



# Brown & Root Environmental

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March 20, 1998

Brown & Root Environmental Project Number 7237

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. 0260

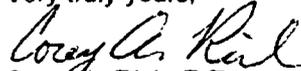
Subject: Responses to CTDEP's Comments on Calculated Remediation Standards  
Lower Subbase Remedial Investigation  
Naval Submarine Base - New London, Groton, Connecticut

Dear Mr. Lewis:

Brown & Root (B&R) Environmental and the Navy received your February 27, 1998 comment letter regarding the Remediation Standards that were calculated for use in the Lower Subbase Remedial Investigation. Responses to CTDEP's comments have been prepared and the appropriate revisions have been made to Tables 1 and 2, which were previously enclosed in B&R Environmental's December 23, 1997 letter. B&R Environmental, on the behalf of the United States Navy, Northern Division Facilities Engineering Command and Naval Submarine Base - New London, has enclosed the Navy's responses to CTDEP's comments and the revised tables for your review and approval.

If you have any questions regarding the responses or the information provided in the revised tables, please contact Mr. Mark Evans at (610) 595-0567 (ext. 162) or me at (412) 921-8244. It is anticipated that any remaining issues can be resolved during a conference call.

Very truly yours,

  
Corey A. Rich, P.E.  
Project Manager

Enclosure(s)

c: Mr. Roger Boucher, NORTHDIV (letter only)  
~~Mr. Mark Evans, NORTHDIV~~  
Mr. Andy Stackpole, NSB-NLON Environmental  
Mr. John Trepanowski, B&R Environmental  
Mr. Daryl Hutson, B&R Environmental (letter only)  
Ms. Karen Smecker, B&R Environmental  
File: CTO 0260

**RESPONSES TO CTDEP'S COMMENTS (2/27/98)  
ON THE CALCULATED CTDEP REMEDIATION STANDARDS (12/23/97)  
CTO 260 - LOWER SUBBASE REMEDIAL INVESTIGATION  
NAVAL SUBMARINE BASE-NEW LONDON, GROTON, CONNECTICUT  
MARCH 20, 1998**

**I. SURROGATE CHEMICALS USED TO SUPPLY TOXICITY VALUES**

Comment:

1. The Navy has used naphthalene as a surrogate to represent the toxicity of benzo(g,h,i)perylene. As noted in Dr. Ginsberg's memorandum, pyrene (RfD 0.03 mg/kg/d) is a more appropriate surrogate. The RfD for naphthalene has been withdrawn from IRIS. Please recalculate the direct exposure, pollutant mobility, and ground water protection criteria for benzo(g,h,i)perylene using this approach. This approach is appropriate for a screening level risk assessment. However, the uncertainties involved with this approach should be acknowledged if these two chemicals are found to be major risk drivers at the site.

Response:

The direct exposure, pollutant mobility, and groundwater protection criteria for benzo(g,h,i)perylene will be recalculated using pyrene as a surrogate. Benzo(g,h,i)perylene was detected in soil and groundwater at the Lower Subbase but was not found to be a major risk driver at any of the zones that were evaluated in the risk assessment. Benzo(g,h,i)perylene was only identified as a COC in groundwater at Zone 4 where it was detected in one sample at a concentration exceeding the State's Ambient Water Quality Criteria (AWQC) for the protection of human health. Consequently, this does not have any impact on the human health risk assessment.

Comment:

2. It is unclear why the Navy calculated criteria for phenanthrene since the regulations list direct exposure, pollutant mobility, and groundwater protection criteria for this compound. Please use the criteria listed in the Regulations for this compound. The Navy should either withdraw their request for approval of criteria for phenanthrene, or, if the Navy is requesting approval of alternative criteria for this compound under the Regulations, the Navy should so state.

Response:

The Navy retracts its request for approval of criteria for phenanthrene. The promulgated criteria for phenanthrene were used in the selection of COCs in the human health risk assessment. Consequently, this does not have any impact on the human health risk assessment.

