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PITT-12-8-054

December 8, 1998

Tetra Tech NUS Project Number 7856

Mr. Mark Lewis
Connecticut Department of Environmental Protection
Water Management Bureau
Permitting, Enforcement, and Remediation Division
Federal Remediation Program
79 Elm Street
Hartford, Connecticut 06106-5127

Reference: CLEAN Contract No. N62472-90-D-1298
Contract Task Order No. 0312

Subject: Calculated Alternative CTDEP Remediation Standards
Existing Data Summary Report for the
Basewide Groundwater OU Remedial Investigation
Naval Submarine Base - New London, Groton, Connecticut

Dear Mr. Lewis:

In preparation of the Existing Data Summary Report (EDSR) for the Basewide Groundwater OU Remedial Investigation (RI), Tetra Tech NUS, Inc. (TtNUS) has calculated Alternative Remediation Standards following the State of Connecticut Remediation Standard Regulations of January 1996. Standards were developed on a matrix-specific basis for all chemicals that were detected at the sites included in the Basewide Groundwater OU investigation area that did not have previously established CTDEP standards. The intent of this memo is to identify the sources of the standards used in the EDSR and to identify those values that have been developed by TtNUS using the State guidance.

Background information (i.e., CAS numbers and published toxicological criteria) and published and calculated Remediation Standards for solid and aqueous media are provided in Tables B-1 and B-2, respectively, which are attached. Table B-1 summarizes the promulgated and calculated soil Pollutant Mobility standards. The basis for each chemical-specific remediation standard (i.e., promulgated, calculated, or calculated using a surrogate) is indicated by the footnotes included in the table. Table B-2 summarizes background information and promulgated and calculated Groundwater and Surface Water Protection standards. Similar to Table B-1, the basis for each chemical-specific remediation standard is indicated by the footnotes included in the table.

TtNUS used these criteria for the screening level assessment provided in this EDSR and intends to use these criteria, as well as Region III RBCs, as part of the human health risk assessment for the Basewide Groundwater OU RI to screen for chemicals of potential concern. Therefore, TtNUS, on the behalf of the United States Navy, requests that the CTDEP review and approve the standards in Tables B-1 and B-2. It is hoped that this approval process will alleviate unnecessary revisions to the RI report in the future and expedite any additional risk-related work required by the State (i.e., application for use of alternative criteria).

It is requested that the CTDEP complete their review and approval of the standards within the review period for the EDSR. If you have any questions regarding the information provided in the tables or the schedule for the review please contact Mr. Mark Evans at (610) 595-0567 (ext. 162) or me at (412) 921-8244.

Very truly yours,

Corey A. Rich

Corey A. Rich, P.E.
Project Manager

Attachment(s)

c: Mr. Mark Evans, NORTHDIV
Mr. Richard Conant, NSB-NLON Environmental
File: CTO 0312

