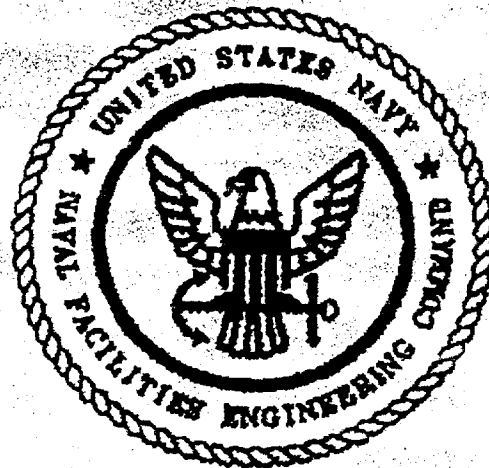


Final

**Remedial Investigation Report  
Operable Unit No. 11 (Site 7)**

**Marine Corps Base,  
Camp Lejeune, North Carolina**

**Appendices  
Volume II of II**



Prepared For:

**Department of the Navy  
Atlantic Division  
Naval Facilities  
Engineering Command  
Norfolk, Virginia**

Under the

**LANTDIV CLEAN Program**

**Comprehensive Long-Term  
Environmental Action Navy**

**Reference:  
Contract  
N62470-89-D-4814**

**CTO-0274**

**February 1996**

**APPENDIX J**  
**FIELD DUPLICATE SUMMARIES**

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**APPENDIX J.1**  
**SOIL ORGANICS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-CC-SB02-00	7-CC-SB02-00D	7-EA-SB02-00	7-EA-SB02-00D	7-EA-SB02-02	7-EA-SB02-02D
Laboratory Sample ID:	AC5468	AC5470	AC5472	AC5474	AC5478	AC5480
Date Sampled:	10/24/94	10/24/94	10/25/94	10/25/94	10/25/94	10/25/94

	<u>UNITS</u>					
<u>VOLATILES</u>						
Chloromethane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Bromomethane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Vinyl chloride	UG/KG	12 U	12 U	11 U	12 UJ	11 UJ
Chloroethane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Methylene chloride	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Acetone	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Carbon Disulfide	UG/KG	12 U	12 U	11 U	12 UJ	11 U
1,1-Dichloroethene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
1,1-Dichloroethane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
1,2-Dichloroethene(total)	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Chloroform	UG/KG	12 UJ	12 UJ	11 UJ	12 UJ	11 U
1,2-Dichloroethane	UG/KG	12 UJ	12 UJ	11 UJ	12 UJ	11 U
2-Butanone	UG/KG	12 U	12 U	11 U	12 UJ	11 U
1,1,1-Trichloroethane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Carbon tetrachloride	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Bromodichloromethane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
1,2-Dichloropropane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
cis-1,3-Dichloropropene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Trichloroethene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Dibromochloromethane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
1,1,2-Trichloroethane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Benzene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
trans-1,3-Dichloropropene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Bromoform	UG/KG	12 U	12 U	11 U	12 UJ	11 U
4-Methyl-2-pentanone	UG/KG	12 U	12 U	11 U	12 UJ	11 U
2-Hexanone	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Tetrachloroethene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
1,1,2,2-Tetrachloroethane	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Toluene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Chlorobenzene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Ethylbenzene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Styrene	UG/KG	12 U	12 U	11 U	12 UJ	11 U
Xylenes (total)	UG/KG	12 U	12 U	11 U	12 UJ	11 U



FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-CC-SB02-00	7-CC-SB02-00D	7-EA-SB02-00	7-EA-SB02-00D	7-EA-SB02-02	7-EA-SB02-02D
Laboratory Sample ID:	AC5468	AC5470	AC5472	AC5474	AC5478	AC5480
Date Sampled:	10/24/94	10/24/94	10/25/94	10/25/94	10/25/94	10/25/94

	UNITS					
SEMIVOLATILES						
Phenol	UG/KG	380 U	390 U	360 U	400 U	360 U
bis(2-Chloroethyl) ether	UG/KG	380 U	390 U	360 U	400 U	360 U
2-Chlorophenol	UG/KG	380 U	390 U	360 U	400 U	360 U
1,3-Dichlorobenzene	UG/KG	380 U	390 U	360 U	400 U	360 U
1,4-Dichlorobenzene	UG/KG	380 U	390 U	360 U	400 U	360 U
1,2-Dichlorobenzene	UG/KG	380 U	390 U	360 U	400 U	360 U
2-Methylphenol	UG/KG	380 U	390 U	360 U	400 U	360 U
2,2'-oxybis-(1-chloropropane)	UG/KG	380 U	390 U	360 U	400 U	360 U
4-Methylphenol	UG/KG	380 U	390 U	360 U	400 U	360 U
N-Nitroso-di-n-propylamine	UG/KG	380 U	390 U	360 U	400 U	360 U
Hexachloroethane	UG/KG	380 U	390 U	360 U	400 U	360 U
Nitrobenzene	UG/KG	380 U	390 U	360 U	400 U	360 U
Isophorone	UG/KG	380 U	390 U	360 U	400 U	360 U
2-Nitrophenol	UG/KG	380 U	390 U	360 U	400 U	360 U
2,4-Dimethylphenol	UG/KG	380 U	390 U	360 U	400 U	360 U
bis(2-Chloroethoxy) methane	UG/KG	380 U	390 U	360 U	400 U	360 U
2,4-Dichlorophenol	UG/KG	380 U	390 U	360 U	400 U	360 U
1,2,4-Trichlorobenzene	UG/KG	380 U	390 U	360 U	400 U	360 U
Naphthalene	UG/KG	380 U	390 U	360 U	400 U	360 U
4-Chloroaniline	UG/KG	380 U	390 U	360 U	400 U	360 U
Hexachlorobutadiene	UG/KG	380 U	390 U	360 U	400 U	360 U
4-Chloro-3-methylphenol	UG/KG	380 U	390 U	360 U	400 U	360 U
2-Methylnaphthalene	UG/KG	380 U	390 U	360 U	400 U	360 U
Hexachlorocyclopentadiene	UG/KG	380 U	390 U	360 U	400 U	360 U
2,4,6-Trichlorophenol	UG/KG	380 U	390 U	360 U	400 U	360 U
2,4,5-Trichlorophenol	UG/KG	920 U	940 U	880 U	980 U	860 U
2-Chloronaphthalene	UG/KG	380 U	390 U	360 U	400 U	360 U
2-Nitroaniline	UG/KG	920 U	940 U	880 U	980 U	860 U
Dimethyl phthalate	UG/KG	380 U	390 U	360 U	400 U	360 U
Acenaphthylene	UG/KG	380 U	390 U	360 U	400 U	360 U
2,6-Dinitrotoluene	UG/KG	380 U	390 U	360 U	400 U	360 U
3-Nitroaniline	UG/KG	920 U	940 U	880 U	980 U	860 U
Acenaphthene	UG/KG	380 U	390 U	360 U	400 U	360 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-CC-SB02-00	7-CC-SB02-00D	7-EA-SB02-00	7-EA-SB02-00D	7-EA-SB02-02	7-EA-SB02-02D
Laboratory Sample ID:	AC5468	AC5470	AC5472	AC5474	AC5478	AC5480
Date Sampled:	10/24/94	10/24/94	10/25/94	10/25/94	10/25/94	10/25/94

	UNITS						
<u>SEMIVOLATILES Cont.</u>							
2,4-Dinitrophenol	UG/KG	920 UJ	940 UJ	880 UJ	980 UJ	860 UJ	880 UJ
4-Nitrophenol	UG/KG	920 U	940 U	880 U	980 U	860 U	880 U
Dibenzofuran	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
2,4-Dinitrotoluene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Diethylphthalate	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
4-Chlorophenyl phenyl ether	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Fluorene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
4-Nitroaniline	UG/KG	920 U	940 U	880 U	980 U	860 U	880 U
4,6-Dinitro-2-methylphenol	UG/KG	920 U	940 U	880 U	980 U	860 U	880 U
N-nitrosodiphenylamine	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
4-Bromophenyl-phenylether	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Hexachlorobenzene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Pentachlorophenol	UG/KG	920 U	940 U	880 U	980 U	860 U	880 U
Phenanthrene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Anthracene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Carbazole	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
di-n-Butylphthalate	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Fluoranthene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Pyrene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Butyl benzyl phthalate	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
3,3'-Dichlorobenzidine	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Benzo[a]anthracene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Chrysene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
bis(2-Ethylhexyl)phthalate	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
di-n-Octylphthalate	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Benzo[b]fluoranthene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Benzo[k]fluoranthene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Benzo[a]pyrene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Indeno[1,2,3-cd]pyrene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Dibenz[a,h]anthracene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U
Benzo[g,h,i]perylene	UG/KG	380 U	390 U	360 U	400 U	360 U	360 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-CC-SB02-00	7-CC-SB02-00D	7-EA-SB02-00	7-EA-SB02-00D	7-EA-SB02-02	7-EA-SB02-02D
Laboratory Sample ID:	AC5468	AC5470	AC5472	AC5474	AC5478	AC5480
Date Sampled:	10/24/94	10/24/94	10/25/94	10/25/94	10/25/94	10/25/94

	UNITS						
<u>PESTICIDES/PCBs</u>							
alpha-BHC	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
beta-BHC	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
delta-BHC	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
Lindane (gamma-BHC)	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
Heptachlor	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
Aldrin	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
Heptachlor epoxide	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
Endosulfan I	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
Dieldrin	UG/KG	16 J	32 J	3.6 U	4 U	3.5 U	3.7 U
4,4'-DDE	UG/KG	3.7 U	3.8 U	11	10	3.5 U	3.7 U
Endrin	UG/KG	3.7 U	3.8 U	3.6 U	4 U	3.5 U	3.7 U
Endosulfan II	UG/KG	3.7 U	3.8 U	3.6 U	4 U	3.5 U	3.7 U
4,4'-DDD	UG/KG	3.7 U	3.8 U	3.6 U	4 U	3.5 U	3.7 U
Endosulfan sulfate	UG/KG	3.7 U	3.8 U	3.6 U	4 U	3.5 U	3.7 U
4,4'-DDT	UG/KG	3.7 U	3.8 U	9.7 U	7.5 U	3.5 U	3.7 U
Methoxychlor	UG/KG	19 U	20 U	19 U	21 U	18 UJ	19 UJ
Endrin ketone	UG/KG	3.7 U	3.8 U	3.6 U	4 U	3.5 U	3.7 U
Endrin aldehyde	UG/KG	3.7 U	3.8 U	3.6 U	4 U	3.5 U	3.7 U
alpha-Chlordane	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
gamma-Chlordane	UG/KG	1.9 U	2 U	1.9 U	2.1 U	1.8 U	1.9 U
Toxaphene	UG/KG	190 U	200 U	190 U	210 U	180 U	190 U
Aroclor 1016	UG/KG	37 U	38 U	36 U	40 U	35 U	37 U
Aroclor 1221	UG/KG	75 U	78 U	74 U	82 U	71 U	75 U
Aroclor 1232	UG/KG	37 U	38 U	36 U	40 U	35 U	37 U
Aroclor 1242	UG/KG	37 U	38 U	36 U	40 U	35 U	37 U
Aroclor 1248	UG/KG	37 U	38 U	36 U	40 U	35 U	37 U
Aroclor 1254	UG/KG	37 U	38 U	36 U	40 U	35 U	37 U
Aroclor 1260	UG/KG	37 U	38 U	36 U	40 U	35 U	37 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NA-SB08-09	7-NA-SB08-09D	7-SWA-SB01-04	7-SWA-SB01-04D
Laboratory Sample ID:	AC5355	AC5357	AC4836	AC4838
Date Sampled:	10/23/94	10/23/94	10/21/94	10/21/94