**Comment:**

- 3. Bromodichloromethane should be used as a surrogate for bromochloromethane. Please use the criteria calculated for bromodichloromethane in place of those calculated using chloromethane as a surrogate.**

**Response:**

Bromodichloromethane will be used as a surrogate for bromochloromethane. Bromodichloromethane was not detected in soil and groundwater samples for any of the zones evaluated in the human health risk assessment, consequently this does not have any impact on the analysis.

**Comment:**

- 4. The Navy's proposal to use 3-methylphenol as a surrogate for 4-chloro-3-methylphenol is not appropriate, due to structural differences between the two compounds. The use of a qualitative risk assessment would be acceptable assuming that concentrations of this chemical do not exceed the low part-per-billion range. Please see Dr. Ginsberg's comments for additional details.**

**Response:**

No criteria will be developed for 4-chloro-3-methylphenol. Instead, as suggested, 4-chloro-3-methylphenol will be evaluated qualitatively. 4-Chloro-3-methylphenol was only detected in one soil sample at the Lower Subbase and at a low concentration (34 ppb), consequently, this does not have any impact on the human health risk assessment.

## **II. INCORRECT OR UNSUPPORTED POTENCY VALUES**

**Comment:**

- 5. Several of the CSFs or RfDs used by the Navy appeared to be incorrect, based on a comparison to the values listed in the EPA Region III Risk Based Concentrations table, IRIS, or HEAST. Please recalculate the direct exposure, pollutant mobility, and ground water protection criteria using correct values for total 1,2-dichloroethene. Please assume that this value pertains to the mixture of *cis* and *trans* isomers. The RfD for the mixture should be 9E-3 mg/kg/d.**

**Response:**

The direct exposure, pollutant mobility, and groundwater protection criteria for total 1,2-dichloroethene will be recalculated using an oral reference dose of 9E-3 mg/kg/day. This revision does not impact the human health risk assessment since all detected concentrations of total 1,2-dichloroethene are less than the recalculated criteria.

**Comment:**

6. The Department was unable to verify the potency factors listed by the Navy for several chemicals. Please either provide references to support the listed potency factors, or derive criteria using acceptable surrogates for the following compounds: chloroethane, 4,6-dinitro-2-methylphenol, 2-hexanone, and 2-methylnaphthalene. Please note that naphthalene is not an appropriate surrogate for 2-methylnaphthalene as the RfD for naphthalene has been withdrawn from IRIS. Please refer to Dr. Ginsberg's memo for additional guidance.

**Response:**

The toxicity criteria for chloroethane, 4,6-dinitro-2-methylphenol, 2-hexanone, and 2-methylnaphthalene were obtained from the current U.S. EPA Region III Risk-based Concentration (RBC) Table dated October 22, 1997. The RBC table cites EPA's National Center for Environmental Assessment (NCEA) as the source for the values for chloroethane, 4,6-dinitro-2-methylphenol, and 2-methylnaphthalene. Although not cited in the RBC table, EPA Region III stated in telephone call on March 12, 1998, that NCEA is also the source for the toxicity criteria for 2-hexanone. Therefore, there are no changes necessary to the proposed values.

**Comment:**

7. The Department was unable to verify the RfD listed by the Navy for 4-nitrophenol (8.00E-3 mg/kg/d). Please either provide a reference for the listed value, or use the default RfD currently listed in the RBC tables (6.2E-2 mg/kg/d).

**Response:**

The current RBC table lists 8.00E-3 mg/kg/day as the oral RfD for 4-nitrophenol and cites EPA's NCEA as the source for the value. The value of 6.2E-2 mg/kg/day was listed in the previous, outdated version of the RBC table. Therefore, there are no changes necessary to the proposed criteria.

**III. POLLUTANT MOBILITY CRITERIA FOR METALS**

**Comment:**

8. The ground water protection criterion for cobalt was calculated correctly by the Navy. However, the approach used by the Navy in calculating pollutant mobility criteria for cobalt is unacceptable. Rather than using the calculated ground water protection criterion (420 µg/l) to establish a pollutant mobility criterion for cobalt, the Navy used the EPA Region III Risk Based Criteria for tap water (2,200 µg/L) as the GAA/GA pollutant mobility criterion. This approach is less conservative than using the calculated ground water protection criterion. The correct pollutant mobility criteria for cobalt, based on the groundwater protection criteria calculated by the Navy, are 420 µg/L for a GAA/GA area, and 4,200 µg/L for a GB area (measurement by TCLP or SPLP).