TABLE B-1

PUBLISHED AND CALCULATED REMEDIATION STANDARDS - SOLID MEDIA
CTO-312, NSB-NLON, GROTON, CONNECTICUT

Analyte	CAS Number	Published Toxicological Criteria[1]		CTDEP Remediation Standard GB Pollutant Mobility[2] (mg/kg)
		RFD_{oral} (mg/kg/day)	CSF_{oral} (kg/day/mg)	
VOLATILE ORGANICS				
1,1,1-Trichloroethane	71556	2.00E-02	-	40
1,1,2,2-Tetrachloroethane	79345	-	2.00E-01	0.1
1,1,2-Trichloroethane	79005	4.00E-03	5.70E-02	1
1,1-Dichloroethene	75354	9.00E-03	6.00E-01	1.4
1,2-Dichloroethene (Total)	540590	9.00E-03	-	12[3]
2-Butanone	78933	6.00E-01	-	80
4-Methyl-2-pentanone	108101	8.00E-02	-	14
Acetone	67641	1.00E-01	-	140
Benzene	71432	3.00E-03	2.90E-02	0.2
Bromodichloromethane	75274	2.00E-02	6.20E-02	0.11[3]
Bromomethane	74839	1.40E-03	-	2[3]
Carbon Disulfide	75150	1.00E-01	-	140[3]
Chlorobenzene	108907	2.00E-02	-	20
Chloroform	67663	1.00E-02	6.10E-03	1.2
Chloromethane	74873	-	1.30E-02	0.54[3]
cis-1,3-Dichloropropene	10061015	3.00E-04[4]	1.80E-01[4]	0.1
Ethylbenzene	100414	1.00E-01	-	10.1
Methylene Chloride	75092	6.00E-02	7.50E-03	1
Styrene	100425	2.00E-01	-	20
Tetrachloroethene	127184	1.00E-02	5.20E-02	1
Toluene	108883	2.00E-01	-	67
trans-1,3-Dichloropropene	10061026	3.00E-04[4]	1.80E-01[4]	0.1
Trichloroethene	79016	6.00E-03	1.10E-02	1
Vinyl Acetate	108054	1.00E+00	-	1400[3]
Xylenes, Total	1330207	2.00E+00	-	19.5
SEMIVOLATILE ORGANICS				
1,4-Dichlorobenzene	106467	3.00E-02	2.40E-02	15
2,4-Dimethylphenol	105679	2.00E-02	-	28[3]
2-Methylnaphthalene	91576	4.00E-02	-	56[3]
2-Methylphenol	95487	5.00E-02	-	70[3]
3,3'-Dichlorobenzidine	91941	-	4.50E-01	0.016[3]
4-Chloro-3-methylphenol	59507	-	-	-
4-Methylphenol	106445	5.00E-03	-	7[3]
Acenaphthene	83329	6.00E-02	-	84[3]
Acenaphthylene	208968	-	-	84
Anthracene	120127	3.00E-01	-	400
Benzo(a)anthracene	56553	-	7.30E-01	1
Benzo(a)pyrene	50328	-	7.30E+00	1

TABLE B-1

PUBLISHED AND CALCULATED REMEDIATION STANDARDS - SOLID MEDIA
CTO-312, NSB-NLON, GROTON, CONNECTICUT

Analyte	CAS Number	Published Toxicological Criteria[1]		CTDEP Remediation Standard GB Pollutant Mobility[2] (mg/kg)
		RFD_{oral} (mg/kg/day)	CSF_{oral} (kg/day/mg)	
Benzo(b)fluoranthene	205992	-	7.30E-01	1
Benzo(g,h,i)perylene	191242	-	-	40[5]
Benzo(k)fluoranthene	207089	-	7.30E-02	1
Benzoic Acid	65850	4.00E+00	-	5600[3]
Bis(2-Ethylhexyl)phthalate	117817	2.00E-02	1.40E-02	11
Butylbenzyl Phthalate	85687	2.00E-01	-	200
Carbazole	86748	-	2.00E-02	0.36[3]
Chrysene	218019	-	7.30E-03	0.96[3]
Dibenzo(a,h)anthracene	53703	-	7.30E+00	0.33[6]
Dibenzofuran	132649	4.00E-03	-	5.6[3]
Diethyl Phthalate	84662	8.00E-01	-	1100[3]
Dimethyl Phthalate	131113	1.00E+01	-	14,000[3]
Di-n-butyl phthalate	84742	1.00E-01	-	140
Di-n-octyl phthalate	117840	2.00E-02	-	20
Fluoranthene	206440	4.00E-02	-	56
Fluorene	86737	4.00E-02	-	56
Indeno(1,2,3-cd)pyrene	193395	-	7.30E-01	0.33[6]
Isophorone	78591	2.00E-01	9.50E-04	7.37[3]
Naphthalene	91203	4.00E-02	-	56
Pentachlorophenol	87865	3.00E-02	1.20E-01	1
Phenanthrene	85018	-	-	40
Phenol	108952	6.00E-01	-	800
Pyrene	129000	3.00E-02	-	40
PESTICIDES/PCBs				
4,4'-DDD	72548	-	2.40E-01	0.029[3]
4,4'-DDE	72559	-	3.40E-01	0.021[3]
4,4'-DDT	50293	5.00E-04	3.40E-01	0.021[3]
Aldrin	309002	3.00E-05	1.70E+01	0.00041[3]
alpha-BHC	319846	-	6.30E+00	0.0011[3]
Alpha-Chlordane	5103719	5.00E-04[7]	3.50E-01[7]	0.066[7]
Aroclor-1242	53469219	-	2.00E+00	-
Aroclor-1248	12672296	-	2.00E+00	-
Aroclor-1254	11097691	2.00E-05	2.00E+00	-
Aroclor-1260	11096825	-	2.00E+00	-
beta-BHC	319857	-	1.80E+00	0.0039[3]
delta-BHC	319868	-	-	0.0011[8]
Dieldrin	60571	5.00E-05	1.60E+01	0.007
Endosulfan I	959988	6.00E-03[9]	-	8.4[9]
Endosulfan II	33213659	6.00E-03[9]	-	8.4[9]