	<u>UNITS</u>				
<u>VOLATILES</u>					
Chloromethane	UG/KG	11 U	11 U	11 U	11 U
Bromomethane	UG/KG	11 U	11 U	11 U	11 U
Vinyl chloride	UG/KG	11 U	11 U	11 U	11 U
Chloroethane	UG/KG	11 U	11 U	11 U	11 U
Methylene chloride	UG/KG	11 U	11 U	11 U	11 U
Acetone	UG/KG	26	46	11 U	11 U
Carbon Disulfide	UG/KG	11 U	11 U	11 U	11 U
1,1-Dichloroethene	UG/KG	11 U	11 U	11 U	11 U
1,1-Dichloroethane	UG/KG	11 U	11 U	11 U	11 U
1,2-Dichloroethene(total)	UG/KG	11 U	11 U	11 U	11 U
Chloroform	UG/KG	11 U	11 U	11 U	11 U
1,2-Dichloroethane	UG/KG	11 U	11 U	11 U	11 U
2-Butanone	UG/KG	11 U	11 U	11 U	11 U
1,1,1-Trichloroethane	UG/KG	11 U	11 U	11 U	11 U
Carbon tetrachloride	UG/KG	11 U	11 U	11 U	11 U
Bromodichloromethane	UG/KG	11 U	11 U	11 U	11 U
1,2-Dichloropropane	UG/KG	11 U	11 U	11 U	11 U
cis-1,3-Dichloropropene	UG/KG	11 U	11 U	11 U	11 U
Trichloroethene	UG/KG	11 U	11 U	11 U	11 U
Dibromochloromethane	UG/KG	11 U	11 U	11 U	11 U
1,1,2-Trichloroethane	UG/KG	11 U	11 U	11 U	11 U
Benzene	UG/KG	11 U	11 U	11 U	11 U
trans-1,3-Dichloropropene	UG/KG	11 U	11 U	11 U	11 U
Bromoform	UG/KG	11 U	11 U	11 U	11 U
4-Methyl-2-pentanone	UG/KG	11 U	11 U	11 U	11 U
2-Hexanone	UG/KG	11 U	11 U	11 U	11 U
Tetrachloroethene	UG/KG	11 U	11 U	11 U	11 U
1,1,2,2-Tetrachloroethane	UG/KG	11 U	11 U	11 U	11 U
Toluene	UG/KG	11 U	11 U	11 U	11 U
Chlorobenzene	UG/KG	11 U	11 U	11 U	11 U
Ethylbenzene	UG/KG	11 U	11 U	11 U	11 U
Styrene	UG/KG	11 U	11 U	11 U	11 U
Xylenes (total)	UG/KG	11 U	11 U	11 U	11 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NA-SB08-09	7-NA-SB08-09D	7-SWA-SB01-04	7-SWA-SB01-04D
Laboratory Sample ID:	AC5355	AC5357	AC4836	AC4838
Date Sampled:	10/23/94	10/23/94	10/21/94	10/21/94

	<u>UNITS</u>				
<u>SEMIVOLATILES</u>					
Phenol	UG/KG	350 U	340 U	350 U	350 U
bis(2-Chloroethyl) ether	UG/KG	350 U	340 U	350 U	350 U
2-Chlorophenol	UG/KG	350 U	340 U	350 U	350 U
1,3-Dichlorobenzene	UG/KG	350 U	340 U	350 U	350 U
1,4-Dichlorobenzene	UG/KG	350 U	340 U	350 U	350 U
1,2-Dichlorobenzene	UG/KG	350 U	340 U	350 U	350 U
2-Methylphenol	UG/KG	350 U	340 U	350 U	350 U
2,2'-oxybis-(1-chloropropane)	UG/KG	350 U	340 U	350 U	350 U
4-Methylphenol	UG/KG	350 U	340 U	350 U	350 U
N-Nitroso-di-n-propylamine	UG/KG	350 U	340 U	350 U	350 U
Hexachloroethane	UG/KG	350 U	340 U	350 U	350 U
Nitrobenzene	UG/KG	350 U	340 U	350 U	350 U
Isophorone	UG/KG	350 U	340 U	350 U	350 U
2-Nitrophenol	UG/KG	350 U	340 U	350 U	350 U
2,4-Dimethylphenol	UG/KG	350 U	340 U	350 U	350 U
bis(2-Chloroethoxy) methane	UG/KG	350 U	340 U	350 U	350 U
2,4-Dichlorophenol	UG/KG	350 U	340 U	350 U	350 U
1,2,4-Trichlorobenzene	UG/KG	350 U	340 U	350 U	350 U
Naphthalene	UG/KG	350 U	340 U	350 U	350 U
4-Chloroaniline	UG/KG	350 U	340 U	350 U	350 U
Hexachlorobutadiene	UG/KG	350 U	340 U	350 U	350 U
4-Chloro-3-methylphenol	UG/KG	350 U	340 U	350 U	350 U
2-Methylnaphthalene	UG/KG	350 U	340 U	350 U	350 U
Hexachlorocyclopentadiene	UG/KG	350 U	340 U	350 U	350 U
2,4,6-Trichlorophenol	UG/KG	350 U	340 U	350 U	350 U
2,4,5-Trichlorophenol	UG/KG	840 U	830 U	840 U	840 U
2-Chloronaphthalene	UG/KG	350 U	340 U	350 U	350 U
2-Nitroaniline	UG/KG	840 U	830 U	840 U	840 U
Dimethyl phthalate	UG/KG	350 U	340 U	350 U	350 U
Acenaphthylene	UG/KG	350 U	340 U	350 U	350 U
2,6-Dinitrotoluene	UG/KG	350 U	340 U	350 U	350 U
3-Nitroaniline	UG/KG	840 U	830 U	840 U	840 U
Acenaphthene	UG/KG	350 U	340 U	350 U	350 U

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Laboratory Sample ID:	AC5355	AC5357	AC4836	AC4838
Date Sampled:	10/23/94	10/23/94	10/21/94	10/21/94

	UNITS				
<u>SEMIVOLATILES Cont.</u>					
2,4-Dinitrophenol	UG/KG	840 UJ	830 UJ	840 UJ	840 UJ
4-Nitrophenol	UG/KG	840 U	830 U	840 U	840 U
Dibenzofuran	UG/KG	350 U	340 U	350 U	350 U
2,4-Dinitrotoluene	UG/KG	350 U	340 U	350 U	350 U
Diethylphthalate	UG/KG	350 U	340 U	350 U	350 U
4-Chlorophenyl phenyl ether	UG/KG	350 U	340 U	350 U	350 U
Fluorene	UG/KG	350 U	340 U	350 U	350 U
4-Nitroaniline	UG/KG	840 U	830 U	840 U	840 U
4,6-Dinitro-2-methylphenol	UG/KG	840 U	830 U	840 U	840 U
N-nitrosodiphenylamine	UG/KG	350 U	340 U	350 U	350 U
4-Bromophenyl-phenylether	UG/KG	350 U	340 U	350 U	350 U
Hexachlorobenzene	UG/KG	350 U	340 U	350 U	350 U
Pentachlorophenol	UG/KG	840 U	830 U	840 U	840 U
Phenanthrene	UG/KG	350 U	340 U	350 U	350 U
Anthracene	UG/KG	350 U	340 U	350 U	350 U
Carbazole	UG/KG	350 U	340 U	350 U	350 U
di-n-Butylphthalate	UG/KG	350 U	340 U	350 U	350 U
Fluoranthene	UG/KG	350 U	340 U	350 U	350 U
Pyrene	UG/KG	350 U	340 U	350 U	350 U
Butyl benzyl phthalate	UG/KG	350 U	340 U	350 U	350 U
3,3'-Dichlorobenzidine	UG/KG	350 U	340 U	350 U	350 U
Benzo[a]anthracene	UG/KG	350 U	340 U	350 U	350 U
Chrysene	UG/KG	350 U	340 U	350 U	350 U
bis(2-Ethylhexyl)phthalate	UG/KG	350 U	340 U	350 U	350 U
di-n-Octylphthalate	UG/KG	350 U	340 U	350 U	350 U
Benzo[b]fluoranthene	UG/KG	350 U	340 U	350 U	350 U
Benzo[k]fluoranthene	UG/KG	350 U	340 U	350 U	350 U
Benzo[a]pyrene	UG/KG	350 U	340 U	350 U	350 U
Indeno[1,2,3-cd]pyrene	UG/KG	350 U	340 U	350 U	350 U
Dibenz[a,h]anthracene	UG/KG	350 U	340 U	350 U	350 U
Benzo[g,h,i]perylene	UG/KG	350 U	340 U	350 U	350 U



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 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NA-SB08-09	7-NA-SB08-09D	7-SWA-SB01-04	7-SWA-SB01-04D
Laboratory Sample ID:	AC5355	AC5357	AC4836	AC4838
Date Sampled:	10/23/94	10/23/94	10/21/94	10/21/94

	<u>UNITS</u>				
<u>PESTICIDES/PCBs</u>					
alpha-BHC	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
beta-BHC	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
delta-BHC	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
Lindane (gamma-BHC)	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
Heptachlor	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
Aldrin	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
Heptachlor epoxide	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
Endosulfan I	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
Dieldrin	UG/KG	3.5 U	3.4 U	3.5 U	3.4 U
4,4'-DDE	UG/KG	3.5 U	3.4 U	3.5 U	3.4 U
Endrin	UG/KG	3.5 U	3.4 U	3.5 U	3.4 U
Endosulfan II	UG/KG	3.5 U	3.4 U	3.5 U	3.4 U
4,4'-DDD	UG/KG	3.5 U	3.4 U	3.5 U	3.4 U
Endosulfan sulfate	UG/KG	3.5 U	3.4 U	3.5 U	3.4 U
4,4'-DDT	UG/KG	3.5 U	3.4 U	3.5 U	3.4 U
Methoxychlor	UG/KG	18 U	18 U	18 U	18 U
Endrin ketone	UG/KG	3.5 U	3.4 U	3.5 U	3.4 U
Endrin aldehyde	UG/KG	3.5 U	3.4 U	3.5 U	3.4 U
alpha-Chlordane	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
gamma-Chlordane	UG/KG	1.8 U	1.8 U	1.8 U	1.8 U
Toxaphene	UG/KG	180 U	180 U	180 U	180 U
Aroclor 1016	UG/KG	35 U	34 U	35 U	34 U
Aroclor 1221	UG/KG	71 U	69 U	70 U	69 U
Aroclor 1232	UG/KG	35 U	34 U	35 U	34 U
Aroclor 1242	UG/KG	35 U	34 U	35 U	34 U
Aroclor 1248	UG/KG	35 U	34 U	35 U	34 U
Aroclor 1254	UG/KG	35 U	34 U	35 U	34 U
Aroclor 1260	UG/KG	35 U	34 U	35 U	34 U

**APPENDIX J.2**  
**SOIL METALS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-CC-SB02-00	7-CC-SB02-00D	7-EA-SB02-00	7-EA-SB02-00D	7-EA-SB02-02	7-EA-SB02-02D
Laboratory Sample ID:	AC5468	AC5470	AC5472	AC5474	AC5478	AC5480
Date Sampled:	10/24/94	10/24/94	10/25/94	10/25/94	10/25/94	10/25/94

	<u>UNITS</u>						
Aluminum	MG/KG	12900 J	8290 J	3740	3740	2740	2580
Antimony	MG/KG	11.6 UJ	11.7 UJ	10.7 UJ	12 UJ	10.3 UJ	10.9 UJ
Arsenic	MG/KG	5.1 J	2.4 J	2.1 U	2.4 U	2.1 U	2.2 U
Barium	MG/KG	18.8	15.7	12.1	10.7	8.5	7.1
Beryllium	MG/KG	0.23 U	0.23 U	0.21 U	0.24 U	0.21 U	0.22 U
Cadmium	MG/KG	1.2 U	1.2 U	1.1 U	1.2 U	1 U	1.1 U
Calcium	MG/KG	3200 J	6080 J	329	316	93.4	90.3
Chromium	MG/KG	23.1 J	13 J	3.7	4.3	3.2	2.7 J
Cobalt	MG/KG	2.3 U	2.3 U	2.1 U	2.4 U	2.1 U	2.2 U
Copper	MG/KG	2.3 U	2.3 U	2.1 U	2.4 U	2.1 U	2.2 U
Iron	MG/KG	17600 J	9170 J	2810	2940	1690	1850
Lead	MG/KG	10.2	8.5	14.9	15.8	4.9	4.7
Magnesium	MG/KG	521 J	339 J	126	124	61.9	52.7
Manganese	MG/KG	9.2	9.2	7.1	6.1	2.7	1.8
Mercury	MG/KG	0.12 U	0.12 U	0.11 U	0.12 U	0.11 U	0.11 U
Nickel	MG/KG	4.7 U	4.7 U	4.3 U	4.8 U	4.1 U	4.4 U
Potassium	MG/KG	776 J	488 J	213 U	241 U	205 U	218 U
Selenium	MG/KG	1.2 U	1.2 U	1.1	1.2 U	1 U	1.1 U
Silver	MG/KG	1.2 U	1.2 U	1.1 U	1.2 U	1 U	1.1 U
Sodium	MG/KG	57.2	60.5	24.8 J	44.9 J	20.5 U	22.5
Thallium	MG/KG	2.3 U	2.3 U	2.1 U	2.4 U	2.1 U	2.2 U
Vanadium	MG/KG	41 J	20.2 J	6.6	6.8	4.6	4.3
Zinc	MG/KG	22.4 J	12.6 J	13.4	17.7	8.7	11
Moisture	%	14.11	16.2	10.67	19.34	8.86	12.51