Response:

The pollutant mobility criteria for cobalt will be changed to 420 µg/L for a GAA/GA area and 4,200 µg/L for a GB area. This revision has no impact on the human health risk assessment because of the following reasons: (1) none of the historical soil samples that were analyzed by TCLP had leachates that were analyzed for cobalt, and (2) only the soil samples from Zone 6 had SPLP leachates that were analyzed for cobalt and all of the results were nondetects.

Comment:

9. The ground water protection criterion for manganese was calculated correctly by the Navy. Rather than using the calculated ground water protection criterion (160 µg/l) to establish a pollutant mobility criterion for manganese, the Navy used the EPA Secondary MCL for drinking water (50 µg/L) as the GAA/GA pollutant mobility criterion. This approach is acceptable as it is more conservative than using the calculated ground water protection criterion.

Response:

No response required.

#### IV. GB POLLUTANT MOBILITY CRITERIA FOR DIMETHYLPHTHALATE

Comment:

10. The GB pollutant mobility criteria listed for dimethylphthalate (1,400 mg/kg) in the Navy's Table 2 appears to be a typo. The correct value should be listed as 14,000 mg/kg.

Response:

The GB pollutant mobility criteria for dimethylphthalate will be corrected to 14,000 mg/kg. This revision has no impact on the analysis since dimethylphthalate was not detected in soil samples in any of the zones that were evaluated in the human health risk assessment.

#### V. BIS(2-CHLOROETHOXY)METHANE

Comment:

11. The Navy proposes a qualitative risk assessment for this compound. This approach is acceptable provided that the compound is not present at concentrations above the low part-per-billion range. As noted by Dr. Ginsberg, if it is present above this range, a more quantitative risk assessment may be required.

Response:

Bis(2-chloroethoxy)methane was not detected in soil or groundwater samples for any of the zones evaluated in the human health risk assessment, consequently this does not have any impact on the analysis.

TABLE 1

SOURCE OF CONNECTICUT REMEDIATION STANDARDS  
CTO 260 LOWER SUBBASE RI  
NEW LONDON, GROTON, CONNECTICUT  
PAGE 1 OF 4

Chemical	CAS Number	Chemical Fraction	Basis of Value to be Used in RI Report		
			Promulgated Value <sup>(1)</sup>	Calculated Value <sup>(2)</sup>	Surrogate Calculated Value <sup>(3)</sup>
Acenaphthene	83329	SVOC		X	
Acenaphthylene	208968	SVOC	X		
Anthracene	120127	SVOC	X		
Acetone	67641	VOC	X		
Aldrin	309002	PEST		X	
Aluminum	7429905	INORG	(4)	(4)	(4)
Antimony	7440360	INORG	X		
Arsenic	7440382	INORG	X		
Barium	7440393	INORG	X		
Benzene	71432	VOC	X		
Benz(a)anthracene	56553	SVOC	X		
Benzo(b)fluoranthene	205992	SVOC	X		
Benzo(k)fluoranthene	207089	SVOC	X		
Benzo(g,h,i)perylene	191242	SVOC			X (pyrene)
Benzo(a)pyrene	50328	SVOC	X		
Beryllium	7440417	INORG	X		
BCH (alpha-)	319846	PEST		X	
BCH (beta-)	319857	PEST		X	
BCH (delta-)	319868	PEST			X (alpha-BHC)
BCH (gamma-; Lindane)	58899	PEST	X		
Bis(2-chloroethoxy)methane	111911	SVOC	(5)	(5)	(5)
Bis(2-chloroethyl)ether	111444	SVOC	X		
Bis(2-ethylhexyl)phthalate	117817	SVOC	X		
Bromochloromethane	74975	VOC			X (bromodichloro- methane)
Bromodichloromethane	75274	VOC		X	
Bromoform	75252	VOC	X		
Bromomethane	74839	VOC		X	
4-Bromophenyl-phenylether	101553	SVOC		X	
2-Butanone	78933	VOC	X		
Butylbenzylphthalate	85687	SVOC	X		
Cadmium	7440439	INORG	X		
Calcium	7440702	INORG	(6)	(6)	(6)
Carbazole	86748	SVOC		X	
Carbon disulfide	75150	VOC		X	
Carbon tetrachloride	56235	VOC	X		
Chlordane (alpha-)	57749	PEST	X <sup>(7)</sup>		
Chlordane (gamma-)	57749	PEST	X <sup>(7)</sup>		
4-Chloroaniline	106478	SVOC		X	
Chlorobenzene	108907	VOC	X		
Chlorodibromomethane	124481	VOC	X		
Chloroethane	75003	VOC		X	
Chloroform	67663	VOC	X		
Chloromethane	74873	VOC		X	
4-Chloro-3-methylphenol	59507	SVOC	(5)	(5)	(5)