TABLE B-1

PUBLISHED AND CALCULATED REMEDIATION STANDARDS - SOLID MEDIA
CTO-312, NSB-NLON, GROTON, CONNECTICUT

Analyte	CAS Number	Published Toxicological Criteria[1]		CTDEP Remediation Standard GB Pollutant Mobility[2] (mg/kg)
		RFD_{oral} (mg/kg/day)	CSF_{oral} (kg/day/mg)	
Endosulfan Sulfate	1031078	6.00E-03[9]	-	8.4[9]
Endrin	72208	3.00E-04	-	0.42[3]
Endrin Aldehyde	7421934	3.00E-04[10]	-	0.42[11]
Endrin Ketone	53494705	3.00E-04[10]	-	0.42[11]
gamma-BHC (Lindane)	58899	3.00E-04	1.30E+00	0.04
Gamma-Chlordane	5103742	5.00E-04[7]	3.50E-01[7]	0.066[7]
Heptachlor	76448	5.00E-04	4.50E+00	0.013
Heptachlor Epoxide	1024573	1.30E-05	9.10E+00	0.02
Methoxychlor	72435	5.00E-03	-	8
DIOXINS/FURANS				
1,2,3,4,6,7,8-HPCDF	67562394	-	-	4.67E-06[12]
1,2,3,4,7,8-HXCDF	70648269	-	-	4.67E-07[12]
1,2,3,6,7,8-HXCDF	57117449	-	-	4.67E-07[12]
OCDD	3268879	-	-	4.67E-05[12]
INORGANICS				
Aluminum	7429905	1.00E+00	-	-
Antimony	7440360	4.00E-04	-	-
Arsenic	7440382	3.00E-04	1.50E+00	-
Barium	7440393	7.00E-02	-	-
Beryllium	7440417	2.00E-03	-	-
Boron	7440428	9.00E-02	-	-
Cadmium	7440439	5.00E-04	-	-
Calcium	7440702	-	-	-
Chromium	7440473	5.00E-3[13]	-	-
Cobalt	7440484	6.00E-02	-	-
Copper	7440508	4.00E-02	-	-
Cyanide	57125	2.00E-02	-	-
Iron	7439896	3.00E-01	-	-
Lead	7439921	-	-	-
Magnesium	7439954	-	-	-
Manganese	7439965	2.00E-02	-	-
Mercury	7439976	-	-	-
Nickel	7440020	2.00E-02	-	-
Potassium	7440097	-	-	-
Selenium	7782492	5.00E-03	-	-
Silver	7440224	5.00E-03	-	-
Sodium	7440235	-	-	-
Thallium	7440280	7.00E-05	-	-
Vanadium	7440622	7.00E-03	-	-
Zinc	7440666	3.00E-01	-	-