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-NA-SB08-09	7-NA-SB08-09D	7-SWA-SB01-04	7-SWA-SB01-04D
Laboratory Sample ID:	AC5355	AC5357	AC4836	AC4838
Date Sampled:	10/23/94	10/23/94	10/21/94	10/21/94

	UNITS				
Aluminum	MG/KG	1270	1230	2550 J	2530 J
Antimony	MG/KG	9.7 U	10.3 U	10.7 UJ	10.2 UJ
Arsenic	MG/KG	1.9 U	2.1 U	2.1 U	2 U
Barium	MG/KG	39.2	42	147	145
Beryllium	MG/KG	0.24	0.33	0.74	0.73
Cadmium	MG/KG	0.97 U	1 U	1.1 U	1 U
Calcium	MG/KG	157 U	164 U	776 J	760 J
Chromium	MG/KG	4	4.2	4.7 J	3.8 J
Cobalt	MG/KG	1.9 U	2.1 U	2.1 U	2 U
Copper	MG/KG	1.9 U	2.1 U	2.1 U	2 U
Iron	MG/KG	372 U	413	569 J	559 J
Lead	MG/KG	1.4	1.4	1.6 J	1.5 J
Magnesium	MG/KG	29.2 U	40.6 U	51.8 J	39.4 J
Manganese	MG/KG	2.3 U	3.5 U	4.6 J	4.4 J
Mercury	MG/KG	0.11 U	0.11 U	0.11 U	0.11 U
Nickel	MG/KG	3.9 U	4.1 U	4.3 U	4.1 U
Potassium	MG/KG	195 U	205 U	213 U	204 U
Selenium	MG/KG	0.97 U	1 U	1.1 U	1 U
Silver	MG/KG	0.97 U	1 U	1.1 U	1 U
Sodium	MG/KG	32.7 U	29.4 U	23.8	31.8
Thallium	MG/KG	1.9 U	2.1 U	2.1 U	2 U
Vanadium	MG/KG	2.2	2.1 U	2.1 U	2 U
Zinc	MG/KG	6.4 UJ	12 UJ	9.1 J	7.9 J
Moisture	%	5.75	5.32	6.15	5.67

**APPENDIX J.3**  
**GROUNDWATER ORGANICS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-MW05-01	7-MW05-01D
Laboratory Sample ID:	AD1620	AD1629
Date Sampled:	12/01/94	12/01/94

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	<u>UNITS</u>		
<u>VOLATILES</u>			
Chloromethane	UG/L	10 UJ	10 UJ
Bromomethane	UG/L	10 UJ	10 UJ
Vinyl chloride	UG/L	10 UJ	10 UJ
Chloroethane	UG/L	10 UJ	10 UJ
Methylene chloride	UG/L	10 UJ	10 UJ
Acetone	UG/L	14 UJ	10 UJ
Carbon Disulfide	UG/L	10 UJ	10 UJ
1,1-Dichloroethene	UG/L	10 UJ	10 UJ
1,1-Dichloroethane	UG/L	10 UJ	10 UJ
1,2-Dichloroethene(total)	UG/L	10 UJ	10 UJ
Chloroform	UG/L	4 J	4 J
1,2-Dichloroethane	UG/L	10 UJ	10 UJ
2-Butanone	UG/L	10 UJ	13 UJ
1,1,1-Trichloroethane	UG/L	10 UJ	10 UJ
Carbon tetrachloride	UG/L	10 UJ	10 UJ
Bromodichloromethane	UG/L	10 UJ	10 UJ
1,2-Dichloropropane	UG/L	10 UJ	10 UJ
cis-1,3-Dichloropropene	UG/L	10 UJ	10 UJ
Trichloroethene	UG/L	10 UJ	10 UJ
Dibromochloromethane	UG/L	10 UJ	10 UJ
1,1,2-Trichloroethane	UG/L	10 UJ	10 UJ
Benzene	UG/L	10 UJ	10 UJ
trans-1,3-Dichloropropene	UG/L	10 UJ	10 UJ
Bromoform	UG/L	10 UJ	10 UJ
4-Methyl-2-pentanone	UG/L	10 UJ	10 UJ
2-Hexanone	UG/L	1 J	10 UJ
Tetrachloroethene	UG/L	10 UJ	10 UJ
1,1,2,2-Tetrachloroethane	UG/L	10 UJ	10 UJ
Toluene	UG/L	10 UJ	10 UJ
Chlorobenzene	UG/L	10 UJ	10 UJ
Ethylbenzene	UG/L	10 UJ	10 UJ
Styrene	UG/L	10 UJ	10 UJ
Xylenes (total)	UG/L	10 UJ	10 UJ



FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-MW05-01	7-MW05-01D
Laboratory Sample ID:	AD1620	AD1629
Date Sampled:	12/01/94	12/01/94

	<u>UNITS</u>		
<u>SEMIVOLATILES</u>			
Phenol	UG/L	10 U	10 U
bis(2-Chloroethyl) ether	UG/L	10 U	10 U
2-Chlorophenol	UG/L	10 U	10 U
1,3-Dichlorobenzene	UG/L	10 U	10 U
1,4-Dichlorobenzene	UG/L	10 U	10 U
1,2-Dichlorobenzene	UG/L	10 U	10 U
2-Methylphenol	UG/L	10 U	10 U
2,2'-oxybis-(1-chloropropane)	UG/L	10 U	10 U
4-Methylphenol	UG/L	10 U	10 U
N-Nitroso-di-n-propylamine	UG/L	10 U	10 U
Hexachloroethane	UG/L	10 U	10 U
Nitrobenzene	UG/L	10 U	10 U
Isophorone	UG/L	10 U	10 U
2-Nitrophenol	UG/L	10 U	10 U
2,4-Dimethylphenol	UG/L	10 U	10 U
bis(2-Chloroethoxy) methane	UG/L	10 U	10 U
2,4-Dichlorophenol	UG/L	10 U	10 U
1,2,4-Trichlorobenzene	UG/L	10 U	10 U
Naphthalene	UG/L	10 U	10 U
4-Chloroaniline	UG/L	10 U	10 U
Hexachlorobutadiene	UG/L	10 U	10 U
4-Chloro-3-methylphenol	UG/L	10 U	10 U
2-Methylnaphthalene	UG/L	10 U	10 U
Hexachlorocyclopentadiene	UG/L	10 UJ	10 UJ
2,4,6-Trichlorophenol	UG/L	10 U	10 U
2,4,5-Trichlorophenol	UG/L	25 U	25 U
2-Chloronaphthalene	UG/L	10 U	10 U
2-Nitroaniline	UG/L	25 U	25 U
Dimethyl phthalate	UG/L	10 U	10 U
Acenaphthylene	UG/L	10 U	10 U
2,6-Dinitrotoluene	UG/L	10 U	10 U
3-Nitroaniline	UG/L	25 U	25 U
Acenaphthene	UG/L	10 U	10 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-MW05-01	7-MW05-01D
Laboratory Sample ID:	AD1620	AD1629
Date Sampled:	12/01/94	12/01/94

UNITS

SEMIVOLATILES Cont.

2,4-Dinitrophenol	UG/L	25 UJ	25 UJ
4-Nitrophenol	UG/L	25 U	25 U
Dibenzofuran	UG/L	10 U	10 U
2,4-Dinitrotoluene	UG/L	10 U	10 U
Diethylphthalate	UG/L	10 U	10 U
4-Chlorophenyl phenyl ether	UG/L	10 U	10 U
Fluorene	UG/L	10 U	10 U
4-Nitroaniline	UG/L	25 U	25 U
4,6-Dinitro-2-methylphenol	UG/L	25 U	25 U
N-nitrosodiphenylamine	UG/L	10 U	10 U
4-Bromophenyl-phenylether	UG/L	10 U	10 U
Hexachlorobenzene	UG/L	10 U	10 U
Pentachlorophenol	UG/L	25 U	25 U
Phenanthrene	UG/L	10 U	10 U
Anthracene	UG/L	10 U	10 U
Carbazole	UG/L	10 U	10 U
di-n-Butylphthalate	UG/L	10 U	4 J
Fluoranthene	UG/L	10 U	10 U
Pyrene	UG/L	10 U	10 U
Butyl benzyl phthalate	UG/L	10 U	10 U
3,3'-Dichlorobenzidine	UG/L	10 U	10 U
Benzo[a]anthracene	UG/L	10 U	10 U
Chrysene	UG/L	10 U	10 U
bis(2-Ethylhexyl)phthalate	UG/L	10 UJ	55 J
di-n-Octylphthalate	UG/L	10 U	10 U
Benzo[b]fluoranthene	UG/L	10 U	10 U
Benzo[k]fluoranthene	UG/L	10 UJ	10 UJ
Benzo[a]pyrene	UG/L	10 U	10 U
Indeno[1,2,3-cd]pyrene	UG/L	10 U	10 U
Dibenz[a,h]anthracene	UG/L	10 U	10 U
Benzo[g,h,i]perylene	UG/L	10 U	10 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-MW05-01	7-MW05-01D
Laboratory Sample ID:	AD1620	AD1629
Date Sampled:	12/01/94	12/01/94

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	<u>UNITS</u>		
<u>PESTICIDES/PCBs</u>			
alpha-BHC	UG/L	0.05 U	0.05 U
beta-BHC	UG/L	0.05 U	0.05 U
delta-BHC	UG/L	0.05 U	0.05 U
Lindane (gamma-BHC)	UG/L	0.05 U	0.05 U
Heptachlor	UG/L	0.05 U	0.05 U
Aldrin	UG/L	0.05 U	0.05 U
Heptachlor epoxide	UG/L	0.05 U	0.05 U
Endosulfan I	UG/L	0.05 U	0.05 U
Dieldrin	UG/L	0.1 U	0.1 U
4,4'-DDE	UG/L	0.1 U	0.1 U
Endrin	UG/L	0.1 U	0.1 U
Endosulfan II	UG/L	0.1 U	0.1 U
4,4'-DDD	UG/L	0.1 U	0.1 U
Endosulfan sulfate	UG/L	0.1 U	0.1 U
4,4'-DDT	UG/L	0.1 U	0.1 U
Methoxychlor	UG/L	0.5 U	0.5 U
Endrin ketone	UG/L	0.1 U	0.1 U
Endrin aldehyde	UG/L	0.1 U	0.1 U
alpha-Chlordane	UG/L	0.05 U	0.05 U
gamma-Chlordane	UG/L	0.05 U	0.05 U
Toxaphene	UG/L	5 U	5 U
Aroclor 1016	UG/L	1 U	1 U
Aroclor 1221	UG/L	2 U	2 U
Aroclor 1232	UG/L	1 U	1 U
Aroclor 1242	UG/L	1 U	1 U
Aroclor 1248	UG/L	1 U	1 U
Aroclor 1254	UG/L	1 U	1 U
Aroclor 1260	UG/L	1 U	1 U

**APPENDIX J.4**  
**GROUNDWATER TOTAL AND DISSOLVED METALS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - FIELD DUPLICATES - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL TOTAL & DISSOLVED INORGANICS

Client Sample ID:	7-MW05-01	7-MW05-01D	7-MW05D-01	7-MW05D-01D
Laboratory Sample ID:	AD1621	AD1630	AD1652	AD1655
Date Sampled:	12/01/94	12/01/94	12/01/94	12/01/94

