-1260	14/31	20 - 160	6.3 - 3,200	507	Yes	NA	NP	NA
alpha-Chlordane	2/31	0.2 - 8.2	0.47 - 1.7	1.1	No	NA	869	No
gamma-Chlordane	3/31	1.8 - 8.2	0.29 - 1.5	0.96	No	NA	869	No
Dieldrin	3/31	0.5 - 16	0.26 - 2.1*	1.3	No	NA	71.2	No
Inorganics (mg/kg)								
Aluminum	31/31	NA	196 - 11,500	2,434	No	29086	ND	No[8]
Arsenic	7/31	2 - 2	0.46 - 2.1	0.9	No	3.6	0.711	No[8]
Barium	25/31	40 - 40	2.6 - 42.5	9.5	No	21	NP	NA

See notes at end of table.

Table S-1 (Continued)
Comparison with Criteria
Site 5 Surface Soils

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals[6]	Exceedance? (Yes/No)[7]
Inorganics (mg/kg) (Continued)								
Beryllium	2/31	1 - 1	0.29 - 0.385*	0.34	Yes	--	NP	NA
Cadmium	2/31	1 - 1	0.63* - 0.81	0.72	No	--	37.5	No
Calcium	31/31	NA	131 - 125,000	19,791	Yes	--	NP	NA
Chromium	17/31	2 - 2	2.5 - 14.4	6.4	No	31.2	[9]201	No
Cobalt	11/31	10 - 10	1.5 - 3.7	2.3	No	--	ND	NA
Copper	7/31	5 - 5	0.76 - 11.8*	4.5	No	--	2,880	No
Iron	31/31	NA	62.7 - 4,150	812	No	8060	ND	No
Lead	31/31	NA	1.2 - 88.9	18.4	No	15.6	ND	NA
Magnesium	17/31	1,000 - 1,000	77.1 - 4,980	979	Yes	474	NP	NA
Manganese	22/31	3 - 3	2.9 - 75.2	18.9	Yes	17	5,710	No
Mercury	1/31	0.1 - 0.1	0.16	0.16	No	--	NP	NA
Nickel	3/31	8 - 8	1.6 - 13.6	6	No	7.2	1,510	No
Selenium	1/31	1 - 1	0.69 - 0.69	0.69	No	--	NP	NA
Sodium	13/31	1,000 - 1,000	91.6 - 350*	145	Yes	--	NP	NA
Vanadium	31/31	10 - 10	1 - 8.9	3.5	No	34.2	501	No
Zinc	21/31	4 - 4	1.6* - 94.05*	25.6	No	--	23,300	No

See notes at end of table.

Table S-1 (Continued)
Comparison with Criteria
Site 5 Surface Soils

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals[6]	Exceedance? (Yes/No)[7]
TRPH	31/31	11 - 1,500	12 - 28,000	1,428	Yes	--	NP	NA

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by asterisk is the average of a sample and its duplicate. For nondetect values, 1/2 the CRQL/CRDL is used as a surrogate.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected, it does not include those samples with a "U" or "UJ" validation qualifier for that analyte.
[4] HHCPCs were selected for surface soil as described in the baseline risk assessment for Operable Unit 2.
[5] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[6] Florida Department of Environmental Protection (FDEP) memorandum dated July 5, 1994. Values presented are the lesser of the Clean-up Goals based on the hazard index for the child resident or the cancer risk for the aggregate resident.
[7] An exceedance of the FDEP clean-up goal is identified when the maximum detected anlalyte concentration is greater than the Clean-up goal concentration. Pursuant to FDEP guidance (July, 1994), an analyte that has a maximum detected concentration that is less than the background concentration is not listed as exceeding the FDEP Clean-up goal.
[8] This analyte is not listed as exceeding the FDEP Clean-up Goal because the maximum detected concentration of the analyte is less than the background soil screening concentration.
[9] Value is for chromium VI.

Notes: The average of a sample and its duplicate is used for all table calculations.
HHCPC = human health chemical of potential concern.
mg/kg = milligrams per kilogram.
ND = analayte is presented in FDEP guidance but no data is provided.
NA = not applicable.
-- = not detected in any background samples.
µg/kg = micrograms per kilogram.
NP = analyte is not presented in FDEP guidance.

Table S-2
Comparison with Criteria
Subsurface Soil Site 5

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals Based on Leachability[6]	Exceedance? (Yes/No)[7]
Volatiles (µg/kg)								
Acetone	8/52	11 - 3,000	54 - 5,200	1,030	No	NA	143	Yes
Benzene	1/52	6 - 1,500	160	160	No	NA	0.386	Yes
2-Butanone	2/52	11 - 3,000	8- 13	10.5	No	NA	878	No
Ethylbenzene	14/52	6 - 1,500	250 - 11,000	2,476	No	NA	72.7	Yes
Toluene	17/52	6 - 1,500	4 - 10,000	2,020	No	NA	NP	NA
Trichloroethene	5/52	6 - 1,500	300 - 1,200	606	No	NA	1.46	Yes
Xylenes (total)	24/52	6 - 1,500	2 - 70,000	8,478	No	NA	14.1	Yes
Semivolatiles (µg/kg)								
Acenaphthene	4/52	330 - 8,400	285* - 2,400*	1,109	Yes	NA	188	Yes
Anthracene	1/52	330 - 8,400	595*	595	Yes	NA	59,200	No
bis(2-Ethylhexyl)phthalate	28/52	330 - 8,400	23 - 2,160*	364	No	NA	NP	NA
Benzo(a)anthracene	1/52	330 - 8,400	1,650*	1,650	Yes	NA	11,000	No
Benzo(a)pyrene	1/52	330 - 8,400	1,085*	1,085	Yes	NA	2,200	No
Benzo(b)fluoranthene	2/52	330 - 8,400	21 - 1,900*	961	Yes	NA	4,400	No
Benzo(g,h,i)perylene	1/52	330 - 8,400	375*	375	Yes	NA	32,000	No
Benzo(k)fluoranthene	1/52	330 - 8,400	510*	510	Yes	NA	4,400	No
Carbazole	1/36	370 - 8,400	405*	405	No	NA	ND	NA
Chrysene	1/52	330 - 8,400	1,350*	1,350	Yes	NA	2,000	No

See notes at end of table.

Table S-2 (Continued)
Comparison with Criteria
Subsurface Soil Site 5

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals Based on Leachability[6]	Exceedance? (Yes/No)[7]
Volatiles (µg/kg) (Continued)								
Di-n-butylphthalate	2/52	330 - 8,400	410 - 5,675*	3,043	No	NA	NP	NA
Dibenz(a,h)anthracene	1/52	330 - 8,400	120*	120	Yes	NA	49,500	No
Dibenzofuran	18/52	330 - 8,400	26 - 2,550*	928	Yes	NA	ND	NA
Fluoranthene	1/52	330 - 8,400	3,450*	3,450	Yes	NA	21,300	No
Fluorene	4/52	330 - 8,400	290* - 2,370*	1,040	Yes	NA	4,140	No
Indeno(1,2,3-cd)pyrene	1/52	330 - 8,400	480*	480	Yes	NA	24,000	No
2-Methylnaphthalene	26/52	330 - 16,000	34.5* - 33,000	12,816	Yes	NA	ND	NA
2-Methylphenol	1/52	330 - 8,400	4,700	4,700	No	NA	NP	NA
4-Methylphenol	4/52	330 - 8,400	1,900 - 42,000	16,225	Yes	NA	NP	NA
Naphthalene	30/52	330 - 8,400	36 - 26,000	7,117	Yes	NA	14.1	Yes
Phenanthrene	4/52	330 - 8,400	390 - 2,250*	940	Yes	NA	282	Yes
Phenol	4/52	330 - 8,400	81* - 14,000	3,760	No	NA	NP	NA
Pyrene	1/52	330 - 8,400	1,850*	1,850	Yes	NA	16,000	No
Pesticides and PCBs (µg/kg)								
Aroclor-1260	35/52	37 - 3,200	8.1 - 1,500	477	Yes	NA	NP	NA
alpha-Chlordane	2/52	0.4 - 1,600	0.51* - 1.2	0.86	No	NA	560	No
gamma-Chlordane	2/52	0.09 - 1,600	0.13 - 1.7	0.92	No	NA	560	No
4,4-DDE	2/52	2.4 - 320	0.9* - 19	10	No	NA	880	No
4,4-DDT	2/52	3.8 - 320	3.2* - 11	7.1	No	NA	48.6	No

See notes at end of table.

Table S-2 (Continued)
Comparison with Criteria
Subsurface Soil Site 5

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals Based on Leachability[6]	Exceedance? (Yes/No)[7]
Pesticides and PCBs (μg/kg) (Continued)								
Dieldrin	1/52	1.45 - 320	1.285*	1.3	No	NA	0.36	Yes
Methoxychlor	3/52	19 - 1,600	1.8 - 5.4*	3.6	No	NA	NP	NA
Inorganics (mg/kg)								
Aluminum	52/52	40 - 200	303 - 20,700*	5,636	No	11,132	ND	NA
Arsenic	16/52	2 - 10	0.25 - 3.1	0.85	Yes	1.3	ND	NA
Barium	37/52	40 - 200	1.7 - 28.2	7.7	No	13.96	NP	NA
Cadmium	3/52	1 - 5	0.48 - 0.59	0.52	No	–	ND	NA
Calcium	22/52	1,000 - 5,000	113 - 88,350*	7,213	Yes	350.7	NP	NA
Chromium	51/52	2 - 10	1 - 24.1	7.6	No	15.7	ND	NA
Cobalt	3/52	10 - 50	1.3 - 1.8	1.5	No	--	ND	NA
Copper	23/52	5 - 25	0.35 - 7.45*	1.5	No	2.5	ND	NA
Cyanide	1/52	1 - 10	0.66	0.66	No	–	NP	NA
Iron	50/52	20 - 100	79.6 - 3,480	650	Yes	2627.6	ND	NA
Lead	52/52	1 - 5	0.66 - 109	11.8	No	15.2	ND	NA
Magnesium	13/52	1,000 - 5,000	81 - 1,330*	260	Yes	227	NP	NA
Manganese	26/52	3 - 15	0.48 - 32.95*	4.2	No	7.9	ND	NA
Mercury	3/52	0.1 - 0.2	0.14 - 0.21	0.17	No	1.1	NP	No[8]
Nickel	17/52	8 - 40	1.6 - 5.4	3.1	No	5.4	ND	No[8]
Potassium	9/52	1,000 - 5,000	41.6 - 270	130	Yes	146.9	NP	NA

See notes at end of table.

Table S-2 (Continued)
Comparison with Criteria
Subsurface Soil Site 5

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals Based on Leachability[6]	Exceedance? (Yes/No)[7]
Inorganics (mg/kg) (Continued)								
Selenium	18/52	1 - 5	0 28 - 1 2	0.5	No	–	NP	NA
Sodium	3/52	1,000 - 5,000	208 - 445	298	Yes	342	NP	NA
Thallium	1/52	2 - 10	0.37	0.37	Yes	–	NP	NA
Vanadium	30/52	10 - 50	0.65 - 15.2	5.3	No	15.4	ND	No[8]
Zinc	13/52	4 - 49	4.1 - 1,106.9*	95.6	No	14	ND	NA
Total Recoverable Petroleum Hydrocarbons (mg/ℓ)								
TRPH	47/51	11 - 2,850	2.7 - 27,500*	5,305	Yes	--	NP	NA

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by asterisk is the average of a sample and its duplicate. For nondetect values, 1/2 the CRQL/CRDL is used as a surrogate.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples with a "U" or "UJ" validation qualifier for that analyte.
[4] HHCPCs were selected for surface soil as described in the baseline risk assessment for Operable Unit 2.
[5] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[6] Florida Department of Environmental Protection (FDEP) memorandum dated July 5, 1994. Values presented are the lesser of the Clean-up Goals based on leachability.
[7] An exceedance of the FDEP clean-up goal is identified when the maximum detected anlalyte concentration is greater than the Clean-up goal concentration. Pursuant to FDEP guidance (July, 1994), an analyte that has a maximum detected concentration that is less than the background concentration is not listed as exceeding the FDEP Clean-up goal.
[8] This analyte is not listed as exceeding the FDEP Clean-up Goal because the maximum detected concentration of the analyte is less than the background soil screening concentration.

Notes: The average of a sample and its duplicate is used for all table calculations.
HHCPC = human health chemical of potential concern.
mg/kg = milligrams per kilogram.
ND = analayte is presented in FDEP guidance but no data is provided.
NA = not applicable.
-- = not detected in any background samples.
µg/kg = micrograms per kilogram.
NP = analyte is not presented in FDEP guidance.

Table S-3
Comparison with Criteria
Site 5 Unfiltered Groundwater

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Federal Primary MCL[5]	Florida Primary Standard[6]	Florida Guidance Concentration[7]	Exceedance? (Yes/No)[8]
Volatile Organic Compounds (µg/ℓ)									
Acetone	14/30	2 - 60	1 - 8,500	984	Yes	NA	NA	700	Yes (G)
Benzene	3/30	1 - 100	8 - 16	11	Yes	5	1	1	Yes (M,P,G)
2-Butanone	4/30	2 - 200	6 - 150	97	No	NA	NA	4,200	No
1,2-Dichloroethene (total)	1/30	1 - 100	14	14	No	[9]70	[9]70	[9]70	No
Ethylbenzene	5/30	1 - 100	11 - 41	28	No	700	700	700	No
2-Hexanone	2/30	2 - 200	35 - 60	48	Yes	NA	NA	NA	NA
4-Methyl-2-pentanone	6/30	2 - 200	7 - 190	98	No	NA	NA	350	No
Tetrachloroethene	1/30	1 - 200	2	2	Yes	5	3	3	No
Toluene	9/30	1 - 17	21 - 180	111	Yes	1,000	1,000	1,000	No
Trichloroethene	1/30	1 - 100	19	19	Yes	5	3	3	Yes (M,P,G)
Xylenes (total)	8/30	1 - 100	56 - 200	117	No	10,000	10,000	10,000	No
Semivolatile Organic Compound (µg/ℓ)									
bis(2-Ethylhexyl)phthalate	9/30	10 - 200	0.5 - 1,400	180	Yes	6	6	6	Yes (M,P,G)
2,4-Dimethylphenol	6/30	10 - 100	64 - 110	86	Yes	NA	NA	400	No
Di-n-butylphthalate	4/30	10 - 200	0 7 - 2	1.7	No	NA	NA	700	No
Diethylphthalate	6/30	10 - 200	0.5 - 8	4.6	No	NA	NA	5,600	No
2-Methylnaphthalene	9/30	10	59 - 1,000	202	Yes	NA	NA	NA	NA

See notes at end of table.