TABLE 1

SOURCE OF CONNECTICUT REMEDIATION STANDARDS  
CTO 260 LOWER SUBBASE RI  
NEW LONDON, GROTON, CONNECTICUT  
PAGE 2 OF 4

Chemical	CAS Number	Chemical Fraction	Basis of Value to be Used in RI Report		
			Promulgated Value <sup>(1)</sup>	Calculated Value <sup>(2)</sup>	Surrogate Calculated Value <sup>(3)</sup>
2-Chloronaphthalene	91587	SVOC		X	
2-Chlorophenol	95578	SVOC	X		
4-Chlorophenyl-phenylether	7005723	SVOC			X (4-Bromophenyl-phenylether)
Chromium (total)		INORG	X <sup>(6)</sup>		
Chrysene	218019	SVOC		X	
Cobalt	7440484	INORG		X	
Copper	7440508	INORG	(4)	(4)	(4)
4,4'-DDD	72548	PEST		X	
4,4'-DDE	72559	PEST		X	
4,4'-DDT	50293	PEST		X	
Dibenzofuran	132649	SVOC		X	
Dibenz(a,h)anthracene	53703	SVOC		X	
1,2-Dibromo-3-chloropropane	96128	VOC		X	
1,2-Dibromoethane	106934	VOC		X	
1,2-Dichlorobenzene	95501	VOC/SVOC	X		
1,3-Dichlorobenzene	541731	VOC/SVOC	X		
1,4-Dichlorobenzene	106467	VOC/SVOC	X		
3,3'-Dichlorobenzidine	91941	SVOC		X	
1,1-Dichloroethane	75343	VOC	X		
1,2-Dichloroethane	107062	VOC	X		
1,1-Dichloroethene	75354	VOC	X		
1,2-Dichloroethene (cis-)	156592	VOC	X		
1,2-Dichloroethene (trans-)	156605	VOC	X		
1,2-Dichloroethene (total)	156605	VOC		X	
2,4-Dichlorophenol	120832	SVOC	X		
1,2-Dichloropropane	78875	VOC	X		
1,3-Dichloropropene (cis-)	542756	VOC	X		
1,3-Dichloropropene (trans-)	542756	VOC	X		
Dieldrin	60571	PEST	X		
Diethyl phthalate	84662	SVOC		X	
2,4-Dimethylphenol	105679	SVOC		X	
Dimethylphthalate	131113	SVOC		X	
Di-n-butylphthalate	84742	SVOC	X		
Di-n-octylphthalate	117840	SVOC	X		
4,6-Dinitro-2-methylphenol	534521	SVOC		X	
2,4-Dinitrophenol	51285	SVOC		X	
2,4-Dinitrotoluene	121142	SVOC		X	
2,6-Dinitrotoluene	606202	SVOC		X	
Endosulfan I	115297	PEST		X <sup>(9)</sup>	
Endosulfan II	115297	PEST		X <sup>(9)</sup>	
Endosulfan sulfate	1031078	PEST			X (endosulfan)
Endrin	72208	PEST	X		
Endrin aldehyde	7421363	PEST			X (endrin)
Endrin ketone	53494705	PEST			X (endrin)