	UNITS				
Aluminum	UG/L	63.7 U	95.7 U	40.5 U	45 U
Antimony	UG/L	50 U	50 U	50 U	50 U
Arsenic	UG/L	10 U	10 U	10 U	10 U
Barium	UG/L	10.5 J	11.8 J	11.6 J	11.3 J
Beryllium	UG/L	1 U	1 U	1 U	1 U
Cadmium	UG/L	5 UJ	5 UJ	5 UJ	5 UJ
Calcium	UG/L	6990	7460	8330	7790
Chromium	UG/L	10 U	10 U	10 U	10 U
Cobalt	UG/L	10 U	10 U	10 U	10 U
Copper	UG/L	10 U	10 U	10 U	10 U
Iron	UG/L	154 U	152 U	168 U	151 U
Lead	UG/L	3 U	3 U	3 U	3 U
Magnesium	UG/L	2040	2170	2400	2260
Manganese	UG/L	56.9	60.9	66.4	61.8
Mercury	UG/L	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	UG/L	20 U	20 U	20 U	20 U
Potassium	UG/L	1020	1510	1150	1090
Selenium	UG/L	5 UJ	5 UJ	5 UJ	5 UJ
Silver	UG/L	5 U	5 U	5 U	5 U
Sodium	UG/L	7530	7990	9140	8510
Thallium	UG/L	10 U	10 U	10 U	10 U
Vanadium	UG/L	10 U	10 U	10 U	10 U
Zinc	UG/L	23.6 UJ	12.4 UJ	23 UJ	23.7 UJ

**APPENDIX J.5**  
**NORTHEAST CREEK SURFACE WATER ORGANICS**



FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NC-SW04	7-NC-SW04D
Laboratory Sample ID:	AB1994	AB1991
Date Sampled:	6/26/94	6/26/94

	UNITS		
<u>VOLATILES</u>			
Chloromethane	UG/L	10 U	10 U
Bromomethane	UG/L	10 U	10 U
Vinyl chloride	UG/L	10 U	10 U
Chloroethane	UG/L	10 U	10 U
Methylene chloride	UG/L	11 U	12 U
Acetone	UG/L	10 U	10 U
Carbon Disulfide	UG/L	10 U	10 U
1,1-Dichloroethene	UG/L	10 U	10 U
1,1-Dichloroethane	UG/L	10 U	10 U
1,2-Dichloroethene(total)	UG/L	10 U	10 U
Chloroform	UG/L	10 U	10 U
1,2-Dichloroethane	UG/L	10 U	10 U
2-Butanone	UG/L	10 U	10 U
1,1,1-Trichloroethane	UG/L	10 U	10 U
Carbon tetrachloride	UG/L	10 U	10 U
Bromodichloromethane	UG/L	10 U	10 U
1,2-Dichloropropane	UG/L	10 U	10 U
cis-1,3-Dichloropropene	UG/L	10 U	10 U
Trichloroethene	UG/L	10 U	10 U
Dibromochloromethane	UG/L	10 U	10 U
1,1,2-Trichloroethane	UG/L	10 U	10 U
Benzene	UG/L	10 U	10 U
trans-1,3-Dichloropropene	UG/L	10 U	10 U
Bromoform	UG/L	10 U	10 U
4-Methyl-2-pentanone	UG/L	10 U	10 U
2-Hexanone	UG/L	10 U	10 U
Tetrachloroethene	UG/L	10 U	10 U
1,1,2,2-Tetrachloroethane	UG/L	10 U	10 U
Toluene	UG/L	10 U	10 U
Chlorobenzene	UG/L	10 U	10 U
Ethylbenzene	UG/L	10 U	10 U
Styrene	UG/L	10 U	10 U
Xylenes (total)	UG/L	10 U	10 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NC-SW04	7-NC-SW04D
Laboratory Sample ID:	AB1994	AB1991
Date Sampled:	6/26/94	6/26/94

	<u>UNITS</u>		
<u>SEMIVOLATILES</u>			
Phenol	UG/L	10 U	10 U
bis(2-Chloroethyl) ether	UG/L	10 U	10 U
2-Chlorophenol	UG/L	10 U	10 U
1,3-Dichlorobenzene	UG/L	10 U	10 U
1,4-Dichlorobenzene	UG/L	10 U	10 U
1,2-Dichlorobenzene	UG/L	10 U	10 U
2-Methylphenol	UG/L	10 U	10 U
2,2'-oxybis-(1-chloropropane)	UG/L	10 U	10 U
4-Methylphenol	UG/L	10 U	10 U
N-Nitroso-di-n-propylamine	UG/L	10 U	10 U
Hexachloroethane	UG/L	10 U	10 U
Nitrobenzene	UG/L	10 U	10 U
Isophorone	UG/L	10 U	10 U
2-Nitrophenol	UG/L	10 U	10 U
2,4-Dimethylphenol	UG/L	10 U	10 U
bis(2-Chloroethoxy) methane	UG/L	10 U	10 U
2,4-Dichlorophenol	UG/L	10 U	10 U
1,2,4-Trichlorobenzene	UG/L	10 U	10 U
Naphthalene	UG/L	10 U	10 U
4-Chloroaniline	UG/L	10 U	10 U
Hexachlorobutadiene	UG/L	10 U	10 U
4-Chloro-3-methylphenol	UG/L	10 U	10 U
2-Methylnaphthalene	UG/L	10 U	10 U
Hexachlorocyclopentadiene	UG/L	10 U	10 U
2,4,6-Trichlorophenol	UG/L	10 U	10 U
2,4,5-Trichlorophenol	UG/L	25 U	25 U
2-Chloronaphthalene	UG/L	10 U	10 U
2-Nitroaniline	UG/L	25 U	25 U
Dimethyl phthalate	UG/L	10 U	10 U
Acenaphthylene	UG/L	10 U	10 U
2,6-Dinitrotoluene	UG/L	10 U	10 U
3-Nitroaniline	UG/L	25 U	25 U
Acenaphthene	UG/L	10 U	10 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NC-SW04	7-NC-SW04D
Laboratory Sample ID:	AB1994	AB1991
Date Sampled:	6/26/94	6/26/94

	<u>UNITS</u>		
<u>SEMIVOLATILES Cont.</u>			
2,4-Dinitrophenol	UG/L	25 U	25 U
4-Nitrophenol	UG/L	25 U	25 U
Dibenzofuran	UG/L	10 U	10 U
2,4-Dinitrotoluene	UG/L	10 U	10 U
Diethylphthalate	UG/L	10 U	10 U
4-Chlorophenyl phenyl ether	UG/L	10 U	10 U
Fluorene	UG/L	10 U	10 U
4-Nitroaniline	UG/L	25 U	25 U
4,6-Dinitro-2-methylphenol	UG/L	25 U	25 U
N-nitrosodiphenylamine	UG/L	10 U	10 U
4-Bromophenyl-phenylether	UG/L	10 U	10 U
Hexachlorobenzene	UG/L	10 U	10 U
Pentachlorophenol	UG/L	25 U	25 U
Phenanthrene	UG/L	10 U	10 U
Anthracene	UG/L	10 U	10 U
Carbazole	UG/L	10 U	10 U
di-n-Butylphthalate	UG/L	10 U	10 U
Fluoranthene	UG/L	10 U	10 U
Pyrene	UG/L	10 U	10 U
Butyl benzyl phthalate	UG/L	10 U	10 U
3,3'-Dichlorobenzidine	UG/L	10 U	10 U
Benzo[a]anthracene	UG/L	10 U	10 U
Chrysene	UG/L	10 U	10 U
bis(2-Ethylhexyl)phthalate	UG/L	10 U	10 U
di-n-Octylphthalate	UG/L	10 U	10 U
Benzo[b]fluoranthene	UG/L	10 U	10 U
Benzo[k]fluoranthene	UG/L	10 U	10 U
Benzo[a]pyrene	UG/L	10 U	10 U
Indeno[1,2,3-cd]pyrene	UG/L	10 U	10 U
Dibenz[a,h]anthracene	UG/L	10 U	10 U
Benzo[g,h,i]perylene	UG/L	10 U	10 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NC-SW04	7-NC-SW04D
Laboratory Sample ID:	AB1994	AB1991
Date Sampled:	6/26/94	6/26/94

	<u>UNITS</u>		
<u>PESTICIDES/PCBs</u>			
alpha-BHC	UG/L	0.05 UJ	0.05 UJ
beta-BHC	UG/L	0.05 UJ	0.05 UJ
delta-BHC	UG/L	0.05 UJ	0.05 UJ
Lindane (gamma-BHC)	UG/L	0.05 UJ	0.05 UJ
Heptachlor	UG/L	0.05 UJ	0.05 UJ
Aldrin	UG/L	0.05 UJ	0.05 UJ
Heptachlor epoxide	UG/L	0.05 UJ	0.05 UJ
Endosulfan I	UG/L	0.05 UJ	0.05 UJ
Dieldrin	UG/L	0.1 UJ	0.1 UJ
4,4'-DDE	UG/L	0.1 UJ	0.1 UJ
Endrin	UG/L	0.1 UJ	0.1 UJ
Endosulfan II	UG/L	0.1 UJ	0.1 UJ
4,4'-DDD	UG/L	0.1 UJ	0.1 UJ
Endosulfan sulfate	UG/L	0.1 UJ	0.1 UJ
4,4'-DDT	UG/L	0.1 UJ	0.1 UJ
Methoxychlor	UG/L	0.5 UJ	0.5 UJ
Endrin ketone	UG/L	0.1 UJ	0.1 UJ
Endrin aldehyde	UG/L	0.1 UJ	0.1 UJ
alpha-Chlordane	UG/L	0.05 UJ	0.05 UJ
gamma-Chlordane	UG/L	0.05 UJ	0.05 UJ
Toxaphene	UG/L	5 UJ	5 UJ
Aroclor 1016	UG/L	1 UJ	1 UJ
Aroclor 1221	UG/L	2 UJ	2 UJ
Aroclor 1232	UG/L	1 UJ	1 UJ
Aroclor 1242	UG/L	1 UJ	1 UJ
Aroclor 1248	UG/L	1 UJ	1 UJ
Aroclor 1254	UG/L	1 UJ	1 UJ
Aroclor 1260	UG/L	1 UJ	1 UJ

**APPENDIX J.6**  
**NORTHEAST CREEK SURFACE WATER METALS**

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-NC-SW04	7-NC-SW04D
Laboratory Sample ID:	AB1996	AB1993
Date Sampled:	6/26/94	6/26/94

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	<u>UNITS</u>		
Aluminum	UG/L	290 J	356 J
Antimony	UG/L	50 U	50 U
Arsenic	UG/L	2 UJ	2 UJ
Barium	UG/L	19	21.3
Beryllium	UG/L	1 U	1 U
Cadmium	UG/L	5 U	5 U
Calcium	UG/L	147000	163000
Chromium	UG/L	10 U	10 U
Cobalt	UG/L	10 U	10 U
Copper	UG/L	10 UJ	10 UJ
Iron	UG/L	208 J	208 J
Lead	UG/L	2.9 UJ	2.9 J
Magnesium	UG/L	476000	548000
Manganese	UG/L	13.4	15.2
Mercury	UG/L	0.2 U	0.2 U
Nickel	UG/L	20 U	20 U
Potassium	UG/L	157000	176000
Selenium	UG/L	2 UJ	2 UJ
Silver	UG/L	6.8	5.4
Sodium	UG/L	3800000	4200000
Thallium	UG/L	10 UJ	10 UJ
Vanadium	UG/L	10 U	10 U
Zinc	UG/L	5 UJ	9 UJ



**APPENDIX J.7**  
**EAST AND WEST TRIBUTARIES, AND DRAINAGE DITCH**  
**SURFACE WATER ORGANICS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-ET-SW02	7-ET-SW02D	7-WT-SW02	7-WT-SW02D
Laboratory Sample ID:	AB1652	AB1630	AB1655	AB1624
Date Sampled:	6/24/94	6/24/94	6/23/94	6/23/94