Table S-3 (Continued)
Comparison with Criteria
Site 5 Unfiltered Groundwater

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Federal Primary MCL[5]	Florida Primary Standard[6]	Florida Guidance Concentration[7]	Exceedance? (Yes/No)[8]
Semivolatile Organic Compound (µg/ℓ) (Continued)									
2-Methylphenol	8/30	10 - 200	14 - 90	60	No	NA	NA	350	No
4-Methylphenol	9/30	10	9 - 820	425	Yes	NA	NA	35	Yes (G)
Naphthalene	10/30	10	0.5* - 610	192	Yes	NA	NA	6.8	Yes (G)
Phenol	15/30	10 - 200	0.5 - 180	59.2	No	NA	NA	10	Yes (G)
Pesticides and PCBs (µg/ℓ)									
alpha-Chlordane	1/30	0.05 - 10	0.15	0.15	Yes	2	2	2	No
beta-HCH	2/30	0.03 - 5	0.18 - 4.5	2.34	Yes	NA	NA	0.1	Yes (G)
Endosulfan II	1/30	0.09 - 2	0.21 - 0.21	0.21	No	NA	NA	0.35	No
Inorganics (µg/ℓ)									
Aluminum	30/30	NA	1,150 - 967,000	100514	Yes	[10]200	NA	200	Yes (G)
Antimony	2/30	12-40	24.2 - 29.4	26.8	Yes	6	6	6	Yes (M,P,G)
Arsenic	21/30	10	2.3 - 79	13.7	No	50	50	50	Yes (M,P,G)
Barium	30/30	NA	16.5 - 1,530	138	Yes	2,000	2,000	2,000	No
Beryllium	4/30	4 - 5	0.58 - 12.5	4.7	Yes	4	4	4	Yes (M,P,G)
Cadmium	4/30	5	3.5 - 5.9	4.5	Yes	5	5	5	Yes (M,P,G)
Calcium	30/30	NA	1,140 - 120,000	14339	Yes	NA	NA	NA	NA
Chromium	27/30	10	6 - 583	82.6	Yes	100	100	100	Yes (M,P,G)
Cobalt	7/30	50	4 6 - 20.9*	11.4	No	NA	NA	NA	NA

See notes at end of table.

Table S-3 (Continued)
Comparison with Criteria
Site 5 Unfiltered Groundwater

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Federal Primary MCL[5]	Florida Primary Standard[6]	Florida Guidance Concentration[7]	Exceedance? (Yes/No)[8]
Inorganics (µg/ℓ) (Continued)									
Copper	13/30	25	5.1 - 79	28.3	No	[10]1,000	NA	1,000	No
Iron	29/30	724	724 - 40,600	10942	Yes	[10]300	NA	300	Yes (M,G)
Lead	30/30	NA	1.4 - 214	42	Yes	[11]15	NA	15	Yes (M,G)
Magnesium	30/30	NA	699 - 20,400	3215	Yes	NA	NA	NA	NA
Manganese	23/30	15	6.3 - 263	53	Yes	[10]50	NA	50	Yes (M,G)
Mercury	11/30	0.2	0.23 - 1.5	0.49	Yes	2	2	2	No
Nickel	11/30	40	12.8 - 68.8	36.2	No	100	100	100	No
Potassium	26/30	5000	800 - 11,800	2598	Yes	NA	NA	NA	NA
Selenium	12/30	2-10.9	2 - 19.3	9.6	Yes	50	50	50	No
Sodium	30/30	NA	4,030 - 28,300	8512	Yes	NA	160,000	160,000	No
Vanadium	27/30	9.2 - 50	3.2 - 489	116	Yes	NA	NA	49	Yes (G)
Zinc	12/30	20 - 25	26.4 - 163	76.8	No	[10]5,000	NA	5,000	No

See notes at end of table.

Table S-3 (Continued)
Comparison with Criteria
Site 5 Unfiltered Groundwater

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Federal Primary MCL[5]	Florida Primary Standard[6]	Florida Guidance Concentration[7]	Exceedance? (Yes/No)[8]
Total Recoverable Petroleum Hydrocarbon (mg/ℓ)									
TRPH	9/30	0.06 - 2.5	0.62 - 160	23.5	Yes	NA	NA	NA	NA

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by asterisk is the average of a sample and its duplicate. For nondetect values, 1/2 the CRQL/CRDL is used as a surrogate.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples with a "U" or "UJ" validation qualifier for that analyte.
[4] HHCPCs were selected for surface soil as described in the baseline risk assessment for Operable Unit 2.
[5] Federal Primary MCLs are taken from USEPA Drinking Water Regulations and Health Advisories (May 1994).
[6] Florida Primary Standards are taken from Chapter 1 (Primary Standards) of the FDEP Groundwater Guidance Concentrations (June 1994).
[7] Florida Guidance Concentrations are taken from Chapter 6 (Guidance Concentrations Index) of the FDEP Groundwater Guidance Concentrations (June 1994).
[8] An exceedance of the available critieria is identified when the maximum detected site concentration is greater than one or more of the criteria.
M = the maximum detected concentration of the contaminant exceeds the Federal Primary MCL.
P = the maximum detected concentration of the contaminant exceeds the Florida Primary Standard.
G = the maximum detected concentration of the contaminant exceeds the Florida Guidance Concentration.
[9] Value is for cis-1,2-Dichloroethylene.
[10] Value is a Federal Secondary MCL.
[11] Treatment technology action limit for drinking water distribution systems per "Drinking Water Regulations and Health Advisories", USEPA, Office of Water, December 1993.

Notes: HHCPC = human health chemical of potential concern.
μg/ℓ = micrograms per liter.
MCL = Maximum Contaminant Level.
NA = not available.

Table S-4
Comparison with Criteria
Site 17 Surface Soils

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals[6]	Exceedance? (Yes/No)[7]
Volatile Organic Compounds (µg/kg)								
Acetone	2/14	12 - 16	190* - 5,200	2695	No	NA	2,290,000	No
2-Butanone	2/14	12 - 16	127.5* - 1,400	764	No	NA	6,770,000	No
Toluene	2/14	6 - 860	3 - 133*	68	No	NA	NP	NA
Xylenes (total)	3/14	6 - 860	3 - 6	4	No	NA	37,900,000	No
Semivolatile Organic Compounds (µg/kg)								
Benzo (b) fluoranthene	1/14	400 - 530	30	30	No	NA	1,480	No
bis(2-Ethylhexyl) phthalate	5/14	400 - 530	25 - 75	42	No	NA	NP	NA
4-Methylphenol	4/14	400 - 530	66 - 780*	274	No	NA	NP	NA
Phenol	1/14	400 - 530	79*	79	No	NA	NP	NA
Pesticides and PCBs (µg/kg)								
4,4-DDE	1/14	0.6 - 4.6	0.45	0.45	No	NA	3,340	No
Inorganics (mg/kg)								
Aluminum	14/14	NA	613 - 3,300	1323	No	29086	ND	No[8]
Arsenic	3/14	2 - 2	0.48 - 0.815*	0.68	No	3.6	0.711	No[8]
Barium	5/14	40 - 40	3.8 - 10	6.1	No	21	NP	No[8]
Calcium	14/14	NA	97.8 - 8,680	1913	No	–	NP	NA
Chromium	8/14	2 - 2	2.75* - 4.4	3.5	No	31.2	[9]201	No[8]
Iron	14/14	NA	265 - 1,550	527	No	8060	ND	No[8]
Lead	14/14	NA	2.4* - 16.8	6.3	No	15.6	ND	NA
Magnesium	6/14	1,000 - 1,000	70 9 - 449	164	No	474	NP	No[8]
Manganese	5/14	3 - 3	6.9 - 30.7	12.2	No	17	5,710	No
Thallium	1/14	2 - 2	0.31	0.31	No	–	NP	NA
Vanadium	14/14	NA	1.3 - 4.2	2.3	No	34.2	501	No[8]

See notes at end of table.

Table S-4 (Continued)
Comparison with Criteria
Site 17 Surface Soils

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals[6]	Exceedance? (Yes/No)[7]
Total Recoverable Petroleum Hydrocarbons (mg/ℓ)								
TRPH	9/14	12 - 16	15 - 210	69.2	Yes	--	NP	NA

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by asterisk is the average of a sample and its duplicate. For nondetect values, 1/2 the CRQL/CRDL is used as a surrogate
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples with a "U" or "UJ" validation qualifier for that analyte.
[4] HHCPCs were selected for surface soil as described in the baseline risk assessment for Operable Unit 2.
[5] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[6] Florida Department of Environmental Protection (FDEP) memorandum dated July 5, 1994. Values presented are the lesser of the Clean-up Goals based on the hazard index for the child resident or the cancer risk for the aggregate resident.
[7] An exceedance of the FDEP clean-up goal is identified when the maximum detected anlalyte concentration is greater than the Clean-up goal concentration. Pursuant to FDEP guidance (July, 1994), an analyte that has a maximum detected concentration that is less than the background concentration is not listed as exceeding the FDEP Clean-up goal.
[8] This analyte is not listed as exceeding the FDEP Clean-up Goal because the maximum detected concentration of the analyte is less than the background soil screening concentration.
[9] Value is for chromium VI.

Notes: The average of a sample and its duplicate is used for all table calculations.
HHCPC = human health chemical of potential concern.
mg/kg = milligrams per kilogram.
ND = analayte is presented in FDEP guidance but no data is provided.
NA = not applicable.
-- = not detected in any background samples.
µg/kg = micrograms per kilogram.
NP = analyte is not presented in FDEP guidance.

Table S-5
Comparison with Criteria
Subsurface Soil at Site 17

Human Health Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals Based on Leachability[6]	Exceedance? (Yes/No)[7]
Volatiles (µg/kg)								
Acetone	17/30	11 - 1,600	160 - 7,900	1,951	No	NA	143	Yes
2-Butanone	3/30	11 - 2,100	4 - 150	54	No	NA	878	No
Chlorobenzene	1/30	6 - 1,000	300	300	No	NA	NP	NA
Ethylbenzene	7/30	6 - 1,000	20 - 1,500	748	No	NA	72.7	Yes
Methylene chloride	12/30	6 - 1,600	3 - 58,000	6,129	No	NA	1.13	Yes
4-Methyl-2-pentanone	4/30	11 - 2,100	45 - 840	260	No	NA	NP	NA
Toluene	8/30	6 - 1,000	3 - 1,400*	845	No	NA	NP	NA
Trichloroethene	2/30	6 - 1,000	13 - 790	402	No	NA	1.46	Yes
Xylenes (total)	8/30	6 - 1,600	110 - 14,000	6,039	No	NA	14.1	Yes
Semivolatiles (µg/kg)								
bis(2-Ethylhexyl)phthalate	23/30	380 - 8,400	21 - 6,000	366	No	NA	NP	NA
Benzo(b)fluoranthene	1/30	380 - 8,400	37	37	No	NA	4,400	No
Chrysene	1/30	380 - 8,400	25	25	No	NA	2,000	No
1,2-Dichlorobenzene	3/30	380 - 8,400	68 - 18,000	6,063	No	NA	NP	NA
1,3-Dichlorobenzene	1/30	380 - 8,400	920	920	No	NA	NP	NA
1,4-Dichlorobenzene	2/30	380 - 8,400	115* - 730	423	No	NA	NP	NA
2,4-Dimethylphenol	2/30	380 - 8,400	150 - 210	180	No	NA	NP	NA

See notes at end of table.

Table S-5 (Continued)
Comparison with Criteria
Subsurface Soil at Site 17

Human Health Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals Based on Leachability[6]	Exceedance? (Yes/No)[7]
Semivolatiles (µg/kg) (Continued)								
Di-n-butylphthalate	9/30	380 - 8,400	26 - 100	62.4	No	NA	NP	NA
Dibenzofuran	2/30	380 - 8,400	1,600 - 1,900	1,750	Yes	NA	ND	NA
Diethylphthalate	1/30	380 - 8,400	28	28	No	NA	NP	NA
Fluorene	2/30	380 - 8,400	800 - 1,400	1,100	No	NA	4,140	No
Fluoranthene	2/30	380 - 8,400	31 - 1,285*	658	No	NA	21,300	No
2-Methylnaphthalene	5/30	380 - 8,400	44 - 47,000	21,609	Yes	NA	ND	NA
2-Methylphenol	3/30	380 - 8,400	56 - 170	119	No	NA	NP	NA
4-Methylphenol	2/30	380 - 8,400	100 - 170	135	No	NA	NP	NA
Naphthalene	7/30	380 - 8,400	21 - 19,000	7,489	No	NA	14.1	Yes
Pentachlorophenol	1/30	930 - 20,000	5,900*	5,900*	No	NA	106	Yes
Phenol	1/30	380 - 8,400	36	36	No	NA	NP	NA
Pyrene	1/30	380 - 8,400	31	31	No	NA	16,000	No
Pesticides and PCBs (µg/kg)								
Aldrin	1/30	0.35 - 10	2.3	2.3	No	NA	NP	NA
alpha-HCH	1/30	2 - 10	0.62	0.62	No	NA	NP	NA
beta-HCH	2/30	0.6 - 10	12.5*	12.5*	No	NA	NP	NA
4,4-DDE	2/30	0.6 - 20	0.44 - 0.55	0.5	No	NA	880	No
Endosulfan II	1/30	3.8 - 20	0.44	0.44	No	NA	NP	NA

See notes at end of table.

Table S-5 (Continued)
Comparison with Criteria
Subsurface Soil at Site 17

Human Health Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals Based on Leachability[6]	Exceedance? (Yes/No)[7]
Pesticides and PCBs (μg/kg) (Continued)								
Hexachlorobenzene	1/30	380 - 8,400	100	100	No	NA	NP	NA
Methoxychlor	2/30	0.7 - 100	1.6 - 3.4	2.5	No	NA	NP	NA
Inorganics (mg/kg)								
Aluminum	30/30	40 - 200	547 - 5,140	1,631	No	11,132	ND	No[8]
Barium	13/30	40 - 200	0.95 - 13.1	4.9	No	13.96	NP	No[8]
Calcium	28/30	1,000 - 5,000	107 - 53,000	4,094	Yes	350.7	NP	NA
Chromium	20/30	2 - 10	1.6 - 41.2	6.1	Yes	15.7	ND	NA
Copper	4/30	5 - 25	1.9 - 6.3	3.9	No	2.5	ND	NA
Cyanide	2/30	1 - 10	0.44 - 1.4	0.92	No	–	NP	NA
Iron	30/30	20 - 100	92.6 - 750	220	No	2,627.6	ND	No[8]
Lead	30/30	1 - 5	0.74 - 27.6	5.9	No	15.2	ND	NA
Magnesium	5/30	1,000 - 5,000	75.2 - 2,890	707	Yes	227	NP	NA
Manganese	17/30	3 - 15	1.4 - 112	18.1	Yes	7.9	ND	NA
Nickel	1/30	8 - 40	3.4	3.4	No	5.4	ND	No[8]
Selenium	2/30	1 - 5	0.33 - 0.45	0.41	No	–	NP	NA
Sodium	24/30	1,000 - 5,000	131 - 305.5*	180	No	342	NP	No[8]
Thallium	7/30	2 - 10	0.24 - 0.615*	0.36	Yes	–	NP	NA
Vanadium	18/30	10 - 50	0.54 - 3.5	1.2	No	15.4	ND	No[8]
Zinc	12/30	4 - 20	1.4 - 20.7	5.5	No	14	ND	NA

See notes at end of table.