TABLE 1

SOURCE OF CONNECTICUT REMEDIATION STANDARDS  
CTO 260 LOWER SUBBASE RI  
NEW LONDON, GROTON, CONNECTICUT  
PAGE 3 OF 4

Chemical	CAS Number	Chemical Fraction	Basis of Value to be Used in RI Report		
			Promulgated Value <sup>(1)</sup>	Calculated Value <sup>(2)</sup>	Surrogate Calculated Value <sup>(3)</sup>
Ethylbenzene	100414	VOC	X		
Fluoranthene	206440	SVOC	X		
Fluorene	86737	SVOC	X		
Heptachlor	76448	PEST	X		
Heptachlor epoxide	1024573	PEST	X		
Hexachlorobenzene	118741	SVOC	X		
Hexachlorobutadiene	87683	SVOC		X	
Hexachlorocyclopentadiene	77474	SVOC		X	
Hexachloroethane	67721	SVOC	X		
2-Hexanone	73663715	VOC		X	
Indeno(1,2,3-cd)pyrene	193395	SVOC		X	
Iron	7439896	INORG	(4)	(4)	(4)
Isophorone	78591	SVOC		X	
Lead	7439291	INORG	X		
Magnesium	7439954	INORG	(6)	(6)	(6)
Manganese	7439965	INORG		X	
Mercury	7439976	INORG	X		
Methoxychlor	72435	PEST	X		
Methylene chloride	75092	VOC	X		
2-Methylnaphthalene	91576	SVOC		X	
4-Methyl-2-pentanone	108101	VOC	X		
2-Methylphenol	95487	SVOC		X	
4-Methylphenol	106445	SVOC		X	
Naphthalene	91203	SVOC	X		
Nickel	7440020	INORG	X		
2-Nitroaniline	88744	SVOC		X	
3-Nitroaniline	99092	SVOC		X	
4-Nitroaniline	100016	SVOC		X	
Nitrobenzene	98953	SVOC		X	
2-Nitrophenol	88755	SVOC			X (4-nitrophenol)
4-Nitrophenol	100027	SVOC		X	
N-Nitrosodiphenylamine	86306	SVOC		X	
N-Nitrosodi-n-propylamine	621647	SVOC		X	
2,2'-Oxybis(1-chloropropane)	108601	SVOC	(5)	(5)	(5)
Pentachlorophenol	87865	SVOC	X		
Phenanthrene	85018	SVOC	X		
Phenol	108952	SVOC	X		
Potassium	7440097	INORG	(6)	(6)	(6)
Pyrene	129000	SVOC	X		
Selenium	7782492	INORG	X		
Silver	7440224	INORG	X		
Sodium	7440235	INORG	(6)	(6)	(6)
Styrene	100425	VOC	X		
1,1,2,2-Tetrachloroethane	79345	VOC	X		
Tetrachloroethylene	127184	VOC	X		
Thallium	6533739	INORG	X		
Toluene	108883	VOC	X		
Toxaphene	8001352	PEST	X		

TABLE 1

**SOURCE OF CONNECTICUT REMEDIATION STANDARDS  
CTO 260 LOWER SUBBASE RI  
NEW LONDON, GROTON, CONNECTICUT  
PAGE 4 OF 4**

Chemical	CAS Number	Chemical Fraction	Basis of Value to be Used in RI Report		
			Promulgated Value <sup>(1)</sup>	Calculated Value <sup>(2)</sup>	Surrogate Calculated Value <sup>(3)</sup>
1,2,4-Trichlorobenzene	120821	SVOC		X	
1,1,1-Trichloroethane	71556	VOC	X		
1,1,2-Trichloroethane	79005	VOC	X		
Trichloroethylene	79016	VOC	X		
2,4,5-Trichlorophenol	95954	SVOC		X	
2,4,6-Trichlorophenol	88062	SVOC		X	
Vanadium	7440622	INORG	X		
Vinyl chloride	75014	VOC	X		
Xylene (total)	1330207	VOC	X		
Zinc	7440666	INORG	X		

INORG Inorganic  
 PEST Pesticide  
 SVOC Semivolatile organic compound  
 VOC Volatile organic compound