TABLE B-1

PUBLISHED AND CALCULATED REMEDIATION STANDARDS - SOLID MEDIA
CTO-312, NSB-NLON, GROTON, CONNECTICUT

Analyte	CAS Number	Published Toxicological Criteria[1]		CTDEP Remediation Standard GB Pollutant Mobility[2] (mg/kg)
		RFD_{oral} (mg/kg/day)	CSF_{oral} (kg/day/mg)	
TOTAL PETROLEUM HYDROCARBONS				
TPH	-	-	-	2500

1 Values obtained from USEPA Region III Risk-Based Concentration Table (April 1, 1998).
2 Unless otherwise noted, value obtained from State of Connecticut Remediation Standard Regulations, Section 22a-133k (January 1996).
3 CTDEP remediation standard not available. Toxicity criteria from USEPA Region III Risk-Based Concentration Table (April 1, 1998) was used to calculate a value using the methodology presented in the CTDEP guidance (CTDEP 1996).
4 Value for 1,3-dicholoropropene is used.
5 Toxicity criteria not available. Toxicity criteria for pyrene was used to calculate a value.
6 Calculated value less than reliably achievable detection limits. Reliable and accurately achievable detection limit is used.
7 Value for chlordane is used.
8 Toxicity criteria not available. Toxicity criteria for alpha-BHC was used to calculate a value.
9 Value for endosulfan is used.
10 Value for endrin is used.
11 Calculated value for endrin is used.
12 Toxicity criteria not available. Toxicity criteria for 2,3,7,8-TCDD in conjunction with toxicity equivalent factor (TEF) (EPA/625/ 3-89/016, March 1989) was used to calculate a value.
13 Value for hexavalent chromium is used.
\- Not available.

TABLE B-2

PUBLISHED AND CALCULATED REMEDIATION STANDARDS - AQUEOUS MEDIA
CTO-312, NSB-NLON, GROTON, CONNECTICUT

Analyte	CAS Number	Published Toxicological Criteria[1]		State Remediation Standards[2]	
		RFD_{oral} (mg/kg/day)	CSF_{oral} (kg/day/mg)	Groundwater Protection (ug/L)	Surface Water Protection (ug/L)
VOLATILE ORGANICS					
1,1,1-Trichloroethane	71556	2.00E-02	-	200	62,000
1,1,2,2-Tetrachloroethane	79345	-	2.00E-01	0.5	110
1,1,2-Trichloroethane	79005	4.00E-03	5.70E-02	5	1260
1,1-Dichloroethane	75343	1.00E-01	-	70	-
1,1-Dichloroethene	75354	9.00E-03	6.00E-01	7	96
1,2-Dichloroethane	107062	3.00E-02	9.10E-02	1	2970
1,2-Dichloroethene (Total)	540590	9.00E-03	-	63[3]	14,000[4,5]
2-Butanone	78933	6.00E-01	-	400	-
2-Hexanone	73663715	4.00E-02	-	280[3]	-
4-Methyl-2-pentanone	108101	8.00E-02	-	350	-
Acetone	67641	1.00E-01	-	700	-
Benzene	71432	3.00E-03	2.90E-02	1	710
Bromodichloromethane	75274	2.00E-02	6.20E-02	0.56[3]	660[4]
Bromomethane	74839	1.40E-03	-	9.8[3]	80,000[4]
Carbon Disulfide	75150	1.00E-01	-	700[3]	-
Chlorobenzene	108907	2.00E-02	-	100	420,000
Chloroform	67663	1.00E-02	6.10E-03	6	14,100
Chloromethane	74873	-	1.30E-02	2.7[3]	9400[4]
Ethylbenzene	100414	1.00E-01	-	700	580,000
Methyl Tert-Butyl Ether	1634044	5.00E-03	-	100	-
Methylene Chloride	75092	6.00E-02	7.50E-03	5	48,000
Tetrachloroethene	127184	1.00E-02	5.20E-02	5	88
Toluene	108883	2.00E-01	-	1000	4,000,000
Trichloroethene	79016	6.00E-03	1.10E-02	5	2340
Vinyl Chloride	75014	-	1.90E+00	2	15,750
Xylenes, Total	1330207	2.00E+00	-	530	-
SEMIVOLATILE ORGANICS					
1,2,4-Trichlorobenzene	120821	1.00E-02	-	70[3]	-
1,2-Dichlorobenzene	95501	9.00E-02	-	600	170,000
1,3-Dichlorobenzene	541731	3.00E-02	-	210[3]	26,000
1,4-Dichlorobenzene	106467	3.00E-02	2.40E-02	75	26,000
2,4-Dichlorophenol	120832	3.00E-03	-	20	15,800
2,4-Dimethylphenol	105679	2.00E-02	-	140[3]	-
2,4-Dinitrotoluene	121142	2.00E-03	-	14[3]	270[4]
2,6-Dinitrotoluene	606202	1.00E-03	-	7[3]	-
2-Chlorophenol	95578	5.00E-03	-	36	46,000[4]
2-Methylnaphthalene	91576	4.00E-02	-	280[3]	-
2-Methylphenol	95487	5.00E-02	-	350[3]	-
4-Methylphenol	106445	5.00E-03	-	35[3]	-
Acenaphthene	83329	6.00E-02	-	420[3]	27,000[4]
Acenaphthylene	208968	-	-	420	0.3
Anthracene	120127	3.00E-01	-	2000	1,100,000
Benzo(a)anthracene	56553	-	7.30E-01	0.06	0.3