APPENDIX T

Table S-5 (Continued)
Comparison with Criteria
Subsurface Soil at Site 17

Human Health Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Screening Background Concentration[5]	FDEP Clean-up Goals Based on Leachability[6]	Exceedance? (Yes/No)[7]
Total Recoverable Petroleum Hydrocarbons (mg/ℓ)								
TRPH	18/30	12 - 610	12.4 - 25,000	4,825	Yes	--	NP	NA

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by asterisk is the average of a sample and its duplicate. For nondetect values, 1/2 the CRQL/CRDL is used as a surrogate.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples with a "U" or "UJ" validation qualifier for that analyte.
[4] HHCPCs were selected for surface soil as described in the baseline risk assessment for Operable Unit 2.
[5] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[6] Florida Department of Environmental Protection (FDEP) memorandum dated July 5, 1994. Values presented are the lesser of the Clean-up Goals based on leachability.
[7] An exceedance of the FDEP clean-up goal is identified when the maximum detected anlalyte concentration is greater than the Clean-up goal concentration. Pursuant to FDEP guidance (July, 1994), an analyte that has a maximum detected concentration that is less than the background concentration is not listed as exceeding the FDEP Clean-up goal.
[8] This analyte is not listed as exceeding the FDEP Clean-up Goal because the maximum detected concentration of the analyte is less than the background soil screening concentration.
[9] Value is for chromium VI.

Notes: The average of a sample and its duplicate is used for all table calculations.
HHCPC = human health chemical of potential concern.
mg/kg = milligrams per kilogram.
ND = analayte is presented in FDEP guidance but no data is provided.
NA = not applicable.
-- = not detected in any background samples.
µg/kg = micrograms per kilogram.
NP = analyte is not presented in FDEP guidance.

Table S-6
Comparison with Criteria
Site 17 Unfiltered Groundwater

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Federal Primary MCL[5]	Florida Primary Standard[6]	Florida Guidance Concentration[7]	Exceedance? (Yes/No)[8]
Volatile Organic Compounds (µg/l)									
Benzene	4/26	1 - 665	5 - 23*	12.3	Yes	5	1	1	Yes (M,P,G)
1,1-Dichloroethane	2/26	1 - 665	1 - 2*	1.5	No	NA	NA	700	No
1,2-Dichloroethene (total)	2/26	1 - 665	10 - 12	11	Yes	[9]70	[9]70	[9]70	No
cis-1,3-Dichloropropene	2/26	1 - 665	5 - 5	5	Yes	NA	NA	1	Yes (G)
Ethylbenzene	4/26	1 - 665	3 - 6.5*	4.9	No	700	700	700	No
Methylene chloride	2/26	1 - 5	2 - 24,000*	12,001	Yes	5	5	5	Yes (M,P,G)
1,1,1-Trichloroethane	1/26	1 - 1,010	520*	520	No	200	200	200	Yes (M,P,G)
Toluene	5/26	1 - 665	4 - 19	11.8	No	1,000	1,000	1,000	No
trans-1,3-Dichloropropene	2/26	1 - 665	5 - 5	5	Yes	NA	NA	1	Yes (G)
Trichloroethene	3/26	1 - 665	6 - 50	22.5	Yes	5	3	3	Yes (M,P,G)
Xylenes (total)	4/26	1 - 665	14 - 22	19	No	10,000	10,000	10,000	No
Semivolatile Organic Compounds (µg/l)									
bis(2-Ethylhexyl) phthalate	9/26	10 - 5,000	0.5 - 6	2.2	Yes	6	6	6	No
Di-n-butylphthalate	4/26	10 - 5,000	0.6 - 2	1.3	No	NA	NA	700	No
Diethylphthalate	2/26	10 - 5,000	0.8	0.8	No	NA	NA	5,600	No
2,4-Dimethylphenol	6/26	10 - 5,000	26 - 3,750*	1,274	Yes	NA	NA	400	Yes (G)
2-Methylphenol	6/26	10 - 5,000	11 - 22,000*	5,074	Yes	NA	NA	350	Yes (G)
4-Methyl-2-pentanone	1/26	2 - 1,300	3	3	No	NA	NA	350	No
4-Methylphenol	5/26	10 - 5,000	0.7 - 19,000*	4,504	Yes	NA	NA	35	Yes (G)

See notes at end of table.

Table S-6 (Continued)
Comparison with Criteria
Site 17 Unfiltered Groundwater

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Federal Primary MCL[5]	Florida Primary Standard[6]	Florida Guidance Concentration[7]	Exceedance? (Yes/No)[8]
Semivolatile Organic Compounds (µg/ℓ) (Continued)									
Naphthalene	4/26	10 - 5,000	10 - 385*	107	Yes	NA	NA	6.8	Yes (G)
Phenol	2/26	10 - 5,000	150 - 5,550*	2,850	Yes	NA	NA	10	Yes (G)
Pesticides and PCBs (µg/ℓ)									
beta-HCH	3/26	0.03 - 1	0.018 - 0.044	0.03	Yes	NA	NA	0.1	No
Inorganics (µg/ℓ)									
Aluminum	26/26	200 - 200	50.7 - 201,000	40,894	Yes	[10]200	NA	200	Yes (G)
Arsenic	13/26	10 - 10	0 89 - 22.3	4.7	Yes	50	50	50	No
Barium	23/26	200 - 200	17.4 - 257*	77.9	No	2,000	2,000	2,000	No
Beryllium	1/26	5 - 5	0.64	0.64	No	4	4	4	No
Calcium	25/26	5,000 - 5,000	981.5* - 73,700	19,254	Yes	NA	NA	NA	NA
Chromium	12/26	10 - 10	28.2213* - 170	77.7	Yes	100	100	100	Yes (M,P,G)
Cobalt	2/26	50 - 50	13.1 - 14.2	13.7	No	NA	NA	NA	NA
Copper	5/26	25 - 25	8.5 - 25.3	16.9	No	[10]1,000	NA	1,000	No
Iron	26/26	100 - 100	202 - 14,700	3,712	Yes	[10]300	NA	300	Yes (M,G)
Lead	14/26	3 - 5	10.8 - 37.2	22.6	Yes	[11]15	15	15	Yes (M,P,G)
Magnesium	25/26	5,000 - 5,000	512 - 8,300	2,381	Yes	NA	NA	NA	NA
Manganese	11/26	15 - 15	2.1 - 5,655.65*	560	Yes	[10]50	NA	50	Yes (M,G)
Mercury	9/26	0.2 - 0.2	0.21 - 0.92	0.43	No	2	2	2	No
Nickel	7/26	40 - 40	10.1 - 56.2	27.6	No	100	100	100	No

See notes at end of table.

Table S-6 (Continued)
Comparison with Criteria
Site 17 Unfiltered Groundwater

Human Health Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Analyte CPC? (Yes/No)[4]	Federal Primary MCL[5]	Florida Primary Standard[6]	Florida Guidance Concentration[7]	Exceedance? (Yes/No)[8]
Inorganics (μg/ℓ)									
Potassium	26/26	5,000 - 5,000	208 - 11,511.2*	1,885	Yes	NA	NA	NA	NA
Selenium	5/26	5 - 5	2.5 - 15	6.2	No	50	50	50	No
Sodium	26/26	5,000 - 5,000	5,150 - 47,896.35*	14,610	Yes	NA	160,000	160,000	No
Vanadium	11/26	50 - 50	19.77* - 169	71.2	Yes	NA	NA	49	Yes (G)
Zinc	4/26	20 - 20	19.8 - 114.065*	46.3	No	[10]5,000	NA	5,000	No
Total Recoverable Petroleum Hydrocarbons (mg/ℓ)									
TRPH	11/26	0.05 - 0.5	0.07 - 1.2	0.61	Yes	NA	NA	NA	NA

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by asterisk is the average of a sample and its duplicate. For nondetect values, 1/2 the CRQL/CRDL is used as a surrogate.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples with a "U" or "UJ" validation qualifier for that analyte.
[4] HHCPCs were selected for surface soil as described in the baseline risk assessment for Operable Unit 2.
[5] Federal Primary MCLs are taken from USEPA Drinking Water Regulations and Health Advisories (May 1994).
[6] Florida Primary Standards are taken from Chapter 1 (Primary Standards) of the FDEP Groundwater Guidance Concentrations (June 1994).
[7] Florida Guidance Concentrations are taken from Chapter 6 (Guidance Concentrations Index) of the FDEP Groundwater Guidance Concentrations (June 1994).
[8] An exceedance of the available critieria is identified when the maximum detected site concentration is greater than one or more of the criteria.
M = the maximum detected concentration of the contaminant exceeds the Federal Primary MCL.
P = the maximum detected concentration of the contaminant exceeds the Florida Primary Standard.
G = the maximum detected concentration of the contaminant exceeds the Florida Guidance Concentration.
[9] Value is for cis-1,2-Dichloroethylene.
[10] Value is a Federal Secondary MCL.
[11] Treatment technology action limit for drinking water distribution systems per "Drinking Water Regulations and Health Advisories", USEPA, Office of Water, December 1993.

Notes: HHCPC = human health chemical of potential concern.
μg/ℓ = micrograms per liter.
MCL = Maximum Contaminant Level.
NA = not available.

APPENDIX T

HUMAN HEALTH AND ECOLOGICAL RISK ASSOCIATED WITH SITE 17 SURFACE WATER AND SEDIMENT

T.0 Risk Assessment for Site 17 Surface Water and Sediment

This addendum addresses the human and ecological risk associated with exposure to surface water and sediment at Site 17. The location, description, and history of Site 17 is discussed in detail in Chapter 2.0 of the baseline risk assessment (BRA) for OU 2.

T.1 Data Collection and Evaluation for Sediment and Surface Water at Site 17. The wetland area adjacent to Site 17 is generally dry. Surface water exists seasonally and possibly after rain events.

One surface water (CEF-17-SW1) and two sediment samples (CEF-17-SD-1 and CEF-17-SD-2) were collected from the wetland area in June of 1994 (Figure T-1). This location is subject to runoff not only from Site 17, but from areas to the north and south. The surface water sample was collected where surface water was first encountered, approximately 300 feet east of perimeter monitoring well CEF-17-23S. The concentrations of inorganic analytes in the original surface water sample and its duplicate were orders of magnitude different, so these data were identified by the validator as being questionable.

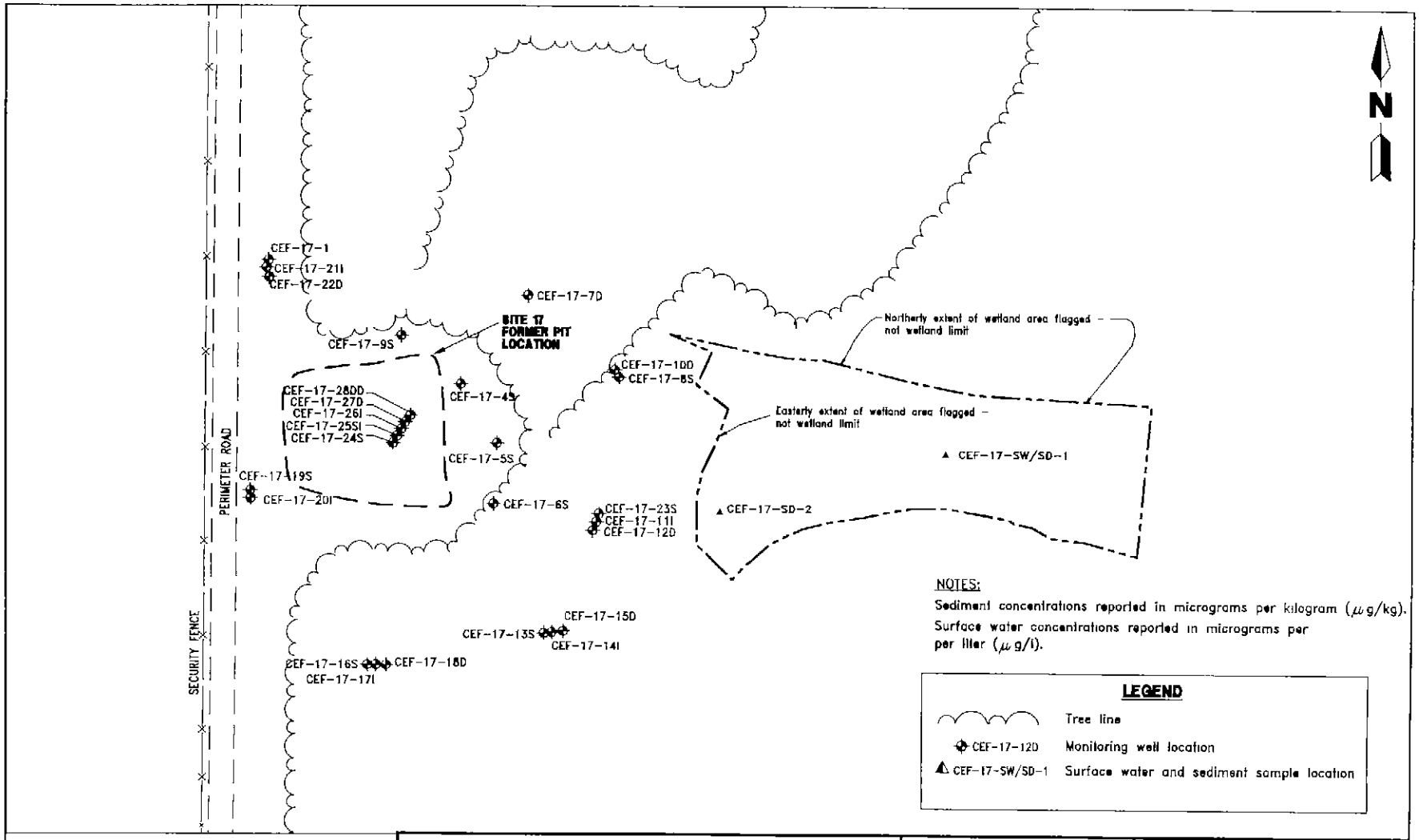
In order to reduce the uncertainties associated with evaluation of surface water at Site 17, resampling of one surface water (CEF-17-SW-1) and sediment sample (CEF-17-SD-1) took place in February, 1995. Field measurements of surface water pH, temperature, depth, conductivity, and dissolved oxygen were recorded at each sample location by field personnel. Surface water and sediment samples were analyzed for target compound list (TCL) organics, target analyte list (TAL) inorganics, total organic carbon (TOC), total petroleum hydrocarbons (TPH), and hardness.

These data were used to evaluate the risk from surface water and sediment at Site 17.

T.2 Sediment and Surface Water Background Investigation. There were no background surface water or sediment samples for Site 17, so the Site 5 background data will be used as background for Site 17. At Site 5, one location (CEF-5-SW/SD-5) was selected as representative of conditions upstream of OU 2 for concentrations of analytes in surface water and sediment in Rowell Creek (Figure T-2). This location was selected because it is locally upstream of OU 2 in a drainage ditch. For the purposes of the BRA, the average detected concentrations of analytes in this surface water and sediment sample were used as the baseline or upstream concentrations. These baseline concentrations are shown on Table T-1. Concentrations of analytes in surface water and sediment samples collected at OU 2 were compared to twice this upstream concentration for selection of chemicals of potential concern (CPCs) (see Sections T.3.1 and T.4.1). Risks associated with contamination present upstream of OU 2 and attributable to other waste sites will be addressed in the risk assessment completed for future OUs.

T.3 HUMAN HEALTH RISK ASSESSMENT FOR SITE 17 SURFACE WATER AND SEDIMENT. A description of the methodology used to complete the HHRA for Site 17 surface water and sediment is presented in Section 4.1 of the BRA for OU 2.