- 1 State of Connecticut Remediation Standard Regulations, Section 22a-133k (January 1996).
- 2 Published toxicity criteria is available. Toxicity criteria from the current USEPA Region III Risk-Based Concentration Table (October 22, 1997) will be used to calculate a value using the methodology presented in the State guidance (January 1996).
- 3 No toxicity criteria is available. Toxicity criteria for a similarly structured chemical (noted in parentheses) will be used to calculate a value.
- 4 Region I does not advocate a quantitative evaluation of this chemical. Exposure to this chemical will be addressed in a qualitative fashion.
- 5 No promulgated value or published toxicity criteria are available. A similarly structured chemical with published toxicity criteria could not be identified. Exposure to this chemical will be addressed in a qualitative fashion.
- 6 Chemical is an essential nutrient.
- 7 Value for chlordane is used.
- 8 Value for hexavalent chromium is used for conservative purposes.
- 9 Value for endosulfan is used.

TABLE 2

CALCULATED AND SURROGATE CALCULATED VALUES  
CTO 260 LOWER SUBBASE RI  
NEW LONDON, GROTON, CONNECTICUT  
PAGE 1 OF 3

Chemical	Published Toxicological Criteria <sup>(1)</sup>		Calculated Remediation Standards <sup>(2)</sup>				
	RfD <sub>oral</sub> (mg/kg/day)	CSF <sub>oral</sub> (kg/day/mg)	Soil (mg/kg)				Groundwater (ug/L)
			RES DE <sup>(3)</sup>	I/C DE <sup>(3)</sup>	GA/GAA PM	GB PM	GA/GAA GP
Acenaphthene	6.00E-02	NA	1000 <sup>(4)</sup>	2500 <sup>(4)</sup>	8.4	84	420
Aldrin	3.00E-05	1.70E+01	0.036	0.34	0.000041	0.00041	0.0021
Benzo(g,h,i)perylene	NA	NA	1000 <sup>(5)</sup>	2500 <sup>(5)</sup>	4 <sup>(5)</sup>	40 <sup>(5)</sup>	200 <sup>(5)</sup>
BCH (alpha-)	NA	6.30E+00	0.097	0.91	0.00011	0.0011	0.0056
BCH (beta-)	NA	1.80E+00	0.34	3.2	0.00039	0.0039	0.0194
BCH (delta-)	NA	NA	0.097 <sup>(6)</sup>	0.91 <sup>(6)</sup>	0.00011 <sup>(6)</sup>	0.0011 <sup>(6)</sup>	0.0056 <sup>(6)</sup>
Bromochloromethane	NA	NA	9.9 <sup>(7)</sup>	92 <sup>(7)</sup>	0.011 <sup>(7)</sup>	0.11 <sup>(7)</sup>	0.56 <sup>(7)</sup>
Bromodichloromethane	2.00E-02	6.20E-02	9.9	92	0.011	0.11	0.56
Bromomethane	1.40E-03	NA	95	1000 <sup>(4)</sup>	0.2	2	9.8
4-Bromophenyl-phenylether	5.80E-02	NA	500 <sup>(4)</sup>	1000 <sup>(4)</sup>	8.2	82	410
Carbazole	NA	2.00E-02	31	290	0.036	0.36	1.8
Carbon disulfide	1.00E-01	NA	500 <sup>(4)</sup>	1000 <sup>(4)</sup>	14	140	700
4-Chloroaniline	4.00E-03	NA	270	2500 <sup>(4)</sup>	0.56	5.6	28
Chloroethane	4.00E-01	2.90E-03	210	1000 <sup>(4)</sup>	0.24	2.4	12
Chloromethane	NA	1.30E-02	47	440	0.054	0.54	2.7
4-Chloro-3-methylphenol	NA	NA	NA <sup>(8)</sup>	NA <sup>(8)</sup>	NA <sup>(8)</sup>	NA <sup>(8)</sup>	NA <sup>(8)</sup>
2-Chloronaphthalene	8.00E-02	NA	1000 <sup>(4)</sup>	2500 <sup>(4)</sup>	11	110	560
4-Chlorophenyl-phenylether	NA	NA	500 <sup>(9)</sup>	1000 <sup>(9)</sup>	8.2 <sup>(9)</sup>	82 <sup>(9)</sup>	410 <sup>(9)</sup>
Chrysene	NA	7.30E-03	84	780	0.096	0.96	4.8
Cobalt	6.00E-02	NA	1000 <sup>(4)</sup>	2500 <sup>(4)</sup>	420 <sup>(10)</sup>	4200 <sup>(10)</sup>	420
4,4'-DDD	NA	2.40E-01	2.6	24	0.0029	0.029	0.15
4,4'-DDE	NA	3.40E-01	1.8	17	0.0021	0.021	0.1
4,4'-DDT	5.00E-04	3.40E-01	1.8	17	0.0021	0.021	0.1
Dibenzofuran	4.00E-03	NA	270	2500 <sup>(4)</sup>	0.56	5.6	28
Dibenz(a,h)anthracene	NA	7.30E+00	0.084	0.78	0.000096	0.00096	0.0048
1,2-Dibromo-3-chloropropane	NA	1.40E+00	0.44	4.1	0.0005	0.005	0.025
1,2-Dibromoethane	NA	8.50E+01	0.0072	0.067	0.0000082	0.000082	0.00041
3,3'-Dichlorobenzidine	NA	4.50E-01	1.4	13	0.0016	0.016	0.078
1,2-Dichloroethene (total)	9.00E-03	NA	500 <sup>(4)</sup>	1000 <sup>(4)</sup>	1.2	12	63
Diethyl phthalate	8.00E-01	NA	1000 <sup>(4)</sup>	2500 <sup>(4)</sup>	110	1100	5600
2,4-Dimethylphenol	2.00E-02	NA	1000 <sup>(4)</sup>	2500 <sup>(4)</sup>	2.8	28	140
Dimethylphthalate	1.00E+01	NA	1000 <sup>(4)</sup>	2500 <sup>(4)</sup>	1400	14000	70000