TABLE B-2

PUBLISHED AND CALCULATED REMEDIATION STANDARDS - AQUEOUS MEDIA
CTO-312, NSB-NLON, GROTON, CONNECTICUT

Analyte	CAS Number	Published Toxicological Criteria[1]		State Remediation Standards[2]	
		RFD_{oral} (mg/kg/day)	CSF_{oral} (kg/day/mg)	Groundwater Protection (ug/L)	Surface Water Protection (ug/L)
Benzo(a)pyrene	50328	-	7.30E+00	0.2	0.3
Benzo(b)fluoranthene	205992	-	7.30E-01	0.08	0.3
Benzo(g,h,i)perylene	191242	-	-	200[3,6]	0.3[4,6]
Benzo(k)fluoranthene	207089	-	7.30E-02	0.5	0.3
Benzoic Acid	65850	4.00E+00	-	28,000[3]	-
Bis(2-Ethylhexyl)phthalate	117817	2.00E-02	1.40E-02	2	59
Butylbenzyl Phthalate	85687	2.00E-01	-	1000	52,000[4]
Carbazole	86748	-	2.00E-02	1.8[3]	29[4]
Chrysene	218019	-	7.30E-03	4.8[3]	0.3[4]
Dibenzo(a,h)anthracene	53703	-	7.30E+00	2[7]	0.3[4]
Dibenzofuran	132649	4.00E-03	-	28[3]	-
Diethyl Phthalate	84662	8.00E-01	-	5600[3]	2,400,000[4]
Dimethyl Phthalate	131113	1.00E+01	-	70,000[3]	58,000,000[4]
Di-n-butyl phthalate	84742	1.00E-01	-	700	120,000
Di-n-octyl phthalate	117840	2.00E-02	-	100	-
Fluoranthene	206440	4.00E-02	-	280	3700
Fluorene	86737	4.00E-02	-	280	140,000
Indeno(1,2,3-cd)pyrene	193395	-	7.30E-01	2[7]	0.3[4]
Naphthalene	91203	4.00E-02	-	280	-
N-Nitrosodiphenylamine	86306	-	4.90E-03	7.1[3]	480[4]
Phenanthrene	85018	-	-	200	0.3
Phenol	108952	6.00E-01	-	4000	92,000,000
Pyrene	129000	3.00E-02	-	200	110,000
PESTICIDES/PCBs					
Aroclor-1016	12674112	7.00E-05	7.00E-02	0.5[8]	0.5
Aroclor-1254	11097691	2.00E-05	2.00E+00	0.5[8]	0.5
Aroclor-1260	11096825	-	2.00E+00	0.5[8]	0.5
Heptachlor	76448	5.00E-04	4.50E+00	0.4	0.05
INORGANICS					
Aluminum	7429905	1.00E+00	-	-	-
Antimony	7440360	4.00E-04	-	6	86,000
Arsenic	7440382	3.00E-04	1.50E+00	50	4
Barium	7440393	7.00E-02	-	1000	-
Beryllium	7440417	2.00E-03	-	4	4
Boron	7440428	9.00E-02	-	630[3]	-
Cadmium	7440439	5.00E-04	-	5	6
Calcium	7440702	-	-	-	-
Chromium (Total)	7440473	5.00E-03[9]	-	50	110[9]
Cobalt	7440484	6.00E-02	-	420[3]	-
Copper	7440508	4.00E-02	-	1300	48
Cyanide	57125	2.00E-02	-	200	52
Iron	7439896	3.00E-01	-	-	-
Lead	7439921	-	-	15	13
Magnesium	7439954	-	-	-	-