T.3.1 Selection of Chemicals of Potential Concern HHCPCs are defined as chemicals for which data of sufficient quality are available for use in the risk



0 40 80

SCALE: 1" = 80'

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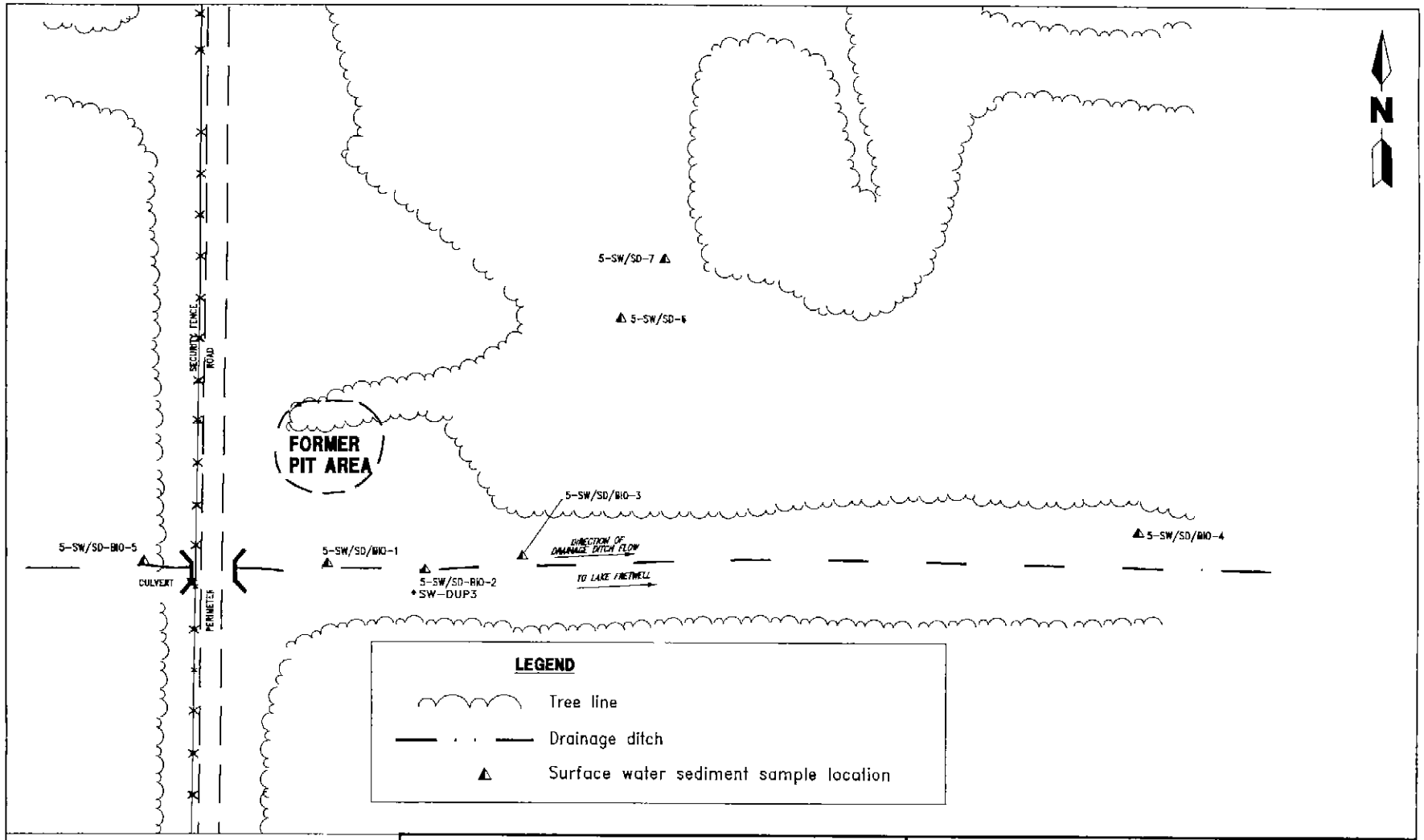
FIGURE T-1

SITE 17, SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS

BASELINE RISK ASSESSMENT
OPERABLE UNIT 2

NAS CECIL FIELD
JACKSONVILLE, FLORIDA



0 75 150

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FIGURE T-2
SITE 5, SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS

BASELINE RISK ASSESSMENT, OPERABLE UNIT 2

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

Table T-1
Average Concentrations of Inorganic Analytes Detected in Site 5 Upstream Surface Water and Sediment Samples[1]

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Surface Water (μg/ℓ)	Sediment (mg/kg)
Aluminum	738	366
Barium	14.2	3
Calcium	2,470	72.1
Chromium	3.3	–
Copper	–	–
Iron	1,260	72.9
Magnesium	576	13.2
Manganese	9.2	0.51
Sodium	5,220	–
Zinc	40.7	0.68

[1] Upstream Site 5 sample location 5-SW5/5SD5.

Notes: μg/ℓ = micrograms per liter.
mg/kg = milligrams per kilogram.
– not detected.

assessment, that are potentially site-related, and that are present at concentrations above risk-based screening levels (where available) as well as background screening levels (where available). In selecting HHCPCs for surface water and sediment USEPA criteria have been used (Section 4.1.2 of the BRA for OU 2).

T.3.1.1 **Surface Water** Surface water was sampled at one location (CEF-17-SW-1) there is also a duplicate associated with this location in the February 1995 sampling period (Figure T-1). CEF-5-SW5 will be used as a background reference point for the risk assessment.

A summary of the analytes detected in the surface water samples at Site 17 and the HHCPC screening results are presented in Table T-2. There were no analytes which were retained as HHCPCs.

T.3.1.2 **Sediment** Sediment samples from June of 1994 (CEF-17-SD-1 and CEF-17-SD-2, including a duplicate at CEF-17-SD-1) and the resampling in February of 1995 (CEF-17-SD1 with its associated duplicate) were collected in the wetland area associated with Site 17 (Figure T-1). CEF-5-SD5 will be used as a background reference point for the risk assessment.

A summary of the analytes detected in the sediment samples at Site 17 and the HHCPC screening results are presented in Table T-3. Three SVOCs (4-methylphenol, pentachlorophenol, and bis(2-ethylhexyl)phthalate) and two inorganics (arsenic and manganese) were retained as HHCPCs.

T.3.2 Exposure Assessment Although permission is required to obtain access to NAS Cecil Field, Site 17 and the surrounding area can be accessed by Navy personnel, including adult and child dependents. Based on current land use, surface soil, surface water, and sediment are the media that are appropriate for evaluation in the HHRA for Site 17. Under future conditions residential land use is a possibility, and therefore, surface soil, subsurface soil, surface water, sediment, and groundwater are evaluated in the HHRA. Exposure to surface soil, subsurface soil, and groundwater at Site 17 are discussed in Section 4.3.2 of the BRA for OU 2. This section only deals with exposure to sediment and surface water.

Surface Water and Sediment

Current Land Use. The wetland area near Site 17 is not currently being used for recreation by Navy personnel or civilians. A transient wading scenario using exposure parameters commonly employed in swimming exposures (except surface area) has been used for the surface water and sediment at Site 17. The transient evaluation is only presented under current land use in the risk characterization.

Future Land Use. Exposure to surface water and sediment via ingestion and dermal contact are evaluated using exposure parameters for a child and adult resident in a future wading scenario. A resident wading scenario using exposure parameters commonly employed in swimming exposures (except surface area) has been used for the surface water and sediment at Site 17.

Exposure Point Concentrations. There were no HHCPCs for Site 17 surface water. The EPCs for HHCPCs for Site 17 sediment are presented in Table T-4.

Table T-2
Selection of Human Health Contaminants of Potential Concern (HHCPCs)
Site 17 Surface Water

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Screening Background Concentration[4]	Screening Concentration[5]	Analyte CPC? (Yes/No)	Reason[6]
Volatiles (µg/ℓ)								
No Analytes Detected								
Semivolatiles (µg/ℓ)								
No Analytes Detected								
Pesticides/PCBs (µg/ℓ)								
No Analytes Detected								
Inorganics (µg/ℓ)								
Aluminum	1/1	200 - 200	345*	345	1,476	11,000	No	S, B
Barium	1/1	200 - 200	6.75*	6.8	28.4	260	No	S, B
Calcium	1/1	5,000 - 5,000	6,695*	6,695	4,940	1,055,398	No	S
Iron	1/1	100 - 100	186.5*	187	2,520	13,267	No	S, B
Magnesium	1/1	5,000 - 5,000	833*	833	1,152	118,807	No	S, B
Manganese	1/1	15 - 15	4.1*	4.1	18.4	18	No	S, B
Potassium	1/1	5,000 - 5,000	263*	263	ND	297,016	No	S
Sodium	1/1	5,000 - 5,000	4,445*	4,445	10,440	396,022	No	S, B
Zinc	1/1	20 - 20	9.3*	9.3	81.4	1,100	No	S, B

See notes on following page.

Table T-2 (Continued)
Selection of Human Health Contaminants of Potential Concern (HHCPCs)
Site 17 Surface Water

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Screening Background Concentration[4]	Screening Concentration[5]	Analyte CPC? (Yes/No)	Reason[6]

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by asterisk is the average of a sample and its duplicate.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples with a "U" or "UJ" validation qualifier for that analyte.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples. This sample was taken from Site 5 because there is no available background for Site 17.
[5] For all chemicals except the essential nutrients (calcium, iron, magnesium, potassium, and sodium),U.S. Environmental Protection Agency (USEPA) Region III Risk Based Concentration (RBC) for tap water per January 1993 guidance (Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening, EPA/903/R-93-001) was used for screening. Actual values are taken from the COC Screening Table dated 18 March 1994, and are based on a Cancer Risk of 10^{-6} or a Hazard Quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances (RDAs).
[6] Analytes were included or excluded from the risk assessment for the following reasons:
S = the maximum detected concentration did not exceed the screening concentration and, therefore, will not be evaluated in the human health risk assessment (HHRA).
G = the maximum detected concentration did not exceed the Florida Guidance Concentration and, therefore, will not be included in the HHRA.
B = the maximum detected concentration did not exceed twice the arithmetic mean of detected concentrations at background locations.
F = the frequency of detection was less than 5 percent
C = the analyte is a member of a chemical class which contains other CPCs (i.e., carcinogenic polynuclear aromatic hydrocarbons [PAHs]).
M = the analyte was detected at less than 5 percent of samples analyzed, but will be retained because it was a CPC im more than one media.

Notes: The average of a sample and its duplicate is used for all table calculations.

Sample locations include: CEF-17-SW-1 (Re-sample on 2/95)
Duplicate samples include: CEF-17-SW-1D (Re-sample on 2/95)
Background sample locations include: 5-SW5 (Site 5 - Operable Unit 2)

HHCPC = human health contaminants of potential concern.
RBC = risk based concentration.
COC = contaminants of concern.
ND = not detected in any background samples.
PCBs = polychlorinated biphenyls.
$\mu g/\ell$ = micrograms per liter.

Table T-3
Selection of Human Health Contaminants of Potential Concern (CPCs)
Site 17 Sediment

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Screening Background Concentration[4]	Screening Concentration[5]	Analyte CPC? (Yes/No)	Reason[6]
Volatiles (µg/kg)								
2-Butanone	2/3	17 - 26	4* - 6*	5	ND	4,700	No	S
Toluene	1/3	8.5 - 17	6.75*	6.8	ND	1,600	No	S
Semivolatiles (µg/kg)								
4-Methylphenol	1/3	565 - 850	62*	62	ND	39	Yes	
Butylbenzylphthalate	1/3	560 - 850	540*	540	ND	1,600	No	S
Diethylphthalate	1/3	565 - 850	48	48	ND	6,300	No	S
Pentachlorophenol	1/3	1,350 - 2,000	53	53	ND	5.3	Yes	
bis(2-Ethylhexyl) phthalate	1/3	560 - 850	690*	690	ND	46	Yes	
Pesticides/PCBs (µg/kg)								
4,4-DDE	2/3	2.8 - 8.5	0.435* - 0.625*	0.53	ND	1.9	No	S
Inorganics (mg/kg)								
Aluminum	3/3	40 - 40	1,080* - 11,100	4,437	732	23,000	No	S
Arsenic	1/3	2 - 20	2.1	2.1	ND	[7]0.37	Yes	
Barium	3/3	40 - 40	4.55* - 59.1	23	6	550	No	S

See notes on following page.

Table T-3 (Continued)
Selection of Human Health Contaminants of Potential Concern (CPCs)
Site 17 Sediment

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Screening Background Concentration[4]	Screening Concentration[5]	Analyte CPC? (Yes/No)	Reason[6]
Inorganics (mg/kg) (Continued)								
Cadmium	1/3	1 - 1	0.95	0.95	ND	3.9	No	S
Calcium	3/3	1,000 - 1,000	737.5* - 9,020	3,507	144.2	1,000,000	No	S
Chromium	1/3	2 - 2	10.4	10.4	ND	[8]39	No	S
Copper	1/3	5 - 5	5.1	5.1	ND	290	No	S
Iron	3/3	20 - 20	184* - 4,250	1,547	145.8	47,824	No	S
Lead	3/3	0.6 - 1	3.3* - 30.6	13	ND	[9]400	No	S
Magnesium	2/3	1,000 - 1,000	59.65* - 272	166	26.4	460,468	No	S
Manganese	3/3	3 - 3	1.95* - 91	31.6	1.02	39	Yes	
Nickel	1/3	8 - 8	3.9	3.9	ND	160	No	S
Selenium	1/3	1 - 1	1.8	1.8	ND	39	No	S
Sodium	2/3	1,000 - 1,000	338 - 348.5*	343	ND	1,000,000	No	S
Vanadium	3/3	10 - 10	1.6* - 10.4	4.8	ND	55	No	S
Zinc	1/3	4 - 4	127	127	1.36	2,300	No	S

See notes on following page.

Table T-3 (Continued)
Selection of Human Health Contaminants of Potential Concern (CPCs)
Site 17 Sediment

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations (*)[2]	Mean of Detected Concentrations[3]	Screening Background Concentration[4]	Screening Concentration[5]	Analyte CPC? (Yes/No)	Reason[6]

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by asterisk is the average of a sample and its duplicate.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected; it does not include those samples in which the analyte was not detected.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples. This sample was taken from Site 5 because there is no available background for Site 17.
[5] U.S. Environmental Protection Agency (USEPA) Region III Risk Based Concentration (RBC) for residential surface soil exposure per January 1993 guidance (Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening, EPA/903/R-93-001). Actual values are taken from the COC Screening Table dated 18 March 1994, and are based on a Cancer Risk of 10^{-6} or a Hazard Quotient of 0.1.
[6] Analytes were included or excluded from the risk assessment for the following reasons:
S = the maximum detected concentration did not exceed USEPA Region III RBC and, therefore, will not be evaluated in the human health risk assessment (HHRA).
B = the maximum detected concentration did not exceed twice the arithmetic mean of detected concentrations at background locations.
F = the frequency of detection was less than 5 percent.
C = the analyte is a member of a chemical class which contains other CPCs (i.e., carcinogenic polynuclear aromatic hydrocarbons [PAHs]).
M = the analyte was detected at less than 5 percent and is CPC in more than one media.
[7] The value is based on arsenic as a carcinogen.
[8] The value is based on chromium hexavalent form.
[9] USEPA Office of Solid Waste and Emergency Response (OSWER) Directive No. 9355.4-12 revised interim recommended soil cleanup for CERCLA and RCRA sites.

Notes: The average of a sample and its duplicate is used for all table calculations.