TABLE 2

CALCULATED AND SURROGATE CALCULATED VALUES  
CTO 260 LOWER SUBBASE RI  
NEW LONDON, GROTON, CONNECTICUT  
PAGE 2 OF 3

Chemical	Published Toxicological Criteria <sup>(1)</sup>		Calculated Remediation Standards <sup>(2)</sup>				
	RfD <sub>oral</sub> (mg/kg/day)	CSF <sub>oral</sub> (kg/day/mg)	Soil (mg/kg)				Groundwater (ug/L)
			RES DE <sup>(3)</sup>	I/C DE <sup>(3)</sup>	GA/GAA PM	GB PM	GA/GAA GP
4,6-Dinitro-2-methylphenol	1.00E-04	NA	6.8	200	0.014	0.14	0.7
2,4-Dinitrophenol	2.00E-03	NA	140	2500 <sup>(4)</sup>	0.28	2.8	14
2,4-Dinitrotoluene	2.00E-03	NA	140	2500 <sup>(4)</sup>	0.28	2.8	14
2,6-Dinitrotoluene	1.00E-03	NA	68	2000	0.14	1.4	7
Endosulfan I	6.00E-03	NA	410	1200	0.84	8.4	42
Endosulfan II	6.00E-03	NA	410	1200	0.84	8.4	42
Endosulfan sulfate	NA	NA	410 <sup>(12)</sup>	1200 <sup>(12)</sup>	0.84 <sup>(12)</sup>	8.4 <sup>(12)</sup>	42 <sup>(12)</sup>
Endrin aldehyde	NA	NA	20 <sup>(13)</sup>	610 <sup>(13)</sup>	NE <sup>(13)</sup>	NE <sup>(13)</sup>	NE <sup>(13)</sup>
Endrin ketone	NA	NA	20 <sup>(13)</sup>	610 <sup>(13)</sup>	NE <sup>(13)</sup>	NE <sup>(13)</sup>	NE <sup>(13)</sup>
Hexachlorobutadiene	2.00E-04	7.80E-02	7.9	73	0.009	0.09	0.45
Hexachlorocyclopentadiene	7.00E-03	NA	470	2500 <sup>(4)</sup>	0.98	9.8	49
2-Hexanone	4.00E-02	NA	500 <sup>(4)</sup>	1000 <sup>(4)</sup>	5.6	56	280
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	0.84	7.8	0.00096	0.0096	0.045
Isophorone	2.00E-01	9.50E-04	640	2500 <sup>(4)</sup>	0.74	7.4	37
Manganese	2.30E-02	NA	1600	47000	50 <sup>(10)(14)</sup>	500 <sup>(10)(14)</sup>	160
2-Methylnaphthalene	4.00E-02	NA	1000 <sup>(4)</sup>	2500 <sup>(4)</sup>	5.6	56	280
2-Methylphenol	5.00E-02	NA	1000 <sup>(4)</sup>	2500 <sup>(4)</sup>	7	70	350
4-Methylphenol	5.00E-03	NA	340	2500 <sup>(4)</sup>	0.7	7	35
2-Nitroaniline	6.00E-05	NA	4.1	1200	0.0084	0.084	0.42
3-Nitroaniline	3.00E-03	NA	200	2500 <sup>(4)</sup>	0.42	4.2	21
4-Nitroaniline	3.00E-03	NA	200	2500 <sup>(4)</sup>	0.42	4.2	21
Nitrobenzene	5.00E-04	NA	34	1000	0.07	0.7	3.5
2-Nitrophenol	NA	NA	540 <sup>(15)</sup>	2500 <sup>(15)</sup>	1.1 <sup>(15)</sup>	11 <sup>(15)</sup>	56 <sup>(15)</sup>
4-Nitrophenol	8.00E-03	NA	540	2500 <sup>(4)</sup>	1.1	11	56