	UNITS				
<b>VOLATILES</b>					
Chloromethane	UG/L	10 U	10 U	10 U	10 U
Bromomethane	UG/L	10 U	10 U	10 U	10 U
Vinyl chloride	UG/L	10 U	10 U	10 U	10 U
Chloroethane	UG/L	10 U	10 U	10 U	10 U
Methylene chloride	UG/L	10 U	10 U	10 U	10 U
Acetone	UG/L	10 U	10 U	10 U	10 U
Carbon Disulfide	UG/L	10 U	10 U	10 U	10 U
1,1-Dichloroethene	UG/L	10 U	10 U	10 U	10 U
1,1-Dichloroethane	UG/L	10 U	10 U	10 U	10 U
1,2-Dichloroethene(total)	UG/L	10 U	10 U	10 U	10 U
Chloroform	UG/L	10 U	10 U	2 J	10 U
1,2-Dichloroethane	UG/L	10 U	10 U	10 U	10 U
2-Butanone	UG/L	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	UG/L	10 U	10 U	10 U	10 U
Carbon tetrachloride	UG/L	10 U	10 U	10 U	10 U
Bromodichloromethane	UG/L	10 U	10 U	10 U	10 U
1,2-Dichloropropane	UG/L	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	UG/L	10 U	10 U	10 U	10 U
Trichloroethene	UG/L	10 U	10 U	10 U	10 U
Dibromochloromethane	UG/L	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	UG/L	10 U	10 U	10 U	10 U
Benzene	UG/L	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	UG/L	10 U	10 U	10 U	10 U
Bromoform	UG/L	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	UG/L	10 U	10 U	10 U	10 U
2-Hexanone	UG/L	10 U	10 U	10 U	10 U
Tetrachloroethene	UG/L	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	UG/L	10 U	10 U	10 U	10 U
Toluene	UG/L	10 U	10 U	10 U	10 U
Chlorobenzene	UG/L	10 U	10 U	10 U	10 U
Ethylbenzene	UG/L	10 U	10 U	10 U	10 U
Styrene	UG/L	10 U	10 U	10 U	10 U
Xylenes (total)	UG/L	1 J	1 J	10 U	10 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-ET-SW02	7-ET-SW02D	7-WT-SW02	7-WT-SW02D
Laboratory Sample ID:	AB1652	AB1630	AB1655	AB1624
Date Sampled:	6/24/94	6/24/94	6/23/94	6/23/94

	UNITS				
<b>SEMIVOLATILES</b>					
Phenol	UG/L	10 U	10 U	10 U	10 U
bis(2-Chloroethyl) ether	UG/L	10 U	10 U	10 U	10 U
2-Chlorophenol	UG/L	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	UG/L	10 U	10 U	5 U	10 U
1,4-Dichlorobenzene	UG/L	10 U	10 U	5 U	10 U
1,2-Dichlorobenzene	UG/L	10 U	10 U	5 U	10 U
2-Methylphenol	UG/L	10 U	10 U	10 U	10 U
2,2'-oxybis-(1-chloropropane)	UG/L	10 U	10 U	10 U	10 U
4-Methylphenol	UG/L	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	UG/L	10 U	10 U	10 U	10 U
Hexachloroethane	UG/L	10 U	10 U	10 U	10 U
Nitrobenzene	UG/L	10 U	10 U	10 U	10 U
Isophorone	UG/L	10 U	10 U	10 U	10 U
2-Nitrophenol	UG/L	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	UG/L	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy) methane	UG/L	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	UG/L	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	UG/L	10 U	10 U	10 U	10 U
Naphthalene	UG/L	10 U	10 U	10 U	10 U
4-Chloroaniline	UG/L	10 U	10 U	10 U	10 U
Hexachlorobutadiene	UG/L	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	UG/L	10 U	10 U	10 U	10 U
2-Methylnaphthalene	UG/L	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	UG/L	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	UG/L	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	UG/L	25 U	25 U	25 U	25 U
2-Chloronaphthalene	UG/L	10 U	10 U	10 U	10 U
2-Nitroaniline	UG/L	25 U	25 U	25 U	25 U
Dimethyl phthalate	UG/L	10 U	10 U	10 U	10 U
Acenaphthylene	UG/L	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	UG/L	10 U	10 U	10 U	10 U
3-Nitroaniline	UG/L	25 U	25 U	25 U	25 U
Acenaphthene	UG/L	10 U	10 U	10 U	10 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-ET-SW02	7-ET-SW02D	7-WT-SW02	7-WT-SW02D
Laboratory Sample ID:	AB1652	AB1630	AB1655	AB1624
Date Sampled:	6/24/94	6/24/94	6/23/94	6/23/94

	UNITS				
<u>SEMIVOLATILES Cont.</u>					
2,4-Dinitrophenol	UG/L	25 U	25 U	25 U	25 U
4-Nitrophenol	UG/L	25 U	25 U	25 U	25 U
Dibenzofuran	UG/L	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	UG/L	10 U	10 U	10 U	10 U
Diethylphthalate	UG/L	10 U	10 U	10 U	10 U
4-Chlorophenyl phenyl ether	UG/L	10 U	10 U	10 U	10 U
Fluorene	UG/L	10 U	10 U	10 U	10 U
4-Nitroaniline	UG/L	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	UG/L	25 U	25 U	25 U	25 U
N-nitrosodiphenylamine	UG/L	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	UG/L	10 U	10 U	10 U	10 U
Hexachlorobenzene	UG/L	10 U	10 U	10 U	10 U
Pentachlorophenol	UG/L	25 U	25 U	25 U	25 U
Phenanthrene	UG/L	10 U	10 U	10 U	10 U
Anthracene	UG/L	10 U	10 U	10 U	10 U
Carbazole	UG/L	10 U	10 U	10 U	10 U
di-n-Butylphthalate	UG/L	10 U	10 U	10 U	10 U
Fluoranthene	UG/L	10 U	10 U	10 U	10 U
Pyrene	UG/L	10 U	10 U	10 U	10 U
Butyl benzyl phthalate	UG/L	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	UG/L	10 U	10 U	10 U	10 U
Benzo[a]anthracene	UG/L	10 U	10 U	10 U	10 U
Chrysene	UG/L	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	UG/L	77 B	10 U	10 U	10 U
di-n-Octylphthalate	UG/L	10 U	10 UJ	10 U	10 UJ
Benzo[b]fluoranthene	UG/L	10 U	10 UJ	10 U	10 UJ
Benzo[k]fluoranthene	UG/L	10 U	10 UJ	10 U	10 UJ
Benzo[a]pyrene	UG/L	10 U	10 UJ	10 U	10 UJ
Indeno[1,2,3-cd]pyrene	UG/L	10 U	10 UJ	10 U	10 UJ
Dibenz[a,h]anthracene	UG/L	10 U	10 UJ	10 U	10 UJ
Benzo[g,h,i]perylene	UG/L	10 U	10 UJ	10 U	10 UJ

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-ET-SW02	7-ET-SW02D	7-WT-SW02	7-WT-SW02D
Laboratory Sample ID:	AB1652	AB1630	AB1655	AB1624
Date Sampled:	6/24/94	6/24/94	6/23/94	6/23/94

	UNITS				
PESTICIDES/PCBs					
alpha-BHC	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
beta-BHC	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
delta-BHC	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
Lindane (gamma-BHC)	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
Heptachlor	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
Aldrin	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
Heptachlor epoxide	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
Endosulfan I	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
Dieldrin	UG/L	0.1 UJ	0.1 UJ	0.4	0.43
4,4'-DDE	UG/L	0.1 UJ	0.1 UJ	0.1 U	0.1 U
Endrin	UG/L	0.1 UJ	0.1 UJ	0.1 U	0.1 U
Endosulfan II	UG/L	0.1 UJ	0.1 UJ	0.1 U	0.1 U
4,4'-DDD	UG/L	0.1 UJ	0.1 UJ	0.1 U	0.1 U
Endosulfan sulfate	UG/L	0.1 UJ	0.1 UJ	0.1 U	0.1 U
4,4'-DDT	UG/L	0.1 UJ	0.1 UJ	0.1 U	0.1 U
Methoxychlor	UG/L	0.5 UJ	0.5 UJ	0.5 U	0.5 U
Endrin ketone	UG/L	0.1 UJ	0.1 UJ	0.13	0.1 U
Endrin aldehyde	UG/L	0.1 UJ	0.1 UJ	0.1 U	0.1 U
alpha-Chlordane	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
gamma-Chlordane	UG/L	0.05 UJ	0.05 UJ	0.05 U	0.05 U
Toxaphene	UG/L	5 UJ	5 UJ	5 U	5 U
Aroclor 1016	UG/L	1 UJ	1 UJ	1 U	1 U
Aroclor 1221	UG/L	2 UJ	2 UJ	2 U	2 U
Aroclor 1232	UG/L	1 UJ	1 UJ	1 U	1 U
Aroclor 1242	UG/L	1 UJ	1 UJ	1 U	1 U
Aroclor 1248	UG/L	1 UJ	1 UJ	1 U	1 U
Aroclor 1254	UG/L	1 UJ	1 UJ	1 U	1 U
Aroclor 1260	UG/L	1 UJ	1 UJ	1 U	1 U

**APPENDIX J.8**  
**EAST AND WEST TRIBUTARIES AND DRAINAGE DITCH**  
**SURFACE WATER METALS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-ET-SW02	7-ET-SW02D	7-WT-SW02	7-WT-SW02D
Laboratory Sample ID:	AB1654	AB1632	AB1657	AB1626
Date Sampled:	6/24/94	6/24/94	6/23/94	6/23/94

	<u>UNITS</u>				
Aluminum	UG/L	123	117	77.1	100
Antimony	UG/L	50 U	50 U	50 U	50 U
Arsenic	UG/L	10 U	2 U	2 U	2 U
Barium	UG/L	19.5	20	16.4	18.1
Beryllium	UG/L	1 U	1 U	1 U	1 U
Cadmium	UG/L	5 U	5 U	5 U	5 U
Calcium	UG/L	149000	153000	9100	10300
Chromium	UG/L	10 U	10 U	10 U	10 U
Cobalt	UG/L	10 UJ	10 UJ	10 UJ	10 UJ
Copper	UG/L	10 U	10 U	10 U	10 U
Iron	UG/L	175 J	161 J	410 J	407 J
Lead	UG/L	7.1 J	2 UJ	7.8 J	3.9 J
Magnesium	UG/L	468000	480000	2480	2730
Manganese	UG/L	15.4	15.7	11.2	11.8
Mercury	UG/L	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	UG/L	20 UJ	20 UJ	20 UJ	20 UJ
Potassium	UG/L	144000	148000	2350 U	2550 U
Selenium	UG/L	10 UJ	2 UJ	2 UJ	2 UJ
Silver	UG/L	6.6 J	6.6 J	5 UJ	5 UJ
Sodium	UG/L	3730000	3840000	14500	16000
Thallium	UG/L	10 UJ	10 UJ	2 UJ	2 UJ
Vanadium	UG/L	10 U	10 U	10 U	10 U
Zinc	UG/L	5 UJ	5 UJ	40 J	20.8 J

**APPENDIX J.9**  
**NORTHEAST CREEK SEDIMENT ORGANICS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SEDIMENT  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NC-SD04-06	7-NC-SD04-06D
Laboratory Sample ID:	AB2039	AB2020
Date Sampled:	6/26/94	6/26/94