Sample locations include: CEF-17-SD1 (6/94), CEF-17-SD2 (6/94), and CF17SD1 (re-sample 2/95)
Duplicate samples include: CEF-17-SD1D(6/94) and CEF-17-SD1D(re-sample 2/95)
Background sample locations include: 5-SD5 (Site 5 - Operable Unit 2)

HHCPC = human health contaminants of potential concern.
RBC = risk based concentration.
COC = contaminants of concern
ND = not detected in any background samples

PCBs = polychlorinated biphenyls.
DDE = dichlorodiphenyldichloroethane.
µg/kg = micrograms per kilograms.
mg/kg = milligrams per kilograms.

Table T-4
Exposure Point Concentrations for Human Health Contaminants of Potential Concern Site 17 Sediment

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration (*)[2]	95% UCL[3]	Exposure Point Concentration[4]
Volatiles (µg/kg)				
No Analytes Selected as HHCPCs				
Semivolatiles (µg/kg)				
4-Methylphenol	1/3	62*	NC	62
Pentachlorophenol	1/3	53	NC	53
bis(2-Ethylhexyl) phthalate	1/3	690*	NC	690
Pesticides/PCBs (µg/kg)				
No Analytes Selected as HHCPCs				
Inorganics (mg/kg)				
Arsenic	1/3	2.1	NC	2.1
Manganese	3/3	91	NC	91

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by asterisk is the average of a sample and its duplicate.
[3] 95 percent upper confidence limit (UCL) calculated on the arithmetic mean of all samples using one-half the contract required quantitation limit or contract required detection limit (CRQL/CRDL) for samples in which the analyte was not detected.
[4] The exposure point concentration is the lesser of the maximum concentration detected onsite or the 95% UCL. In cases where the analyte was detected in three or less samples, the maximum detected concentration is used as the exposure point concentration.

Notes: % = percent.
HHCPC = human health contaminants of potential concern.
UCL = upper confidence limit.
µg/kg = micrograms per kilograms.
mg/kg = milligrams per kilograms.
NC = not calculated.
PCBs = polychlorinated biphenyls

T.3.3 **Toxicity Assessment** The purpose of the toxicity assessment is to identify the adverse effects that are associated with exposure to each analyte and to identify the relationship between level of exposure and severity or likelihood of adverse effects. The toxicity assessment methods are described in Section 4.1.4 of the BRA for OU 2.

Brief toxicity summaries for the HHCPCs appear in Appendix E of the BRA. Dose-response information for HHCPCs is identified in Tables 4-3 to 4-8 of the BRA for OU 2. This information was used to estimate the ELCR for carcinogens and the HI for all HHCPCs in the risk characterization (Section 4.1.5 of the BRA for OU 2).

T.3.4 **Risk Characterization** Quantitative estimates of both carcinogenic and noncarcinogenic risks were calculated for each HHCPC and each complete exposure pathway selected for evaluation in the exposure assessment, as described in Section 4.1.5 of the BRA for OU 2. A summary of risk estimates for current and future scenarios is provided in Tables T-5 and T-6, respectively. Risk calculation spreadsheets are presented in Attachment T1, Tables T1-1 to T1-4.

T.3.4.1 **Surface Water** There was no risk characterization conducted for the surface water at Site 17 because there were no HHCPCs.

T.3.4.2 **Sediment** The risk characterization results for sediment are shown in spreadsheets T1-1 to T1-4 in Attachment T1 of this appendix.

Both cancer and non-cancer risks are below the levels of concern for both current and future land use. For current land use, the cancer risk associated with sediment ingestion and dermal contact at Site 17 is 4×10^{-7} for the transient wader (child and adult). Under future land use, the cancer risk associated with surface water ingestion and dermal contact is 2×10^{-6} for the resident. The HIs associated with sediment ingestion and dermal contact for current and future land use are below 1 (adult and child transient; child and adult resident).

T.3.5 **Uncertainty Analysis** General uncertainties associated with the collection, analysis, and evaluation of data, exposure assessment, toxicity assessment, and the risk estimation process were discussed in Section 4.1.6 of the BRA for OU 2. Site-specific uncertainties that are important for the interpretation of the calculated risk estimates at Site 17 were presented in Section 4.3.5 of the BRA for OU 2.

T.4 **ECOLOGICAL RISK ASSESSMENT FOR SITE 17 SURFACE WATER AND SEDIMENT**. A description of the methodology used to complete the ecological risk assessment for Site 17 surface water and sediment is presented in Section 6-1 of the BRA for OU 2.

T.4.1 **Selection of Ecological Chemicals of Potential Concern (ECPCs)** Analytes were determined to be ECPCs pursuant to USEPA (1989a; 1989b) national guidance. The process is described in Section 6.1.2 and illustrated on Figure 6-3 of the BRA for OU 2. Surface water and sediment ECPCs were selected separately for aquatic life and wildlife. Upgradient analytes used in the screening process are discussed in Sections 3.5, 6.2 and 6.3 of the BRA for OU 2.

T.4.1.1 **Surface Water** Surface water was sampled at one location in the Site 17 wetland (CEF-17-SW1) in the February 1995 sampling period (Figure T-1). A duplicate sample is associated with this location. CEF-5-SW-5 is used as a

Table T-5
Risk Summary for Current Scenarios at Site 17

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Medium and Receptor	Exposure Route	HI	ELCR
Current Land Use			
Sediments:			
Adult Transient (Wader)	Incidental Ingestion	0.001	2×10^{-7}
	Dermal Contact	0.0002	1×10^{-8}
	Total Adult Transient	**0.001**	**2×10^{-7}**
Child Transient (Wader)	Incidental Ingestion	0.002	2×10^{-7}
	Dermal Contact	0.0003	8×10^{-9}
	Total Child Transient:	**0.002**	**2×10^{-7}**
	Total Transient:	**NC**	**4×10^{-7}**

Notes: NC = not calculated because child and adult hazard indices are not additive.
ND = no toxicity values available for calculation.
HI = hazard index.
ELCR = excess lifetime cancer risk.

Table T-6
Risk Summary for Future Scenarios at Site 17

Baseline Risk Assessment
Operbale Unit 2
NAS Cecil Field, Jacksonville, Florida

Medium and Receptor		Exposure Route	HI	ELCR
Future Land Use				
Sediments:				
	Adult Resident (Wader)	Incidental Ingestion	0.003	5×10^{-7}
		Dermal Contact	0.0005	3×10^{-8}
		Total Adult Resident	**0.004**	**5×10^{-7}**
	Child Resident (Wader)	Incidental Ingestion	0.03	1×10^{-6}
		Dermal Contact	0.0008	1×10^{-6}
		Total Child Resident:	**0.03**	**1×10^{-6}**
		Total Resident:	**NC**	**2×10^{-6}**

Notes: NC = not calculated because child and adult hazard indices are not additive.
ND = no toxicity values available for calculation.
HI = hazard index.
ELCR = excess lifetime cancer risk.

background reference point for the ecological risk assessment (Figure T-2); data collected at this sampling station are summarized in Table T-1.

Surface water analytical results for the Site 17 wetland are summarized in Table T-7. No organic analytes were detected in the samples. None of the 9 inorganic analytes were retained as ECPCs. Four of the detected analytes (calcium, magnesium, potassium, and sodium) are essential nutrients and were eliminated on that basis. The remaining five analytes were present at concentrations less than twice the reference screening values and/or Region IV water quality screening values (USEPA, 1992.)

T.4.1.2 **Sediment** Sediment samples were collected at two locations in the Site 17 wetland in June 1994 (CEF-17-SD1 and its associated duplicate, and CEF-17-SD2), and at one location in February 1995 (CEF-17-SD1 and its associated duplicate) (Figure T-1). All sediment data were evaluated in this screening-level ecological assessment. CEF-5-SD5 is used as a background reference point (Figure T-2); these data are summarized in Table T-1.

Sediment analytical results for all compounds detected in the Site 17 wetland are summarized in Table T-8. Two VOCs and 5 SVOCs were detected and retained as ECPCs for aquatic and wildlife receptors. One pesticide (4,4-DDE) and 8 inorganic analytes were selected as ECPCs for both aquatic and wildlife receptors. Five additional inorganic analytes were detected and retained as ECPCs for wildlife only; these analytes were eliminated as ECPCs for aquatic receptors because the maximum detected concentrations were less than the USEPA Region IV sediment screening criteria. Three inorganic analytes were not retained as ECPCs because they are essential nutrients (calcium, magnesium, and sodium). Total petroleum hydrocarbon (TPH) was detected at concentrations ranging from 18 to 21 mg/kg (Table T-9); TPH was retained as an ECPC.

T.4.2 Exposure Assessment The exposure assessment identifies exposure pathways and estimates the magnitude of exposures for aquatic and wildlife receptors associated with contamination in Site 17 surface water and sediment. Exposure pathways were identified for aquatic and wildlife receptors in the contaminant pathway model (Figure 6-1, OU 2 BRA). Exposure pathways identified for evaluation in the ERA for Site 17 are discussed in Section 6.1.3, OU 2 BRA.

T.4.2.1 **Surface Water** No analytes detected in Site 17 wetland surface water samples were identified as ECPCs. Exposure of aquatic and wildlife receptors to site-related contaminants is not anticipated.

T.4.2.2. **Sediment** Both aquatic and wildlife receptors may be exposed to ECPCs in sediment. Exposure pathways for ECPCs in sediment are depicted on Figure 6-1, OU 2 BRA.

Aquatic Receptors Contaminant exposures related to direct contact with sediment are evaluated for aquatic receptors in the Site 17 wetland. Exposures are evaluated for each of the sampling locations with the exposure concentrations assumed to be equal to the amount of an analyte detected in the sediment from the respective location.

Terrestrial and Wetland Wildlife Five species were selected as representative wildlife species for the purpose of evaluating risks associated with exposures to surface water and sediment contamination in the Site 17 wetland. Life history

Table T-7
Selection of Ecological Chemicals of Potential Concern for Site 17 Wetland Surface Water

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection[1]	Detected Concentrations[2]	Reporting Limits	Detected Concentrations[3]	Reference Screening Concentration[4]	Region IV Water Quality Screening Values[5]	Chemical of Ecological Concern? (Yes[6]/No)
Inorganics (µg/ℓ)							
Aluminum	1/1	345	200	345	1,476	[7] 87	No [8]
Barium	1/1	6.75	200	6.8	28.4	NA	No [8]
Calcium	1/1	6,695	5,000	6,695	4,940	NA	No [9]
Iron	1/1	186.5	100	187	2,520	1,000	No [8,10]
Magnesium	1/1	833	5,000	833	1,152	NA	No [8,9]
Manganese	1/1	4.1	15	4.1	18.4	NA	No [8]
Potassium	1/1	263	5,000	263	ND	NA	No [8]
Sodium	1/1	4,445	5,000	4,445	10,440	NA	No [8,9]
Zinc	1/1	9.3	20	9.3	81.4	30	No [8,10]

1 Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples.
2 Value is the average of a sample and its duplicate.
3 The average of detected concentrations is the arithmetic mean of the sample and its duplicate. It does not include those samples in which the analyte was not detected.
4 Because there is no upstream Site 17 wetland station, CF-5-SW-5 was used as the upstream sample location. Twice the average of detected concentrations is calculated for inorganic analytes.
5 USEPA Region IV Waste Management Division Freshwater Water Quality Chronic Screening Values for Hazardous Waste Sites (11/16/92 Version). Value for zinc is based upon the average measured hardness for surface water samples of 21 mg/ℓ from Site 17 wetland, station 17-SW1.
6 The ECPC selection process is depicted on Figure 6-3, Baseline Risk Assessment for OU 2.
7 Criterion is based on an assumed pH of 6.5-9 (USEPA, 1988d).
8 Maximum detected concentration is less than two times the average background concentration.
9 Analyte is an essential nutrient and is not present at toxic levels.
10 Maximum analyte concentration is below the Region IV surface water screening value (USEPA, 1992), therefore the analyte will not be considered as an ECPC for aquatic receptors.

Notes: Sample locations include: CF-17-SW1
Duplicate samples include: CF-17-SW1DUP
Background samples include: CF-5-SW5

ECPC = ecological chemical of potential concern.
mg/ℓ = milligrams per liter.
µg/ℓ = micrograms per liter.
NA = not available.
ND = not detected in any background samples.

Table T-8
Selection of Ecological Chemicals of Potential Concern for Site 17 Wetland Sediment

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations	Average of Detected Concentrations [2]	Reference Screening Concentration [3]	Region IV Sediment Quality Screening Values [4]	Chemical of Ecological Concern [5]		Exposure Point Concentrations		
									Risk Assessment Mean [6]	Maximum [7]	Average [8]
Volatiles (µg/kg)											
2-Butanone	2/3	17 - 26	[9]4- [9]6	5	NA	NA	Yes	A/W	7.7	6	6
Toluene	1/3	8.5 - 17	[9]6.75	6.8	NA	NA	Yes	A/W	5.8	6.75	5.8
Semivolatiles (µg/kg)											
4-Methyl-phenol	1/3	565 - 850	[9]62	62	NA	NA	Yes	A/W	257	62	62
Butylbenzyl-phthalate	1/3	560 - 850	[9]540	540	NA	NA	Yes	A/W	417	540	417
Diethylphthalate	1/3	565 - 850	48	48	NA	NA	Yes	A/W	205	48	48
Pentachloro-phenol	1/3	1,350 - 2,000	53	53	NA	NA	Yes	A/W	476	53	53
bis(2-Ethyl-hexyl)phthalate	1/3	560 - 850	[9]690	690	NA	NA	Yes	A/W	467	690	467
Pesticides and PCBs (µg/kg)											
4,4-DDE	2/3	2.8 - 8.5	[9]0.435 - [9]0.625	0.53	NA	[10]3.3	Yes	W [11]	1.8	0.625	0.625

See notes at end of table.

Table T-8 (Continued)
Selection of Ecological Chemicals of Potential Concern for Site 17 Wetland Sediment

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations	Average of Detected Concentrations [2]	Reference Screening Concentration [3]	Region IV Sediment Quality Screening Values [4]	Chemical of Ecological Concern [5]		Exposure Point Concentrations		
									Risk Assessment Mean [6]	Maximum [7]	Average [8]
Inorganics (mg/kg)											
Aluminum	3/3	40 - 40	[9]1,080 - 11,100	4,437	732	NA	Yes	A/W	4,437	11,100	4,437
Arsenic	1/3	2 - 20	2.1	2.1	ND	8	Yes	W [11]	4.4	2.1	2.1
Barium	3/3	40 - 40	[9]4.55 - 59.1	23	6	NA	Yes	A/W	23	59.1	23
Cadmium	1/3	1 - 1	0.95	0.95	ND	1	Yes	W [11]	0.65	0.95	0.65
Calcium	3/3	1,000 - 1,000	[9]737.5 - 9,020	3,507	144.2	NA	No [12]				
Chromium	1/3	2 - 2	10.4	10.4	ND	33	Yes	W [11]	4.1	10.4	4.1
Copper	1/3	5 - 5	5.1	5.1	ND	28	Yes	W [11]	3.4	5.1	3.4
Iron	3/3	20 - 20	[9]184 - 4,250	1,547	145.8	NA	Yes	A	1,547	4,250	1,547
Lead	3/3	0.6 - 1	[9]3.3 - 30.6	13	ND	21	Yes	A/W	13	30.6	13
Magnesium	2/3	1,000 - 1,000	[9]59.65 - 272	166	26.4	NA	No [12]				
Manganese	3/3	3 - 3	[9]1.95 - 91	31.6	1.02	NA	Yes	A/W	31.6	91	31.6
Nickel	1/3	8 - 8	3.9	3.9	ND	20.9	Yes	W [11]	4	3.9	3.9
Selenium	1/3	1 - 1	1.8	1.8	ND	NA	Yes	A/W	0.93	1.8	0.93
Sodium	2/3	1,000 - 1,000	338 - [9]348.5	343	ND	NA	No [12]				
Vanadium	3/3	10 - 10	[9]1.6 - 10.4	4.8	ND	NA	Yes	A/W	4.8	10.4	4.8
Zinc	1/3	4 - 4	127	127	1.36	68	Yes	A/W	43.7	127	43.7

See notes at end of table.