TABLE B-2

PUBLISHED AND CALCULATED REMEDIATION STANDARDS - AQUEOUS MEDIA
CTO-312, NSB-NLON, GROTON, CONNECTICUT

Analyte	CAS Number	Published Toxicological Criteria[1]		State Remediation Standards[2]	
		RFD_{oral} (mg/kg/day)	CSF_{oral} (kg/day/mg)	Groundwater Protection (ug/L)	Surface Water Protection (ug/L)
Manganese	7439965	2.00E-02	-	50[3]	-
Mercury	7439976	-	-	2	0.4
Nickel	7440020	2.00E-02	-	100	880
Potassium	7440097	-	-	-	-
Selenium	7782492	5.00E-03	-	50	50
Silver	7440224	5.00E-03	-	36	12
Sodium	7440235	-	-	-	-
Thallium	7440280	7.00E-05	-	5	63
Vanadium	7440622	7.00E-03	-	50	-
Zinc	7440666	3.00E-01	-	5000	123
TOTAL PETROLEUM HYDROCARBONS					
Diesel Range Organics	-	-	-	-	-
Gasoline Range Organics	-	-	-	-	-
Oil & Grease	-	-	-	-	-
TPH	-	-	-	500	-
MISCELLANEOUS PARAMETERS					
Ammonia, as Nitrogen	7664417	-	-	-	-
Biochemical Oxygen Demand	-	-	-	-	-
Chemical Oxygen Demand	-	-	-	-	-
Hardness as CaCO3	-	-	-	-	-
Total Organic Carbon	-	-	-	-	-
Total Phosphorus	-	-	-	-	-
Total Suspended Solids	-	-	-	-	-

1 Values obtained from USEPA Region III Risk-Based Concentration Table (April 1, 1998).
2 Unless otherwise noted, value obtained from State of Connecticut Remediation Standard Regulations, Section 22a-133k (January 1996).
3 CTDEP remediation standard not available. Value calculated using methodologies presented in State guidance (January 1996).
4 CTDEP remediation standard not available. Value calculated using lower of human health or freshwater aquifer criteria and dilution factors based on methodologies presented in CTDEP guidance (January 1996).
5 Value used is for trans-1,2-dichloroethene.
6 Calculated value used is for pyrene.
7 Calculated value is less than reliably achievable detection limit. Reliably and accurately achievable detection limit is used.
8 Value used is for polychlorinated biphenyls (PCBs).
9 Hexavalent chromium.
- Not available.