N-Nitrosodiphenylamine	NA	4.90E-03	130	1200	0.14	1.4	7.1
N-Nitrosodi-n-propylamine	NA	7.00E+00	0.088	0.82	0.0001	0.001	0.005
1,2,4-Trichlorobenzene	1.00E-02	NA	680	2500 <sup>(4)</sup>	1.4	14	70
2,4,5-Trichlorophenol	1.00E-01	NA	1000 <sup>(4)</sup>	2500 <sup>(4)</sup>	14	140	700
2,4,6-Trichlorophenol	NA	1.10E-02	56	520	0.064	0.64	3.2

RfD            Reference dose  
CSF            Cancer slope factor

TABLE 2

CALCULATED AND SURROGATE CALCULATED VALUES  
 CTO 260 LOWER SUBBASE RI  
 NEW LONDON, GROTON, CONNECTICUT  
 PAGE 3 OF 3

RES DE	Direct exposure criteria for residential land use
I/C DE	Direct exposure criteria for industrial/commercial land use.
GA/GAA PM	Pollutant mobility criteria for a GA/GAA classified area
GB PM	Pollutant mobility criteria for a GB classified area
GA/GAA GP	Groundwater protection criteria for a GA/GAA classified area
NA	Not available
NE	None established by Connecticut DEP (January 1996)

- 1 Values obtained from current USEPA Region III Risk-Based Concentration Table (October 22, 1997)
- 2 Calculated using methodologies presented in State guidance (January 1996).
- 3 Calculated value for direct exposure for volatile and semivolatile organics is replaced with the appropriate ceiling limit if the calculated value exceeds the ceiling limit. Ceiling limit for volatiles is 500 mg/kg for residential exposure and 1000 mg/kg for industrial/commercial exposure. Ceiling limit for semivolatiles is 1000 mg/kg for residential exposure and 2500 mg/kg for industrial/commercial exposure.
- 4 Ceiling limit. Calculated value exceeds the ceiling limit.
- 5 Value for pyrene is used.
- 6 Value for alpha-BHC is used.
- 7 Value for bromodichloromethane is used.
- 8 Chemical will be addressed qualitatively at CTEP's request
- 9 Value for 4-bromophenyl-phenylether is used.
- 10 Value is for aqueous units (ug/L) and is based on SPLP or TCLP analytical results.
- 11 Value is based on the Region III RBC for tap water (2200 ug/L).
- 12 Value for endosulfan is used.
- 13 Value for endrin is used.
- 14 Value is based on the secondary Federal MCL for drinking water (50 ug/L).
- 15 Value for 4-nitrophenol is used.