Table T-8 (Continued)
Selection of Ecological Chemicals of Potential Concern for Site 17 Wetland Sediment

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limits	Range of Detected Concentrations	Average of Detected Concentrations [2]	Reference Screening Concentration [3]	Region IV Sediment Quality Screening Values [4]	Chemical of Ecological Concern [5]	Exposure Point Concentrations		
								Risk Assessment Mean [6]	Maxi-mum [7]	Aver-age [8]

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed.
[2] The average of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples in which the analyte was not detected.
[3] Twice the average of detected concentrations of inorganic analytes in upgradient reference samples is calculated.
[4] USEPA Region IV Waste Management Division Sediment Screening Values for Hazardous Waste Sites (2/16/94 Version).
[5] A = ECPC for aquatic receptors
W = ECPC for terrestrial receptors
ECPC selection process is depicted on Figure 6-3, Baseline Risk Assessment for OU 2.
[6] The Risk Assessment Mean assigns a value of 1/2 the CRQL/CRDL to all non-detects.
[7] Maximum Exposure Point Concentrations are equal to the maximum detected concentration. No 95th percent UCLs were calculated because the sample population was too small.
[8] Average Exposure Point Concentrations (for wildlife only) are equal to the Risk Assessment Mean. If the average exposure point concentration is greater than the maximum exposure point concentration (EPC), the maximum EPC was used for both.
[9] Value represents the average of a sample and its duplicate.
[10] Value for 4,4'-DDT used as a surrogate.
[11] Maximum analyte concentration is below the Region IV surface water screening value (USEPA, 1992), therefore the analyte will not be considered as an ECPC for aquatic receptors.
[12] Analyte is an essential nutrient and is not present at toxic levels.

Notes: The average of a sample and its duplicate is used for all table calculations.

Sample locations include: CEF-17-SW-1 (6/94), CEF-17-SD-2 (6/94), and CEF-17-SD-1 (re-sample 2/95).
Duplicate sample locations include: CEF-17-SD-1D (6/94) and CEF-17-SD-1D (re-sample 2/95).
Reference sample locations include: CEF-5-SD-5

ECPC = ecological chemical of potential concern.
mg/kg = milligrams per kilogram.
μg/kg = micrograms per kilogram.
NA = not available.
ND = not detected in any background samples.

Table T-9
Summary of Site 17 Surface Water and Sediment Total Petroleum Hydrocarbon (TPH) and Total Organic Carbon (TOC) Data

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Medium	Sampling Location	TPH	TOC
Surface Water (mg/ℓ)			
	CF-17-SW1 (6/94)	NA	15
	CF-17-SW1 (2/95)	NA	10
	CF-17-SW2 (6/94)	NA	NA
Sediment (mg/kg)			
	CF-17-SD1 (6/94)	NA	26,150
	CF-17-SD1 (2/95)	19.5	11,550
	CF-17-SD2 (6/94)	NA	310,000
	CF-5-SD-5	23.3	3,970

Notes: mg/kg = milligrams per kilogram.
NA = not analyzed.

information used to estimate exposures for each of the representative species is summarized in Table 6-15 of the OU 2 BRA. The five representative species are as follows.

- **Cotton mouse** (*Peromyscus gossypinus*). This species represents small mammals at Site 17 that may come into contact with surface water as a result of ingestion. The cotton mouse was selected to represent mammalian species that would be maximally exposed (receive higher doses as a result of their small body size).

- **American woodcock** (*Scolopex minor*). The woodcock is a vermivorous (feeding exclusively on earthworm) bird that inhabits areas of fertile moist soil where earthworms are plentiful. These areas include open pastures, cultivated fields, and stream banks (DeGraaf and Rudis, 1986). The woodcock represents avian insectivores at the Site 17 wetland.

- **Short-tailed shrew** (*Blarina brevicauda*). The short-tailed shrew finds suitable habitat in forests, fields, marshes, and brush. It primarily feeds on earthworms, snails, centipedes, insects, small vertebrates, and slugs. The shrew represents the small mammalian insectivore community at the site. Relative to other small mammals, insectivorous species may receive high doses of contamination as a result of their voracious appetite and small body size.

- **Raccoon** (*Procyon lotor*). This species represents an opportunistic omnivorous species that may be exposed to contamination in surface water and sediment both as a result of direct ingestion and ingestion of aquatic prey. Aquatic prey (plants, invertebrates, and fish) may become contaminated as a result of accumulation of contaminants from the surface water and sediment.

- **Great horned owl** (*Bubo virginianus*). The great horned owl is primarily a nocturnal hunter of small mammals. Its habitat includes low, wet, deep woods and heavily wooded swamps often near open country where it may hunt for food (DeGraaf and Rudis, 1986). The owl represents avian carnivores and may be exposed to contamination that accumulates in the tissue of mammalian and avian insectivores and herbivores.

Contaminant exposures for each of the representative wildlife species related to sediment ECPCs were estimated based on equations presented in Table 6-3, OU 2 BRA. Routes of exposure to contaminated sediment evaluated for each of the representative wildlife species include indirect ingestion of sediment (during foraging activities) and ingestion of contaminated food (aquatic organisms that have accumulated contamination from the surface water and sediment). Bioaccumulation factors used to predict the contaminant concentrations in aquatic prey for each ECPC are listed in Appendix K, OU 2 BRA. The model of potential exposures to each ECPC in sediment for each of the representative wildlife species is presented in Attachment 2.

T.4.3 Ecological Effects Assessment The purpose of the ecological effects assessment is to identify the potential adverse effects associated with identified ECPCs for ecological receptors. The methodology for the ecological effects assessment is described in Section 6.1.4.1, OU 2 BRA.

T.4.3.1 Surface Water No ECPCs were identified in Site 17 surface water samples. Adverse ecological effects in aquatic or wildlife receptors are not expected to be associated with exposure to Site 17 surface water.

T.4.3.2 Sediment Potential or actual adverse ecological effects associated with the ECPCs in Site 17 sediment are discussed separately for wildlife and aquatic receptors.

Aquatic Receptors Effects to aquatic receptors were evaluated through comparison of detected ECPC concentrations in Site 17 sediment with respective toxicity benchmarks or standards as described in Section 6.1.4.2 of the OU 2 BRA. Although some uncertainty is associated with the use of sediment quality guidelines to evaluate risks from exposure to Site 17 wetland sediment, these guidelines provide a conservative screening tool in the absence of site-specific sediment toxicity test data. Information on the aquatic toxicity of sediment ECPCs is also included in Appendix K of the OU 2 BRA.

Terrestrial and Wetland Wildlife Information on the toxicity of the sediment ECPCs to mammalian and avian wildlife species is listed in Appendix K, OU 2 BRA. Reported toxicity values (RTVs) were selected for both lethal and sublethal effects, as described in Section 6.1.4.3, OU 2 BRA. The RTVs are compared to potential ECPC exposures to evaluate risks from exposure to Site 17 sediment by the method described in Section 6.2.4.2, OU 2 BRA.

T.4.4 Risk Characterization Risks were characterized for aquatic and wildlife receptors associated with exposure to surface water and sediment in the Site 17 wetland. Risks are characterized based upon the methodology provided in Section 6.1.5 of the OU 2 BRA.

T.4.4.1 Surface Water There was no risk characterization conducted for the surface water at Site 17 because there were no ECPCs identified for this medium. No analytes were present at concentrations that exceeded background screening values. The concentration of one analyte, aluminum (345 mg/kg) in Site 17 surface water slightly exceeds the Region IV water quality screening value (87 mg/kg aluminum chloride). The most sensitive ecological receptors with regard to aluminum exposure are larval trout, which are cold water species. Because no trout occur in the Site 17 wetland, adverse effects on ecological receptors at the site are not anticipated. Instead, indigenous species at the site are likely to be comparatively more tolerant of aluminum.

T.4.4.2 Sediment

Aquatic Receptors Risks for aquatic receptors potentially exposed to Site 17 sediment ECPCs were characterized by comparison of concentrations of ECPCs in sediment to available toxicity standards. Results are summarized in Table T-10.

Of the five analytes for which screening standards are available, only zinc and bis(2-ethylhexyl)phthalate are in exceedance. The magnitude of the exceedance for zinc (120 mg/kg in the site samples, as compared to a guidelines of 120 mg/kg), implies that risk to aquatic receptors from exposure to Site 17 sediment is minimal or unlikely. Further, the sediment concentration of zinc at the Site 17 wetland is less than the NOAA ER-L guideline (150 mg/kg), a conservative screening value (Long and others, 1993).

Although bis(2-ethylhexyl)phthalate (690 μg/kg) slightly exceeds the State sediment toxicity effect level (TEL; 182 μg/kg), the sample concentration is well below the probable effects level (PEL; 2647 μg/kg). Further, the two phthalates and three phenolic compounds were each identified in only one sample associated with Site 17 sediment. The actual presence of phthallic esters at Site 17 is in question, given that these chemicals are known to be common laboratory contaminants. Further, 4-methylphenol could be natural product.

Sediment toxicity standards were not available for the additional 11 ECPCs. However, reported aquatic effect levels from literature include a lowest observed effect level, or LOEL of 17,500 μg/ℓ toluene, (AWQC, 1986), and the following values reported in AQUIRE (1994): 70,000 μg/ℓ 2-butanone (LOEL); 15 μg/ℓ aluminum (LOEL); 26,000 μg/ℓ barium (LOEL); and 70 μg/ℓ selenium (LC_{50}). Aluminum is the only analyte that clearly exceeds its reported aquatic effects threshold; however the effect level is based upon effects in larval trout, which are known to be among the most sensitive ecological receptors. In addition, maximum selenium and barium concentrations in sediment slightly exceed aquatic benchmarks.

Total petroleum hydrocarbon (TPH) concentrations in Site 17 wetland sediment (19.5 mg/kg) are similar to the reference station TPH concentration of 23.3 mg/kg. Sediment toxicity testing results for Site 5, OU 2 (Section 6.2.3.2, BRA) showed no effects on survival or reproduction in *Ceriodaphnia dubia* or *Hyalella azteca* exposed to sediment containing 170 mg/kg TPH.

Based on these data, risks are not anticipated for aquatic receptors associated with exposures to those ECPCs in Site 17 wetland sediment for which there are available sediment standards. Comparison of concentrations of the remaining 11 ECPCs to reported aquatic toxicity effect levels suggests slight exceedance of these values at maximum concentrations of aluminum, barium, and selenium. However, use of these values is highly conservative, given that these toxicity levels represent concentrations in water, not sediment.

Bioavailability of sediment ECPCs to aquatic receptors is uncertain. The much lower concentrations of these analytes (or their complete absence) in surface water samples from the Site 17 wetland, suggests they are unlikely to pose a threat to aquatic receptors at the site.

<u>Terrestrial and Wetland Wildlife</u> Risk for the representative wildlife species associated with ingestion of surface water, potentially contaminated aquatic life, and sediment was quantitatively evaluated by the method described in Section 6.1.5.2 of the OU 2 BRA. The lethal and sublethal HIs and HQs derived from maximum exposure point concentrations for each sediment ECPC are provided in Attachment 2. All HIs and HQs are less than 1, indicating no potential adverse effects to wildlife as a result of exposure to the ECPCs in sediment at the Site 17 wetland. Because the HIs for maximum exposure point concentrations (EPCs) did not exceed 1, it was not necessary to calculate HQs associated with exposure to the average EPCs.

Lethal effect HIs ranged from 0.0065 for the great horned owl to 0.13 for the raccoon, and sublethal effect HIs ranged from 0.00058 for the raccoon to 0.38 for the short-tailed shrew.

Table T-10
Comparison of Site 17 Sediment ECPC Exposure Concentrations to Aquatic Toxicity Benchmark Values

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	CEF-17-SD1	CEF-17-SD2	NOAA [1]		OME LEL [2]	Florida SQGs [3]		Result
			ER-L	ER-M		TEL	PEL	
Volatile Organic Compounds (µg/kg)								
2-Butanone	[4]5	ND	NA	NA	NA	NA	NA	No TBV
Toluene	[5]6.8	ND	NA	NA	NA	NA	NA	No TBV
Semivolatile Organic Compounds (µg/kg)								
4-Methylphenol	[5]62	ND	NA	NA	NA	NA	NA	No TBV
Butylbenzylphthalate	[5]540	ND	NA	NA	NA	NA	NA	No TBV
Diethylphthalate	ND	48	NA	NA	NA	NA	NA	No TBV
Pentachlorophenol	ND	53	NA	NA	NA	NA	NA	No TBV
bis(2-Ethylhexyl)phthalate	[5]690	ND	NA	NA	NA	182	2,647	No TBV
Inorganic Compounds (mg/kg)								
Aluminum	[4]1,105	11,100	NA	NA	NA	NA	NA	No TBV
Barium	[4]5	59.1	NA	NA	NA	NA	NA	No TBV
Iron	[4]196	4250	NA	NA	20,000	NA	NA	
Lead	[4]17	25	46.7	218	31	30.2	112	
Manganese	[4]1.98	91	NA	NA	460	NA	NA	
Selenium	ND	1.8	NA	NA	NA	NA	NA	No TBV
Vanadium	[4]2.03	10.4	NA	NA	NA	NA	NA	No TBV

See notes at end of table.

Table T-10 (Continued)
Comparison of Site 17 Sediment ECPC Exposure Concentrations to Aquatic Toxicity Benchmark Values

Baseline Risk Assessment
Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

Analyte	CEF-17-SD1	CEF-17-SD2	NOAA [1]		OME LEL [2]	Florida SQGs [3]		Result
			ER-L	ER-M		TEL	PEL	
Inorganic Compounds (mg/kg)								
Zinc	ND	127	150	410	120	NA	NA	Exceeds
TPH	[5]19.5	NA	NA	NA	NA	NA	NA	No TBV

[1] National Oceanic and Atmospheric Administration (NOAA) Effects Range-Low (ER-L) and Effects Range-Median (ER-M) Sediment Guidelines (Long and others, 1993).
[2] Ontario Ministry of the Environment (OME) Low Effects Level (LEL) Provincial Sediment Quality Guidelines (Persaud and others, 1992) corresponds to a concentration that can be tolerated by the majority of benthic organisms.
[3] Florida Department of Environmental Protection (FDEP, 1994) Approach to the Assessment of Sediment Quality in Florida Coastal Wters, Volume 1, Develoopment and Evaluation of Sediment Quality Assessment Guidelines, November 1994.
[4] Value is an average of concentrations detected in samples collected in 6/94 and 2/95.
[5] Value represents the mean of detected concentrations identified in the 2/95 sample only; this analyte was not detected in the 6/94 sample.
[6] Value represents the mean of detected concentrations identified in the 6/94 sample only; this analyte was not detected in the 2/95 sample.