	<u>UNITS</u>		
<u>VOLATILES</u>			
Chloromethane	UG/KG	13 U	13 U
Bromomethane	UG/KG	13 U	13 U
Vinyl chloride	UG/KG	13 U	13 U
Chloroethane	UG/KG	13 U	13 U
Methylene chloride	UG/KG	52 U	51 U
Acetone	UG/KG	17 U	13 U
Carbon Disulfide	UG/KG	13 U	13 U
1,1-Dichloroethene	UG/KG	13 U	13 U
1,1-Dichloroethane	UG/KG	13 U	13 U
1,2-Dichloroethene(total)	UG/KG	13 U	13 U
Chloroform	UG/KG	13 U	13 U
1,2-Dichloroethane	UG/KG	13 U	13 U
2-Butanone	UG/KG	13 U	13 U
1,1,1-Trichloroethane	UG/KG	13 U	13 U
Carbon tetrachloride	UG/KG	13 U	13 U
Bromodichloromethane	UG/KG	13 U	13 U
1,2-Dichloropropane	UG/KG	13 U	13 U
cis-1,3-Dichloropropene	UG/KG	13 U	13 U
Trichloroethene	UG/KG	13 U	13 U
Dibromochloromethane	UG/KG	13 U	13 U
1,1,2-Trichloroethane	UG/KG	13 U	13 U
Benzene	UG/KG	13 U	13 U
trans-1,3-Dichloropropene	UG/KG	13 U	13 U
Bromoform	UG/KG	13 U	13 U
4-Methyl-2-pentanone	UG/KG	13 U	13 U
2-Hexanone	UG/KG	13 U	13 U
Tetrachloroethene	UG/KG	13 U	13 U
1,1,2,2-Tetrachloroethane	UG/KG	13 U	13 U
Toluene	UG/KG	13 U	13 U
Chlorobenzene	UG/KG	13 U	13 U
Ethylbenzene	UG/KG	13 U	13 U
Styrene	UG/KG	13 U	13 U
Xylenes (total)	UG/KG	13 U	13 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SEDIMENT  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NC-SD04-06	7-NC-SD04-06D
Laboratory Sample ID:	AB2039	AB2020
Date Sampled:	6/26/94	6/26/94

	<u>UNITS</u>		
<u>SEMIVOLATILES</u>			
Phenol	UG/KG	410 U	430 U
bis(2-Chloroethyl) ether	UG/KG	410 U	430 U
2-Chlorophenol	UG/KG	410 U	430 U
1,3-Dichlorobenzene	UG/KG	410 U	430 U
1,4-Dichlorobenzene	UG/KG	410 U	430 U
1,2-Dichlorobenzene	UG/KG	410 U	430 U
2-Methylphenol	UG/KG	410 U	430 U
2,2'-oxybis-(1-chloropropane)	UG/KG	410 U	430 U
4-Methylphenol	UG/KG	410 U	430 U
N-Nitroso-di-n-propylamine	UG/KG	410 U	430 U
Hexachloroethane	UG/KG	410 U	430 U
Nitrobenzene	UG/KG	410 U	430 U
Isophorone	UG/KG	410 U	430 U
2-Nitrophenol	UG/KG	410 U	430 U
2,4-Dimethylphenol	UG/KG	410 U	430 U
bis(2-Chloroethoxy) methane	UG/KG	410 U	430 U
2,4-Dichlorophenol	UG/KG	410 U	430 U
1,2,4-Trichlorobenzene	UG/KG	410 U	430 U
Naphthalene	UG/KG	410 U	430 U
4-Chloroaniline	UG/KG	410 U	430 U
Hexachlorobutadiene	UG/KG	410 U	430 U
4-Chloro-3-methylphenol	UG/KG	410 U	430 U
2-Methylnaphthalene	UG/KG	410 U	430 U
Hexachlorocyclopentadiene	UG/KG	410 U	430 U
2,4,6-Trichlorophenol	UG/KG	410 U	430 U
2,4,5-Trichlorophenol	UG/KG	1000 U	1000 U
2-Chloronaphthalene	UG/KG	410 U	430 U
2-Nitroaniline	UG/KG	1000 U	1000 U
Dimethyl phthalate	UG/KG	410 U	430 U
Acenaphthylene	UG/KG	410 U	430 U
2,6-Dinitrotoluene	UG/KG	410 U	430 U
3-Nitroaniline	UG/KG	1000 U	1000 U
Acenaphthene	UG/KG	410 U	430 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SEDIMENT  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NC-SD04-06	7-NC-SD04-06D
Laboratory Sample ID:	AB2039	AB2020
Date Sampled:	6/26/94	6/26/94

	<u>UNITS</u>		
<u>SEMIVOLATILES Cont.</u>			
2,4-Dinitrophenol	UG/KG	1000 U	1000 U
4-Nitrophenol	UG/KG	1000 UJ	1000 UJ
Dibenzofuran	UG/KG	410 U	430 U
2,4-Dinitrotoluene	UG/KG	410 U	430 U
Diethylphthalate	UG/KG	410 U	430 U
4-Chlorophenyl phenyl ether	UG/KG	410 U	430 U
Fluorene	UG/KG	410 U	430 U
4-Nitroaniline	UG/KG	1000 U	1000 U
4,6-Dinitro-2-methylphenol	UG/KG	1000 U	1000 U
N-nitrosodiphenylamine	UG/KG	410 U	430 U
4-Bromophenyl-phenylether	UG/KG	410 U	430 U
Hexachlorobenzene	UG/KG	410 U	430 U
Pentachlorophenol	UG/KG	1000 U	1000 U
Phenanthrene	UG/KG	410 U	430 U
Anthracene	UG/KG	410 U	430 U
Carbazole	UG/KG	410 U	430 U
di-n-Butylphthalate	UG/KG	410 U	430 U
Fluoranthene	UG/KG	410 U	430 U
Pyrene	UG/KG	410 U	430 U
Butyl benzyl phthalate	UG/KG	410 U	430 U
3,3'-Dichlorobenzidine	UG/KG	410 U	430 U
Benzo[a]anthracene	UG/KG	410 U	430 U
Chrysene	UG/KG	410 U	430 U
bis(2-Ethylhexyl)phthalate	UG/KG	410 U	430 U
di-n-Octylphthalate	UG/KG	410 U	430 U
Benzo[b]fluoranthene	UG/KG	410 U	430 U
Benzo[k]fluoranthene	UG/KG	410 U	430 U
Benzo[a]pyrene	UG/KG	410 U	430 U
Indeno[1,2,3-cd]pyrene	UG/KG	410 U	430 U
Dibenz[a,h]anthracene	UG/KG	410 U	430 U
Benzo[g,h,i]perylene	UG/KG	410 U	430 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SEDIMENT  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-NC-SD04-06	7-NC-SD04-06D
Laboratory Sample ID:	AB2039	AB2020
Date Sampled:	6/26/94	6/26/94

<u>PESTICIDES/PCBs</u>	<u>UNITS</u>		
alpha-BHC	UG/KG	2.1 U	2.2 U
beta-BHC	UG/KG	2.1 U	2.2 U
delta-BHC	UG/KG	2.1 U	2.2 U
Lindane (gamma-BHC)	UG/KG	2.1 U	2.2 U
Heptachlor	UG/KG	2.1 U	2.2 U
Aldrin	UG/KG	2.1 U	2.2 U
Heptachlor epoxide	UG/KG	2.1 U	2.2 U
Endosulfan I	UG/KG	2.1 U	2.2 U
Dieldrin	UG/KG	4.1 U	4.3 U
4,4'-DDE	UG/KG	4.1 U	4.3 U
Endrin	UG/KG	4.1 U	4.3 U
Endosulfan II	UG/KG	4.1 U	4.3 U
4,4'-DDD	UG/KG	4.3	4.3 U
Endosulfan sulfate	UG/KG	4.1 U	4.3 U
4,4'-DDT	UG/KG	4.1 U	4.3 U
Methoxychlor	UG/KG	21 U	22 U
Endrin ketone	UG/KG	4.1 UJ	4.3 U
Endrin aldehyde	UG/KG	4.1 U	4.3 U
alpha-Chlordane	UG/KG	2.1 U	2.2 U
gamma-Chlordane	UG/KG	2.1 U	2.2 U
Toxaphene	UG/KG	210 U	220 U
Aroclor 1016	UG/KG	41 U	43 U
Aroclor 1221	UG/KG	83 U	86 U
Aroclor 1232	UG/KG	41 U	43 U
Aroclor 1242	UG/KG	41 U	43 U
Aroclor 1248	UG/KG	41 U	43 U
Aroclor 1254	UG/KG	41 U	43 U
Aroclor 1260	UG/KG	41 U	43 U

**APPENDIX J.10**  
**NORTHEAST CREEK SEDIMENT METALS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SEDIMENT  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-NC-SD04-06	7-NC-SD04-06D
Laboratory Sample ID:	AB2040	AB2021
Date Sampled:	6/26/94	6/26/94

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	<u>UNITS</u>		
Aluminum	MG/KG	820 J	1360 J
Antimony	MG/KG	12 U	12.9 U
Arsenic	MG/KG	0.49 UJ	0.51 UJ
Barium	MG/KG	4.6	4.1
Beryllium	MG/KG	0.24 U	0.26 U
Cadmium	MG/KG	1.2 U	1.3 U
Calcium	MG/KG	347	290
Chromium	MG/KG	3.6	3.2
Cobalt	MG/KG	2.4 U	2.6 U
Copper	MG/KG	9.3 J	2.6 UJ
Iron	MG/KG	397 J	635 J
Lead	MG/KG	4.3 J	13 J
Magnesium	MG/KG	372 U	330 U
Manganese	MG/KG	1.9	2.7
Mercury	MG/KG	0.12 U	0.13 U
Nickel	MG/KG	4.8 U	5.2 U
Potassium	MG/KG	508 U	358 U
Selenium	MG/KG	0.49 U	0.51 U
Silver	MG/KG	1.2 U	1.3 U
Sodium	MG/KG	1590	1500
Thallium	MG/KG	0.49 U	0.51 U
Vanadium	MG/KG	2.4 U	3.3
Zinc	MG/KG	5.9 J	8.4 J

**APPENDIX J.11**  
**EAST AND WEST TRIBUTARIES, DRAINAGE DITCH,**  
**AND MARSH AREA SEDIMENT ORGANICS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-DD-SD01-06	7-DD-SD01-06D	7-ET-SD02-06	7-ET-SD02-06D	7-MA-SD02-06	7-MA-SD02-06D	
Laboratory Sample ID:	AB1377	AB1380	AB1687	AB1664	AB1409	AB1411	
Date Sampled:	6/22/94	6/22/94	6/24/94	6/24/94	6/23/94	6/23/94	
	<u>UNITS</u>						
<u>VOLATILES</u>							
Chloromethane	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Bromomethane	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Vinyl chloride	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Chloroethane	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Methylene chloride	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Acetone	UG/KG	14 U	13 U	190 U	340 U	140 U	89 U
Carbon Disulfide	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
1,1-Dichloroethene	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
1,1-Dichloroethane	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
1,2-Dichloroethene(total)	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Chloroform	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
1,2-Dichloroethane	UG/KG	14 UJ	13 UJ	67 U	67 U	62 UJ	62 UJ
2-Butanone	UG/KG	14 U	13 U	67 U	21 J	62 UJ	62 UJ
1,1,1-Trichloroethane	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Carbon tetrachloride	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Bromodichloromethane	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
1,2-Dichloropropane	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
cis-1,3-Dichloropropene	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Trichloroethene	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Dibromochloromethane	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
1,1,2-Trichloroethane	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Benzene	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
trans-1,3-Dichloropropene	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
Bromoform	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
4-Methyl-2-pentanone	UG/KG	14 U	13 U	67 U	67 U	62 UJ	62 UJ
2-Hexanone	UG/KG	14 U	13 U	67 UJ	67 U	62 UJ	62 UJ
Tetrachloroethene	UG/KG	14 U	13 U	67 UJ	67 U	62 UJ	62 UJ
1,1,2,2-Tetrachloroethane	UG/KG	14 U	13 U	67 UJ	67 U	62 UJ	62 UJ
Toluene	UG/KG	14 U	13 U	67 UJ	67 U	21 J	62 UJ
Chlorobenzene	UG/KG	14 U	13 U	67 UJ	67 U	62 UJ	62 UJ
Ethylbenzene	UG/KG	14 U	13 U	67 UJ	67 U	62 UJ	62 UJ
Styrene	UG/KG	14 U	13 U	67 UJ	67 U	28 J	62 UJ
Xylenes (total)	UG/KG	14 U	13 U	67 UJ	67 U	62 UJ	62 UJ



FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-DD-SD01-06	7-DD-SD01-06D	7-ET-SD02-06	7-ET-SD02-06D	7-MA-SD02-06	7-MA-SD02-06D
Laboratory Sample ID:	AB1377	AB1380	AB1687	AB1664	AB1409	AB1411
Date Sampled:	6/22/94	6/22/94	6/24/94	6/24/94	6/23/94	6/23/94