Notes: Results of analyses of sediment samples included in Appendix A.
ECPC = ecological contaminant of potential concern.
NOAA = National Oceanic and Atmospheric Administration.
ER-L = Effects Range-Low.
ER-M = Effects Range-Medium.
OME = Ontario Ministry of the Environment.
USEPA = U.S. Environmental Protection Agency.
SQGs = Sediment Quality Guidelines.
µg/kg = micrograms per kilogram.
NA = not available.
ND = not detected.
TBV = toxicity benchmark value.
PCBs = polychlorinated biphenyls.
DDE = dichlorodiphenyldichloroethene.
mg/kg = milligrams per kilogram.
= detection exceeds the most conservative screening value, or no screening value exists.

T.4.5. Uncertainty Analyses General uncertainties associated with the ecological risk assessment process are discussed in Subsection 6.1.6 of the OU 2 BRA. Site-specific uncertainties that underlie the process are discussed in Subsection 6.3.5 of the OU 2 BRA.

This appendix addresses the prior data gap associated with lack of adequate surface water samples for assessing risk to aquatic and wildlife receptors at Site 17. Some uncertainty exists regarding the presence of aluminum in surface water samples at concentrations that exceed the Region IV water quality screening value; however, its presence in background samples suggests it is not a site-related occurrence.

In the absence of site-specific toxicity data, sediment concentrations of analytes were compared to benchmark toxicity values. The lack of sediment benchmark values for 12 of the 16 ECPCs results in uncertainty regarding risk to aquatic receptors. Use of limited reported aquatic toxicity data suggests minimal risk associated with exposure to certain metals.

REFERENCES

Aquatic Retrieval System (AQUIRE), 1994, USEPA On-line Aquatic Database Recrod Search, April (Toxicity Data) and July (Bioconcentration Factors).

DeGraaf, R.M., and D.D. Rudis, 1986. New England Wildlife: Habitat, Natural History, and Distribution; USDA Forest Service. Northeastern Forest Experiment Station, General Technical Report NE-108.

Florida Department of Environmental Protection (FDEP), 1994, Approach to the Assessment of Sediment Quality in Florida Coastal Waters, Volume 1, Development and Evaluation of Sediment Quality Guidelines, November 1994.

Long, E.R., MacDonald, Smith, S.L., and Calder, F.D., 1993, Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments; National Oceanic and Atmospheric Administration, September 15.

Persaud, D., Jaagumagi, R., and Hayton, A., 1992, Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, Ontario Ministry of the Environment, Queen's Pritner for Ontario, 23 pp.

U.S. Environmental Protection Agency (USEPA), 1986, Quality Criteria for Water, Washington, D.C., Report No. 440/5-86-001.

USEPA, 1989a, Ecological assessment of Hazardous Waste Sites: A Field and Laboratory Reference; Environmental Research Laboratory, Corvallis, Oregon; EPA 600/3-89/013; March 1989.

USEPA, 1989b, Risk Assessment Guidance for Superfund: Environmental Evaluation Manual; Volume 2; EPA/540/1-89/002; December 1989.

USEPA, 1992, Waste Management Division Freshwater Water Quality Chronic Screening Values for Hazardous Waste Sites, USEPA Region IV, November.

USEPA, 1994, Internal Memorandum regarding draft Region IV Waste Management Division Sediment Screening Values, Atlanta, Georgia, February 22.

ATTACHMENT T1

HUMAN HEALTH RISK SPREADSHEETS

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-1

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMENT	CS	chemical specific	chemical-specific	
INGESTION RATE	IR	200	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
AGE-SPECIFIC SURFACE AREA	SA di	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS dd	chemical specific	unitless	USEPA, 1992b
CONVERSION FACTOR	CF	1.00E-06	kg/mg	SEE BELOW
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW di	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	100	days/year *	Assumption
EXPOSURE DURATION	ED	6	years	USEPA, 1991
AGE-SPECIFIC EXPOSURE DURATIO	ED di	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [1]	SA dsoil/adj	766	cm2-year/kg	Per USEPA, 1992a
DOSE ABSORBED PER EVENT	DA devent	chemical specific	g/cm u2 -even	Per USEPA, 1992a
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

* Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
[1] In estimating the dermally absorbed dose for children age 1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEP

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992 and Dermal Exposure Appendix of this document.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.

CF = 10E-09 kg/ug for organics

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)^-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

INTAKE-DERMAL =(DA devent x EF / AT x 365 days/year) x SA dsoil/adj]

Where:

SA dsoil/adj = SUM (SA di x ED di / BW di)

DA devent = CS x AF x ABS dd x CF

Note:

For noncarcinogenic effects: AT = ED

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-1
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)^-1	CANCER RIS DERMAL	TOTAL CANCER RISK
Pentachlorophenol	O	53	ug/kg	1.7E-08	0.12	2.0E-09	0.01	1.6E-09	0.133	2.1E-10	2.2E-09
bis(2-Ethylhexyl)phthalate	O	690	ug/kg	2.2E-07	0.014	3.0E-09	0.01	2.1E-08	0.014	2.9E-10	3.3E-09
Arsenic	I	2.1	mg/kg	6.6E-07	1.75	1.2E-06	0.001	6.3E-09	1.79	1.1E-08	1.2E-06
					SUMMARY CANCER RISK	**1.2E-06**				**1E-08**	**1E-06**

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-1
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
4-Methylphenol	O	62	ug/kg	2.3E-07	0.005	4.5E-05	0.01	2.2E-08	0.00475	4.6E-06	5.0E-05
Pentachlorophenol	O	53	ug/kg	1.9E-07	0.03	6.5E-06	0.01	1.9E-08	0.027	6.9E-07	7.1E-06
bis(2-Ethylhexyl)phthalate	O	690	ug/kg	2.5E-06	0.02	1.3E-04	0.01	2.4E-07	0.02	1.2E-05	1.4E-04
Arsenic	I	2.1	mg/kg	7.7E-06	0.0003	2.6E-02	0.001	7.3E-08	0.000294	2.5E-04	2.6E-02
Manganese	I	91	mg/kg	3.3E-04	0.14	2.4E-03	0.001	3.2E-06	0.0056	5.7E-04	2.9E-03
					SUMMARY HAZARD INDEX	2.8E-02				8E-04	3E-02

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-2
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMEN	CS	chemical specific	chemical specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS dd	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVEN	DA devent	chemical specific	g/cm u2 -eve	Per USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-06	kg/mg	SEE BELOW
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	100	days/year *	Assumption
EXPOSURE DURATION	ED	24	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.
CF = 10E-9 kg/ug for organics

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day) u-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE-INGESTION = $\frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$

INTAKE-DERMAL = $\frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$

Where:

DAevent = CS x AF x ABS dd x CF

Note: For noncarcinogenic effects: AT = ED

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-2
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC O ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Pentachlorophenol	O	53	ug/kg	7.1E-09	0.12	8.5E-10	0.01	4.1E-09	0.133	5.4E-10	1.4E-09
bis(2-Ethylhexyl)phthalate	O	690	ug/kg	9.3E-08	0.014	1.3E-09	0.01	5.3E-08	0.014	7.5E-10	2.0E-09
Arsenic	I	2.1	mg/kg	2.8E-07	1.75	4.9E-07	0.001	1.6E-08	1.79	2.9E-08	5.2E-07
					SUMMARY CANCER RISK	**5E-07**				**3E-08**	**5E-07**

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT RESIDENT
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-2
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC O ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
4-Methylphenol	O	62	ug/kg	2.4E-08	0.005	4.9E-06	0.01	1.4E-08	0.00475	2.9E-06	7.8E-06
Pentachlorophenol	O	53	ug/kg	2.1E-08	0.03	6.9E-07	0.01	1.2E-08	0.027	4.4E-07	1.1E-06
bis(2-Ethylhexyl)phthalate	O	690	ug/kg	2.7E-07	0.02	1.4E-05	0.01	1.6E-07	0.02	7.8E-06	2.1E-05
Arsenic	I	2.1	mg/kg	8.2E-07	0.0003	2.7E-03	0.001	4.7E-08	0.000294	1.6E-04	2.9E-03
Manganese	I	91	mg/kg	3.6E-05	0.14	2.5E-04	0.001	2.0E-06	0.0056	3.7E-04	6.2E-04
			SUMMARY HAZARD INDEX			**3E-03**				**5E-04**	**4E-03**

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD TRESPASSER
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-3

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMENT	CS	chemical specifi	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
AGE-SPECIFIC SURFACE AREA	SA di	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS dd	chemical specifi	unitless	USEPA, 1992b
CONVERSION FACTOR	CF	1.00E-06	kg/mg	SEE BELOW
BODY WEIGHT	BW	40	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW di	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	45	days/year *	USEPA, 1991
EXPOSURE DURATION	ED	11	years	USEPA, 1991
AGE-SPECIFIC EXPOSURE DURATIO	ED di	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [1]	SA dsed/adj	1136	cm2-year/kg	Per USEPA, 1992a
DOSE ABSORBED PER EVENT	DA devent	chemical specifi	mg/cm u2 -even	Per USEPA, 1992a
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	11	years	USEPA, 1991

* Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
[1] In estimating the dermally absorbed dose for children age 6 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 11 age periods, age 6 through 16, per USEPA, 1992.
USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992 and Dermal Exposure Appendix of this document.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.
CF = 10E-09 kg/ug for organics

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)$^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

INTAKE-DERMAL = (DA devent x EF / AT x 365 days/year) x SA dsoil/adj

Where:

SA dsoil/adj = SUM (SA di x ED di / BW di)

DA devent = CS x AF x ABS dd x CF

Note:
For noncarcinogenic effects: AT = ED

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD TRESPASSER
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-3
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Pentachlorophenol	O	53	ug/kg	2.6E-09	0.12	3.1E-10	0.01	1.1E-09	0.133	1.4E-10	4.5E-10
bis(2-Ethylhexyl)phthalate	O	690	ug/kg	3.3E-08	0.014	4.7E-10	0.01	1.4E-08	0.014	1.9E-10	6.6E-10
Arsenic	I	2.1	mg/kg	1.0E-07	1.75	1.8E-07	0.001	4.2E-09	1.79	7.5E-09	1.9E-07
					SUMMARY CANCER RISK	1.8E-07				8E-09	2E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD TRESPASSER
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-3
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
4-Methylphenol	O	62	ug/kg	1.9E-08	0.005	3.8E-06	0.01	7.9E-09	0.00475	1.7E-06	5.5E-06
Pentachlorophenol	O	53	ug/kg	1.6E-08	0.03	5.4E-07	0.01	6.7E-09	0.027	2.5E-07	7.9E-07
bis(2-Ethylhexyl)phthalate	O	690	ug/kg	2.1E-07	0.02	1.1E-05	0.01	8.8E-08	0.02	4.4E-06	1.5E-05
Arsenic	I	2.1	mg/kg	6.5E-07	0.0003	2.2E-03	0.001	2.7E-08	0.000294	9.1E-05	2.2E-03
Manganese	I	91	mg/kg	2.8E-05	0.14	2.0E-04	0.001	1.2E-06	0.0056	2.1E-04	4.1E-04
					SUMMARY HAZARD INDE	2.4E-03				3E-04	3E-03

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT TRESPASSER
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-4
EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMEN	CS	chemical specific	chemical specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992a
ABSORPTION FRACTION	ABS dd	chemical specific	unitless	USEPA, 1992b
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992a
DOSE ABSORBED PER EVEN	DA devent	chemical specific	g/cm u2 -eve	Per USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-06	kg/mg	SEE BELOW
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	45	days/year *	Assumption
EXPOSURE DURATION	ED	19	years	Assumption
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	19	years	USEPA, 1991

* Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memo February 10, 1992.
CF = 10E-9 kg/ug for organics

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day) u-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

INTAKE-INGESTION = $\frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$

INTAKE-DERMAL = $\frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$

Where:

DAevent = **CS x AF x ABS dd x CF**

Note: **For noncarcinogenic effects: AT = ED**

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT TRESPASSER
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-4
CARCINOGENIC EFFECTS

COMPOUND	INORGANIC O ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Pentachlorophenol	O	53	ug/kg	2.5E-09	0.12	3.0E-10	0.01	1.5E-09	0.133	1.9E-10	5.0E-10
bis(2-Ethylhexyl)phthalate	O	690	ug/kg	3.3E-08	0.014	4.6E-10	0.01	1.9E-08	0.014	2.7E-10	7.3E-10
Arsenic	I	2.1	mg/kg	1.0E-07	1.75	1.8E-07	0.001	5.8E-09	1.79	1.0E-08	1.9E-07
					SUMMARY CANCER RISK	**2E-07**				**1E-08**	**2E-07**

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral CSFs.
ND = No data available

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT TRESPASSER
Site 17
NAS Cecil Field Operable Unit 2
TABLE T1-4
NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC O ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
4-Methylphenol	O	62	ug/kg	1.1E-08	0.005	2.2E-06	0.01	6.3E-09	0.00475	1.3E-06	3.5E-06
Pentachlorophenol	O	53	ug/kg	9.3E-09	0.03	3.1E-07	0.01	5.4E-09	0.027	2.0E-07	5.1E-07
bis(2-Ethylhexyl)phthalate	O	690	ug/kg	1.2E-07	0.02	6.1E-06	0.01	7.0E-08	0.02	3.5E-06	9.6E-06
Arsenic	I	2.1	mg/kg	3.7E-07	0.0003	1.2E-03	0.001	2.1E-08	0.000294	7.2E-05	1.3E-03
Manganese	I	91	mg/kg	1.6E-05	0.14	1.1E-04	0.001	9.2E-07	0.0056	1.6E-04	2.8E-04
SUMMARY HAZARD INDEX						**1E-03**				**2E-04**	**1E-03**

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = No data available

ATTACHMENT T2

MODEL OF POTENTIAL EXPOSURES AND RISKS FOR REPRESENTATIVE WILDLIFE SPECIES TO ECPCs IN SURFACE WATER AND SEDIMENTS AT SITE 17 WETLAND

Table T2–1
Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Lethal Effects
Site 17 Wetland
Appendix T, Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	EXPOSURE CONCENTRATION DATA: MAXIMUM SEDIMENT CONCENTRATION (mg/kg)	EXPOSURE CONCENTRATION DATA: MAXIMUM SURFACE WATER CONCENTRATION (mg/L)	ESTIMATED TISSUE LEVELS IN PRIMARY FOOD ITEMS: BAFs [a]	ESTIMATED TISSUE LEVELS IN PRIMARY FOOD ITEMS: Aquatic Organism Tissue Concentration [b] (mg/kg)
2-Butanone	6.0E-03			
Toluene	6.8E-03			
4-Methylphenol	6.2E-02			
Butylbenzylphthalate	5.4E-01			
Diethylphthalate	4.8E-02			
Pentachlorophenol	5.3E-02			
bis(2-Ethylhexyl)phthalate	6.9E-01			
4,4'-DDE	6.3E-04		2.1E+01	1.3E-02
Aluminum	1.1E+04			
Arsenic	2.1E+00			
Barium	5.9E+01			
Cadmium	9.5E-01			
Chromium	1.0E+01			
Copper	5.1E+00			
Iron	4.3E+03			
Lead	3.1E+01			
Manganese	9.1E+01			
Nickel	3.9E+00			
Selenium	1.8E+00			
Vanadium	1.0E+01			
Zinc	1.3E+02			

EXPOSURE PARAMETERS [c]: Representative Wildlife Species		Percent Prey in Diet: Aquatic Organisms	Percent Prey in Diet: Sediment	Home Range (acres)	ED [d]	Site Foraging Frequency [e]	Food Ingestion Rate (kg/day)	Water Ingestion Rate (L/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	0%	1%	0.147	1	1.00E+00	0.0029	0.0031	0.021
American woodcock	(Small omn. bird)	0%	5%	80.1	1	1.00E+00	0.020	0.019	0.197
Short-tailed shrew	(Small omn. mammal)	0%	5%	0.96	1	1.00E+00	0.0024	0.0039	0.017
Raccoon	(Piscivorous mammal)	93%	7%	385	1	1.00E+00	0.214	0.344	3.99
Great horned owl	(Pred. bird)	0%	1%	15	1	1.00E+00	0.079	0.081	1.59

NOTES:

SITE AREA:	1.10 acres

ECPC = Ecological Contaminant of Potential Concern

[a] BAF data presented in Appendix K, Table K1–4.
BAF data presented for 4,4'-DDE.
[b] ECPC concentrations in aquatic organism tissue equals the aquatic BAF/BCF multiplied by the maximum sediment/surface water concentration of the contaminant.
[c] Documentation of exposure parameters presented in Table 6–15, Baseline Risk Assessment
[d] ED = Exposure Duration (percentage of year receptor is expected to be found at study area)
[e] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0)); for lethal exposure, a one-time acute exposure is assumed.

Table T2-1
Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Lethal Effects
Site 17 Wetland
Appendix T, Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [g]

ANALYTE	*Cotton mouse*	*American woodcock*	*Short-tailed shrew*	*Raccoon*	*Great horned owl*
2-Butanone	8.3E-06	3.0E-05	4.2E-05	2.3E-05	1.5E-06
Toluene	9.4E-06	3.5E-05	4.8E-05	2.6E-05	1.7E-06
4-Methylphenol	8.6E-05	3.1E-04	4.4E-04	2.3E-04	1.5E-05
Butylbenzylphthalate	7.5E-04	2.7E-03	3.8E-03	2.0E-03	1.3E-04
Diethylphthalate	6.6E-05	2.4E-04	3.4E-04	1.8E-04	1.2E-05
Pentachlorophenol	7.3E-05	2.7E-04	3.7E-04	2.0E-04	1.3E-05
bis(2-Ethylhexyl)phthalate	9.5E-04	3.5E-03	4.9E-03	2.6E-03	1.7E-04
4,4'-DDE	8.7E-07	3.2E-06	4.4E-06	6.6E-04	1.6E-07
Aluminum	1.5E+01	5.6E+01	7.8E+01	4.1E+01	2.7E+00
Arsenic	2.9E-03	1.1E-02	1.5E-02	7.9E-03	5.2E-04
Barium	8.1E-02	3.0E-01	4.2E-01	2.2E-01	1.5E-02
Cadmium	1.3E-03	4.8E-03	6.7E-03	3.6E-03	2.4E-04
Chromium	1.4E-02	5.1E-02	7.1E-02	3.8E-02	2.5E-03
Copper	7.0E-03	2.6E-02	3.6E-02	1.9E-02	1.3E-03
Iron	5.9E+00	2.2E+01	3.0E+01	1.6E+01	1.1E+00
Lead	4.3E-02	1.6E-01	2.2E-01	1.2E-01	7.7E-03
Manganese	1.3E-01	4.6E-01	6.4E-01	3.4E-01	2.3E-02
Nickel	5.4E-03	2.0E-02	2.8E-02	1.5E-02	9.7E-04
Selenium	2.5E-03	9.1E-03	1.3E-02	6.8E-03	4.5E-04
Vanadium	1.4E-02	5.1E-02	7.1E-02	3.8E-02	2.5E-03
Zinc	1.8E-01	6.6E-01	9.2E-01	4.9E-01	3.2E-02

[g] Calculated by summing the aquatic prey, surface water, and sediment exposure (Table 6-2).

Table T2-2
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 17 Wetland
Appendix T, Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Cotton mouse*			*American woodcock*			*Short-tailed shrew*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
2-Butanone	8.3E-06	5.5E+02	1.5E-08	3.0E-05			4.2E-05	5.5E+02	7.7E-08
Toluene	9.4E-06	1.0E+03	9.4E-09	3.5E-05			4.8E-05	1.0E+03	4.8E-08
4-Methylphenol	8.6E-05	2.2E+02	3.9E-07	3.1E-04			4.4E-04	2.2E+02	2.0E-06
Butylbenzylphthalate	7.5E-04	4.7E+02	1.6E-06	2.7E-03			3.8E-03	4.7E+02	8.1E-06
Diethylphthalate	6.6E-05	1.7E+03	3.9E-08	2.4E-04			3.4E-04	1.7E+03	2.0E-07
Pentachlorophenol	7.3E-05	5.4E+00	1.4E-05	2.7E-04	7.6E+01	3.5E-06	3.7E-04	5.4E+00	6.9E-05
bis(2-Ethylhexyl)phthalate	9.5E-04	1.6E+02	6.0E-06	3.5E-03			4.9E-03	1.6E+02	3.0E-05
4,4'-DDE	8.7E-07	1.2E+01	7.3E-08	3.2E-06	1.2E+02	2.7E-08	4.4E-06	1.4E+02	3.2E-08
Aluminum	1.5E+01	7.4E+02	2.1E-02	5.6E+01			7.8E+01	7.4E+02	1.0E-01
Arsenic	2.9E-03	2.9E+01	1.0E-04	1.1E-02	3.6E+00	3.0E-03	1.5E-02	2.9E+01	5.1E-04
Barium	8.1E-02	4.3E+02	1.9E-04	3.0E-01			4.2E-01	4.3E+02	9.7E-04
Cadmium	1.3E-03	3.0E+01	4.4E-05	4.8E-03			6.7E-03	3.0E+01	2.2E-04
Chromium	1.4E-02	4.0E+01	3.5E-04	5.1E-02	2.5E+01	2.0E-03	7.1E-02	4.0E+01	1.8E-03
Copper	7.0E-03	1.9E+02	3.7E-05	2.6E-02			3.6E-02	1.9E+02	1.9E-04
Iron	5.9E+00	2.4E+02	2.5E-02	2.2E+01			3.0E+01	2.4E+02	1.3E-01
Lead	4.3E-02	6.0E+01	7.1E-04	1.6E-01	7.5E+01	2.1E-03	2.2E-01	6.0E+01	3.6E-03
Manganese	1.3E-01	2.3E+03	5.5E-05	4.6E-01			6.4E-01	2.3E+03	2.8E-04
Nickel	5.4E-03	7.0E+01	7.7E-05	2.0E-02	1.0E+02	2.0E-04	2.8E-02	7.0E+01	3.9E-04
Selenium	2.5E-03	2.8E+01	8.9E-05	9.1E-03	2.7E+00	3.4E-03	1.3E-02	2.8E+01	4.5E-04
Vanadium	1.4E-02			5.1E-02	2.0E+01	2.5E-03	7.1E-02		
Zinc	1.8E-01	3.9E+02	4.6E-04	6.6E-01			9.2E-01	3.9E+02	2.4E-03
SUMMARY HAZARD INDEX			4.7E-02			1.3E-02			2.4E-01

PDE = Potential Dietary Exposure (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species.

Table T2-2
Risk from Potential Lethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs in Surface Water and Sediment
Site 17 Wetland
Appendix T, Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

ANALYTE	*Raccoon*			*Great horned owl*		
	PDE	RTV	HQ	PDE	RTV	HQ
2-Butanone	2.3E-05	5.5E+02	4.1E-08	1.5E-06		
Toluene	2.6E-05	1.0E+03	2.6E-08	1.7E-06		
4-Methylphenol	2.3E-04	2.2E+02	1.1E-06	1.5E-05		
Butylbenzylphthalate	2.0E-03	4.7E+02	4.3E-06	1.3E-04		
Diethylphthalate	1.8E-04	1.7E+03	1.1E-07	1.2E-05		
Pentachlorophenol	2.0E-04	3.0E+01	6.6E-06	1.3E-05	7.6E+01	1.7E-07
bis(2-Ethylhexyl)phthalate	2.6E-03	1.6E+02	1.6E-05	1.7E-04		
4,4'-DDE	6.6E-04	1.4E+02	4.7E-06	1.6E-07	4.5E+02	3.5E-10
Aluminum	4.1E+01	7.4E+02	5.6E-02	2.7E+00		
Arsenic	7.9E-03	2.9E+01	2.7E-04	5.2E-04	3.6E+00	1.4E-04
Barium	2.2E-01	4.3E+02	5.2E-04	1.5E-02		
Cadmium	3.6E-03	3.0E+01	1.2E-04	2.4E-04		
Chromium	3.8E-02	4.0E+01	9.4E-04	2.5E-03	2.5E+01	9.9E-05
Copper	1.9E-02	1.9E+02	1.0E-04	1.3E-03		
Iron	1.6E+01	2.4E+02	6.7E-02	1.1E+00		
Lead	1.2E-01	6.0E+01	1.9E-03	7.7E-03	7.5E+01	1.0E-04
Manganese	3.4E-01	2.3E+03	1.5E-04	2.3E-02		
Nickel	1.5E-02	7.0E+01	2.1E-04	9.7E-04	1.0E+02	9.7E-06
Selenium	6.8E-03	2.8E+01	2.4E-04	4.5E-04	2.7E+00	1.7E-04
Vanadium	3.8E-02			2.5E-03	2.0E+01	1.2E-04
Zinc	4.9E-01	3.9E+02	1.3E-03	3.2E-02		
SUMMARY HAZARD INDEX			1.3E-01			6.5E-04

PDE = Potential Dietary Exposure (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)
RTV = Reference Toxicity Value (mg/kgBW/day) = 1/5 of the lowest reported LD_{50} for closest related species.

Table T2-3
Estimated Exposure from Ingestion of Maximum ECPCs in Food, Surface Water, and Sediment: Sublethal Effects
Site 17 Wetland
Appendix T, Baseline Risk Assessment for Operable Unit 2
NAS Cecil Field, Jacksonville, Florida

EXPOSURE CONCENTRATION DATA			ESTIMATED TISSUE LEVELS IN PRIMARY FOOD ITEMS	
ANALYTE	MAXIMUM SEDIMENT CONCENTRATION (mg/kg)	MAXIMUM SURFACE WATER CONCENTRATION (mg/L)	BAFs and BCFs [a]	Aquatic Organism Tissue Concentration [b] (mg/kg)
2-Butanone	6.0E-03			
Toluene	6.8E-03			
4-Methylphenol	6.2E-02			
Butylbenzylphthalate	5.4E-01			
Diethylphthalate	4.8E-02			
Pentachlorophenol	5.3E-02			
bis(2-Ethylhexyl)phthalate	6.9E-01			
4,4'-DDE	6.3E-04		2.1E+01	1.3E-02
Aluminum	1.1E+04			
Arsenic	2.1E+00			
Barium	5.9E+01			
Cadmium	9.5E-01			
Chromium	1.0E+01			
Copper	5.1E+00			
Iron	4.3E+03			
Lead	3.1E+01			
Manganese	9.1E+01			
Nickel	3.9E+00			
Selenium	1.8E+00			
Vanadium	1.0E+01			
Zinc	1.3E+02			

EXPOSURE PARAMETERS [c]

Representative Wildlife Species		Percent Prey in Diet: Aquatic Organisms	Percent Prey in Diet: Sediment	Home Range (acres)	ED [d]	Site Foraging Frequency [e]	Food Ingestion Rate (kg/day)	Water Ingestion Rate (L/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	0%	1%	0.147	1	1.00E+00	0.0029	0.0031	0.021
American woodcock	(Small omn. bird)	0%	5%	80.1	1	1.37E-02	0.020	0.019	0.197
Short-tailed shrew	(Small omn. mammal)	0%	5%	0.96	1	1.00E+00	0.0024	0.0039	0.017
Raccoon	(Piscivorous mammal)	93%	7%	385	1	2.86E-03	0.214	0.344	3.99
Great horned owl	(Pred. bird)	0%	1%	15	1	7.33E-02	0.079	0.081	1.59

NOTES:

SITE AREA:	1.10 acres

ECPC = Ecological Contaminant of Potential Concern

[a] BAF data presented in Appendix K, Table 11-4.
BAF data presented for 4,4'-DDE.
[b] ECPC concentrations in aquatic organism tissue equals the aquatic BAF/BCF multiplied by the maximum sediment/surface water concentration of the contaminant.
[c] Documentation of exposure parameters presented in Table 6-15
[d] ED = Exposure Duration (percentage of year receptor is expected to be found at study area)
[e] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0))

Table T2-4
Risk from Potential Sublethal Effects for Representative Wildlife Species from Maximum Exposure Concentrations of ECPCs
Site 17 Wetland
Appendix T, Baseline Risk Assessment
NAS Cecil Field, Jacksonville, Florida

ANALYTE	Raccoon			Great horned owl		
	PDE	RTV	HQ	PDE	RTV	HQ
2-Butanone	6.4E-08	1.7E+02	3.8E-10	1.1E-07		
Toluene	7.3E-08	7.6E+01	9.6E-10	1.2E-07		
4-Methylphenol	6.7E-07	5.0E+01	1.3E-08	1.1E-06		
Butylbenzylphthalate	5.8E-06	4.9E+03	1.2E-09	9.8E-06		
Diethylphthalate	5.1E-07	3.3E+03	1.6E-10	8.7E-07		
Pentachlorophenol	5.7E-07	3.0E+01	1.9E-08	9.7E-07	3.0E+00	3.2E-07
bis(2-Ethylhexyl)phthalate	7.4E-06	3.5E+01	2.1E-07	1.3E-05		
4,4'-DDE	1.9E-06	3.5E+03	5.4E-10	1.1E-08	5.8E-01	2.0E-08
Aluminum	1.2E-01	4.3E+02	2.7E-04	2.0E-01		
Arsenic	2.3E-05	5.8E-01	3.9E-05	3.8E-05	1.0E+00	3.8E-05
Barium	6.3E-04	2.0E+02	3.2E-06	1.1E-03		
Cadmium	1.3E-05	2.2E+01	4.6E-07	1.7E-05	1.0E+01	1.7E-06
Chromium	1.1E-04	1.4E+03	7.7E-08	1.8E-04	2.0E+02	9.1E-07
Copper	5.5E-05	1.0E+02	5.5E-07	9.3E-05	2.1E+00	4.4E-05
Iron	4.6E-02			7.8E-02		
Lead	3.3E-04	2.5E+00	1.3E-04	9.3E-05	5.0E+01	1.9E-06
Manganese	9.8E-04	1.4E+02	7.0E-06	7.8E-02		
Nickel	4.2E-05	1.6E+02	2.6E-07	7.1E-05		
Selenium	1.9E-05	2.0E-01	9.7E-05	5.6E-04	6.0E-01	9.4E-04
Vanadium	1.1E-04	8.4E+00	1.3E-05	1.7E-03	1.1E+01	1.5E-04
Zinc	1.4E-03	2.0E+02	7.0E-06	7.1E-05		
SUMMARY HAZARD INDEX			5.7E-04			1.2E-03

PDE = Potential Dietary Exposure (mg/kgBW/day)
RTV = Reference Toxicity Value (mg/kgBW/day) = lowest reported LOAEL for closest related species.
HQ = Hazard Quotient (calculated by dividing PDE by RT