	UNITS						
SEMIVOLATILES							
Phenol	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
bis(2-Chloroethyl) ether	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2-Chlorophenol	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
1,3-Dichlorobenzene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
1,4-Dichlorobenzene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
1,2-Dichlorobenzene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2-Methylphenol	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2,2'-oxybis-(1-chloropropane)	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
4-Methylphenol	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
N-Nitroso-di-n-propylamine	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Hexachloroethane	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Nitrobenzene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Isophorone	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2-Nitrophenol	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2,4-Dimethylphenol	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
bis(2-Chloroethoxy) methane	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2,4-Dichlorophenol	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
1,2,4-Trichlorobenzene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Naphthalene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
4-Chloroaniline	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Hexachlorobutadiene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
4-Chloro-3-methylphenol	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2-Methylnaphthalene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Hexachlorocyclopentadiene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2,4,6-Trichlorophenol	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2,4,5-Trichlorophenol	UG/KG	1100 U	1000 U	5300 U	5300 U	4700 U	5000 U
2-Chloronaphthalene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2-Nitroaniline	UG/KG	1100 U	1000 U	5300 U	5300 U	4700 U	5000 U
Dimethyl phthalate	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Acenaphthylene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2,6-Dinitrotoluene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
3-Nitroaniline	UG/KG	1100 U	1000 U	5300 U	5300 U	4700 U	5000 U
Acenaphthene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-DD-SD01-06	7-DD-SD01-06D	7-ET-SD02-06	7-ET-SD02-06D	7-MA-SD02-06	7-MA-SD02-06D
Laboratory Sample ID:	AB1377	AB1380	AB1687	AB1664	AB1409	AB1411
Date Sampled:	6/22/94	6/22/94	6/24/94	6/24/94	6/23/94	6/23/94

	UNITS						
<b>SEMIVOLATILES Cont.</b>							
2,4-Dinitrophenol	UG/KG	1100 U	1000 U	5300 U	5300 U	4700 UJ	5000 UJ
4-Nitrophenol	UG/KG	1100 U	1000 U	5300 U	5300 U	4700 U	5000 U
Dibenzofuran	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
2,4-Dinitrotoluene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Diethylphthalate	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
4-Chlorophenyl phenyl ether	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Fluorene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
4-Nitroaniline	UG/KG	1100 U	1000 U	5300 U	5300 U	4700 U	5000 U
4,6-Dinitro-2-methylphenol	UG/KG	1100 U	1000 U	5300 U	5300 U	4700 U	5000 U
N-nitrosodiphenylamine	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
4-Bromophenyl-phenylether	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Hexachlorobenzene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Pentachlorophenol	UG/KG	1100 U	1000 U	5300 U	5300 U	4700 U	5000 U
Phenanthrene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Anthracene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Carbazole	UG/KG	440 U	430 U	2200 U	2200 U	1900 UJ	2000 UJ
di-n-Butylphthalate	UG/KG	76 J	59 J	2200 U	2200 U	880 J	1700 J
Fluoranthene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Pyrene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Butyl benzyl phthalate	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
3,3'-Dichlorobenzidine	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Benzo[a]anthracene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Chrysene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
bis(2-Ethylhexyl)phthalate	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
di-n-Octylphthalate	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Benzo[b]fluoranthene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Benzo[k]fluoranthene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Benzo[a]pyrene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Indeno[1,2,3-cd]pyrene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Dibenz[a,h]anthracene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U
Benzo[g,h,i]perylene	UG/KG	440 U	430 U	2200 U	2200 U	1900 U	2000 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-DD-SD01-06	7-DD-SD01-06D	7-ET-SD02-06	7-ET-SD02-06D	7-MA-SD02-06	7-MA-SD02-06D
Laboratory Sample ID:	AB1377	AB1380	AB1687	AB1664	AB1409	AB1411
Date Sampled:	6/22/94	6/22/94	6/24/94	6/24/94	6/23/94	6/23/94

	<u>UNITS</u>						
<u>PESTICIDES/PCBs</u>							
alpha-BHC	UG/KG	2.3 U	2.2 U	11 U	11 U	9.8 U	10 UJ
beta-BHC	UG/KG	2.3 U	2.2 U	11 U	11 U	9.8 U	10 UJ
delta-BHC	UG/KG	2.3 U	2.2 U	11 U	11 U	9.8 U	10 UJ
Lindane (gamma-BHC)	UG/KG	2.3 U	2.2 U	11 U	11 U	9.8 U	10 UJ
Heptachlor	UG/KG	2.3 U	2.2 U	11 U	11 U	9.8 U	10 UJ
Aldrin	UG/KG	2.3 U	2.2 U	11 U	11 U	9.8 U	10 UJ
Heptachlor epoxide	UG/KG	2.3 U	2.2 U	11 U	11 U	9.8 U	10 UJ
Endosulfan I	UG/KG	2.3 U	2.2 U	11 U	11 U	9.8 U	10 UJ
Dieldrin	UG/KG	4.4 U	6.9	22 U	22 U	19 U	20 UJ
4,4'-DDE	UG/KG	14 J	47 J	22 U	22 U	130	69 J
Endrin	UG/KG	4.4 U	4.3 U	22 U	22 U	19 U	20 UJ
Endosulfan II	UG/KG	4.4 U	4.3 U	22 U	22 U	19 U	20 UJ
4,4'-DDD	UG/KG	23 J	110 J	22 U	22 U	39 J	30 J
Endosulfan sulfate	UG/KG	4.4 U	4.3 U	22 U	22 U	19 U	20 UJ
4,4'-DDT	UG/KG	110 J	66 J	22 U	22 U	36 J	20 UJ
Methoxychlor	UG/KG	23 U	22 U	110 U	110 U	98 U	100 UJ
Endrin ketone	UG/KG	4.4 U	4.3 U	22 U	22 U	19 U	20 UJ
Endrin aldehyde	UG/KG	4.4 U	4.3 U	22 U	22 U	19 U	20 UJ
alpha-Chlordane	UG/KG	2.3 U	7.2	13 J	11 U	38 J	31 J
gamma-Chlordane	UG/KG	2.3 U	6.2	11 U	11 U	9.8 U	10 UJ
Toxaphene	UG/KG	230 U	220 U	1100 U	1100 U	980 U	1000 UJ
Aroclor 1016	UG/KG	44 U	43 U	220 U	220 U	190 U	200 UJ
Aroclor 1221	UG/KG	90 U	86 U	440 U	440 U	390 U	410 UJ
Aroclor 1232	UG/KG	44 U	43 U	220 U	220 U	190 U	200 UJ
Aroclor 1242	UG/KG	44 U	43 U	220 U	220 U	190 U	200 UJ
Aroclor 1248	UG/KG	44 U	43 U	220 U	220 U	190 U	200 UJ
Aroclor 1254	UG/KG	44 U	43 U	220 U	220 U	190 U	200 UJ
Aroclor 1260	UG/KG	44 U	43 U	220 U	220 U	190 U	200 UJ

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-WT-SD02-06	7-WT-SD02-06D
Laboratory Sample ID:	AB1692	AB1666
Date Sampled:	6/23/94	6/23/94

	<u>UNITS</u>		
<u>VOLATILES</u>			
Chloromethane	UG/KG	12 U	15 U
Bromomethane	UG/KG	12 U	15 U
Vinyl chloride	UG/KG	12 U	15 U
Chloroethane	UG/KG	12 U	15 U
Methylene chloride	UG/KG	12 U	15 U
Acetone	UG/KG	55 U	47 U
Carbon Disulfide	UG/KG	12 U	15 U
1,1-Dichloroethene	UG/KG	12 U	15 U
1,1-Dichloroethane	UG/KG	12 U	15 U
1,2-Dichloroethene(total)	UG/KG	12 U	15 U
Chloroform	UG/KG	12 U	15 U
1,2-Dichloroethane	UG/KG	12 U	15 U
2-Butanone	UG/KG	9 J	15 U
1,1,1-Trichloroethane	UG/KG	12 U	15 U
Carbon tetrachloride	UG/KG	12 U	15 U
Bromodichloromethane	UG/KG	12 U	15 U
1,2-Dichloropropane	UG/KG	12 U	15 U
cis-1,3-Dichloropropene	UG/KG	12 U	15 U
Trichloroethene	UG/KG	12 U	15 U
Dibromochloromethane	UG/KG	12 U	15 U
1,1,2-Trichloroethane	UG/KG	12 U	15 U
Benzene	UG/KG	12 U	15 U
trans-1,3-Dichloropropene	UG/KG	12 U	15 U
Bromoform	UG/KG	12 U	15 U
4-Methyl-2-pentanone	UG/KG	12 U	15 U
2-Hexanone	UG/KG	12 U	15 U
Tetrachloroethene	UG/KG	12 U	15 U
1,1,2,2-Tetrachloroethane	UG/KG	12 U	15 U
Toluene	UG/KG	12 U	15 U
Chlorobenzene	UG/KG	12 U	15 U
Ethylbenzene	UG/KG	12 U	15 U
Styrene	UG/KG	12 U	15 U
Xylenes (total)	UG/KG	12 U	15 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-WT-SD02-06	7-WT-SD02-06D
Laboratory Sample ID:	AB1692	AB1666
Date Sampled:	6/23/94	6/23/94

	<u>UNITS</u>		
<b>SEMIVOLATILES</b>			
Phenol	UG/KG	410 U	500 U
bis(2-Chloroethyl) ether	UG/KG	410 U	500 U
2-Chlorophenol	UG/KG	410 U	500 U
1,3-Dichlorobenzene	UG/KG	410 U	500 U
1,4-Dichlorobenzene	UG/KG	410 U	500 U
1,2-Dichlorobenzene	UG/KG	410 U	500 U
2-Methylphenol	UG/KG	410 U	500 U
2,2'-oxybis-(1-chloropropane)	UG/KG	410 U	500 U
4-Methylphenol	UG/KG	410 U	500 U
N-Nitroso-di-n-propylamine	UG/KG	410 U	500 U
Hexachloroethane	UG/KG	410 U	500 U
Nitrobenzene	UG/KG	410 U	500 U
Isophorone	UG/KG	410 U	500 U
2-Nitrophenol	UG/KG	410 U	500 U
2,4-Dimethylphenol	UG/KG	410 U	500 U
bis(2-Chloroethoxy) methane	UG/KG	410 U	500 U
2,4-Dichlorophenol	UG/KG	410 U	500 U
1,2,4-Trichlorobenzene	UG/KG	410 U	500 U
Naphthalene	UG/KG	410 U	500 U
4-Chloroaniline	UG/KG	410 U	500 U
Hexachlorobutadiene	UG/KG	410 U	500 U
4-Chloro-3-methylphenol	UG/KG	410 U	500 U
2-Methylnaphthalene	UG/KG	410 U	500 U
Hexachlorocyclopentadiene	UG/KG	410 U	500 U
2,4,6-Trichlorophenol	UG/KG	410 U	500 U
2,4,5-Trichlorophenol	UG/KG	990 U	1200 U
2-Chloronaphthalene	UG/KG	410 U	500 U
2-Nitroaniline	UG/KG	990 U	1200 U
Dimethyl phthalate	UG/KG	410 U	500 U
Acenaphthylene	UG/KG	410 U	500 U
2,6-Dinitrotoluene	UG/KG	410 U	500 U
3-Nitroaniline	UG/KG	990 U	1200 U
Acenaphthene	UG/KG	410 U	500 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-WT-SD02-06	7-WT-SD02-06D
Laboratory Sample ID:	AB1692	AB1666
Date Sampled:	6/23/94	6/23/94

UNITS

<u>SEMIVOLATILES Cont.</u>			
2,4-Dinitrophenol	UG/KG	990 U	1200 U
4-Nitrophenol	UG/KG	990 U	1200 U
Dibenzofuran	UG/KG	410 U	500 U
2,4-Dinitrotoluene	UG/KG	410 U	500 U
Diethylphthalate	UG/KG	410 U	500 U
4-Chlorophenyl phenyl ether	UG/KG	410 U	500 U
Fluorene	UG/KG	410 U	500 U
4-Nitroaniline	UG/KG	990 U	1200 U
4,6-Dinitro-2-methylphenol	UG/KG	990 U	1200 U
N-nitrosodiphenylamine	UG/KG	410 U	500 U
4-Bromophenyl-phenylether	UG/KG	410 U	500 U
Hexachlorobenzene	UG/KG	410 U	500 U
Pentachlorophenol	UG/KG	990 U	1200 U
Phenanthrene	UG/KG	410 U	500 U
Anthracene	UG/KG	410 U	500 U
Carbazole	UG/KG	410 U	500 U
di-n-Butylphthalate	UG/KG	410 U	500 U
Fluoranthene	UG/KG	410 U	500 U
Pyrene	UG/KG	410 U	63 J
Butyl benzyl phthalate	UG/KG	410 U	500 U
3,3'-Dichlorobenzidine	UG/KG	410 U	500 U
Benzo[a]anthracene	UG/KG	410 U	500 U
Chrysene	UG/KG	410 U	500 U
bis(2-Ethylhexyl)phthalate	UG/KG	410 U	700
di-n-Octylphthalate	UG/KG	410 U	500 U
Benzo[b]fluoranthene	UG/KG	410 U	500 U
Benzo[k]fluoranthene	UG/KG	410 U	500 U
Benzo[a]pyrene	UG/KG	410 U	500 U
Indeno[1,2,3-cd]pyrene	UG/KG	410 U	500 U
Dibenz[a,h]anthracene	UG/KG	410 U	500 U
Benzo[g,h,i]perylene	UG/KG	410 U	500 U

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-WT-SD02-06	7-WT-SD02-06D
Laboratory Sample ID:	AB1692	AB1666
Date Sampled:	6/23/94	6/23/94

	UNITS		
<u>PESTICIDES/PCBs</u>			
alpha-BHC	UG/KG	2.1 U	2.5 U
beta-BHC	UG/KG	2.1 U	2.5 U
delta-BHC	UG/KG	2.1 U	2.5 U
Lindane (gamma-BHC)	UG/KG	2.1 U	2.5 U
Heptachlor	UG/KG	2.1 U	2.5 U
Aldrin	UG/KG	2.1 U	2.5 U
Heptachlor epoxide	UG/KG	2.1 U	2.5 U
Endosulfan I	UG/KG	2.1 U	2.5 U
Dieldrin	UG/KG	22	30
4,4'-DDE	UG/KG	4 U	27
Endrin	UG/KG	4 U	4.8 U
Endosulfan II	UG/KG	4 U	4.8 U
4,4'-DDD	UG/KG	4 U	4.9
Endosulfan sulfate	UG/KG	4 U	4.8 U
4,4'-DDT	UG/KG	4 U	7.4 J
Methoxychlor	UG/KG	21 U	25 U
Endrin ketone	UG/KG	4 U	4.8 U
Endrin aldehyde	UG/KG	4 U	4.8 U
alpha-Chlordane	UG/KG	2.7	3.9 J
gamma-Chlordane	UG/KG	2.1 U	2.5 U
Toxaphene	UG/KG	210 U	250 U
Aroclor 1016	UG/KG	40 U	48 U
Aroclor 1221	UG/KG	81 U	98 U
Aroclor 1232	UG/KG	40 U	48 U
Aroclor 1242	UG/KG	40 U	48 U
Aroclor 1248	UG/KG	40 U	48 U
Aroclor 1254	UG/KG	40 UJ	79 J
Aroclor 1260	UG/KG	40 U	48 U

**APPENDIX J.12**  
**EAST AND WEST TRIBUTARIES, DRAINAGE DITCH,**  
**AND MARSH AREA SEDIMENT METALS**

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FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-DD-SD01-06	7-DD-SD01-06D	7-ET-SD02-06	7-ET-SD02-06D	7-MA-SD02-06	7-MA-SD02-06D
Laboratory Sample ID:	B1378	B1381	AB1688	AB1665	AB1410	AB1412
Date Sampled:	6/22/94	6/22/94	6/24/94	6/24/94	6/23/94	6/23/94

	UNITS	7-DD-SD01-06	7-DD-SD01-06D	7-ET-SD02-06	7-ET-SD02-06D	7-MA-SD02-06	7-MA-SD02-06D
Aluminum	MG/KG	5720 J	3020 J	2060 J	4150 J	1170	1550
Antimony	MG/KG	12.8 U	12.6 U	64.7 U	66.7 U	60 U	60.7 U
Arsenic	MG/KG	0.51 U	0.49 U	3	3.7	2.4 U	2.4 U
Barium	MG/KG	18 J	9.7 J	7	9.1	31.7	37.5
Beryllium	MG/KG	0.44	0.36	1.3 U	1.3 U	1.2 U	1.2 U
Cadmium	MG/KG	1.3 U	1.3 U	6.5 U	6.7 U	6 U	6.1 U
Calcium	MG/KG	522 J	1200 J	5400	6830	2990	3500
Chromium	MG/KG	7.5 J	4.4 J	12.9 U	13.3 U	12 U	12.1 U
Cobalt	MG/KG	2.6 U	2.5 U	12.9 U	13.3 U	12 U	12.1 U
Copper	MG/KG	2.6 U	2.5 U	12.9 U	13.3 U	12 U	12.1 U
Iron	MG/KG	757	654	1120 J	2860 J	570	687
Lead	MG/KG	4.8 J	9 J	17.3 J	17.2 J	46.9	61.9
Magnesium	MG/KG	190	118	5390	7800	2420	2920
Manganese	MG/KG	5.1 J	2.1 J	5.5	10.8	4.7	6
Mercury	MG/KG	0.14 U	0.13 U	0.57 U	0.59 U	0.61 U	0.57 U
Nickel	MG/KG	5.1 U	5 U	25.9 U	26.7 U	24 U	24.3 U
Potassium	MG/KG	471 U	365 U	3380 U	2200 U	1200 U	1690
Selenium	MG/KG	0.51 U	0.49 U	2.5 U	2.7 U	2.4 U	2.4 U
Silver	MG/KG	1.3 U	1.3 U	6.5 U	6.7 U	6 U	6.1 U
Sodium	MG/KG	40.9	43.5	20700	27100	3810	4520
Thallium	MG/KG	0.51 U	0.49 UJ	2.5 UJ	4 J	2.4 UJ	2.4 UJ
Vanadium	MG/KG	5.5 J	3.1 J	12.9 U	13.3 U	12 U	12.1 U
Zinc	MG/KG	4.7	4.5	38.1	37.2	10.7 J	18.3 J

FIELD DUPLICATE SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-WT-SD02-06	7-WT-SD02-06D
Laboratory Sample ID:	AB1693	AB1667
Date Sampled:	6/23/94	6/23/94

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	<u>UNITS</u>		
Aluminum	MG/KG	1690 J	3910 J
Antimony	MG/KG	12.2 U	14.3 U
Arsenic	MG/KG	0.45 U	0.56 U
Barium	MG/KG	9	15.2
Beryllium	MG/KG	0.24 U	0.29 U
Cadmium	MG/KG	1.2 U	1.4 U
Calcium	MG/KG	877	611
Chromium	MG/KG	4.2	6.1
Cobalt	MG/KG	2.4 U	2.9 U
Copper	MG/KG	3.2	2.9 U
Iron	MG/KG	975	1350
Lead	MG/KG	16.7 J	44.7 J
Magnesium	MG/KG	138	416
Manganese	MG/KG	3.8	5.6
Mercury	MG/KG	0.11 U	0.15 U
Nickel	MG/KG	4.9 U	5.7 U
Potassium	MG/KG	395 U	630 U
Selenium	MG/KG	0.45 U	0.56 U
Silver	MG/KG	1.2 U	1.4 U
Sodium	MG/KG	206	325
Thallium	MG/KG	0.45 UJ	0.69 J
Vanadium	MG/KG	4.1	6.8
Zinc	MG/KG	15.2	19.4

**APPENDIX K**  
**QA/QC SUMMARIES**

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**APPENDIX K.1**  
**SOIL ORGANICS**

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FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	274-FB-01	7-FB-01	7-RS-06	7-TB-01	7-TB-02	7-TB-03
Laboratory Sample ID:	AD2074	AC5368	AD2077	AC4841	AC4941	AC5363
Date Sampled:	12/03/94	10/24/94	12/03/94	10/21/94	10/22/94	10/23/94

	UNITS						
<u>VOLATILES</u>							
Chloromethane	UG/L	10 U	10 U	10 U	10 U	9 J	10 U
Bromomethane	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	UG/L	10 UJ	10 U	10 UJ	10 U	10 U	10 U
Methylene chloride	UG/L	2 J	10 U	2 J	10 U	4 J	10 U
Acetone	UG/L	14	10 U	16	10 U	10 U	10 U
Carbon Disulfide	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene(total)	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	UG/L	10 U	6 J	10 U	10 U	10 U	10 U
1,2-Dichloroethane	UG/L	10 U	10 U	10 U	10 U	3 J	10 U
2-Butanone	UG/L	15	10 U	15	10 U	10 U	10 U
1,1,1-Trichloroethane	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Xylenes (total)	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	274-FB-01	7-FB-01	7-RS-06	7-TB-01	7-TB-02	7-TB-03
Laboratory Sample ID:	AD2074	AC5368	AD2077	AC4841	AC4941	AC5363
Date Sampled:	12/03/94	10/24/94	12/03/94	10/21/94	10/22/94	10/23/94

UNITS

SEMIVOLATILES

Compound	274-FB-01	7-FB-01	7-RS-06	7-TB-01	7-TB-02	7-TB-03
Phenol	UG/L	10 U	10 U	10 U	NA	NA
bis(2-Chloroethyl) ether	UG/L	10 U	10 UJ	10 U	NA	NA
2-Chlorophenol	UG/L	10 U	10 U	10 U	NA	NA
1,3-Dichlorobenzene	UG/L	10 U	10 U	10 U	NA	NA
1,4-Dichlorobenzene	UG/L	10 U	10 U	10 U	NA	NA
1,2-Dichlorobenzene	UG/L	10 U	10 U	10 U	NA	NA
2-Methylphenol	UG/L	10 U	10 U	10 U	NA	NA
2,2'-oxybis-(1-chloropropane)	UG/L	10 U	10 U	10 U	NA	NA
4-Methylphenol	UG/L	10 U	10 U	10 U	NA	NA
N-Nitroso-di-n-propylamine	UG/L	10 U	10 UJ	10 U	NA	NA
Hexachloroethane	UG/L	10 U	10 U	10 U	NA	NA
Nitrobenzene	UG/L	10 U	10 U	10 U	NA	NA
Isophorone	UG/L	10 U	10 U	10 U	NA	NA
2-Nitrophenol	UG/L	10 U	10 U	10 U	NA	NA
2,4-Dimethylphenol	UG/L	10 U	10 U	10 U	NA	NA
bis(2-Chloroethoxy) methane	UG/L	10 U	10 U	10 U	NA	NA
2,4-Dichlorophenol	UG/L	10 U	10 U	10 U	NA	NA
1,2,4-Trichlorobenzene	UG/L	10 U	10 U	10 U	NA	NA
Naphthalene	UG/L	10 U	10 U	10 U	NA	NA
4-Chloroaniline	UG/L	10 U	10 U	10 U	NA	NA
Hexachlorobutadiene	UG/L	10 U	10 U	10 U	NA	NA
4-Chloro-3-methylphenol	UG/L	10 U	10 U	10 U	NA	NA
2-Methylnaphthalene	UG/L	10 U	10 U	10 U	NA	NA
Hexachlorocyclopentadiene	UG/L	10 U	10 U	10 U	NA	NA
2,4,6-Trichlorophenol	UG/L	10 U	10 U	10 U	NA	NA
2,4,5-Trichlorophenol	UG/L	25 U	25 U	25 U	NA	NA
2-Chloronaphthalene	UG/L	10 U	10 U	10 U	NA	NA
2-Nitroaniline	UG/L	25 U	25 U	25 U	NA	NA
Dimethyl phthalate	UG/L	10 U	10 U	10 U	NA	NA
Acenaphthylene	UG/L	10 U	10 U	10 U	NA	NA
2,6-Dinitrotoluene	UG/L	10 U	10 U	10 U	NA	NA
3-Nitroaniline	UG/L	25 U	25 U	25 U	NA	NA
Acenaphthene	UG/L	10 U	10 U	10 U	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	274-FB-01	7-FB-01	7-RS-06	7-TB-01	7-TB-02	7-TB-03
Laboratory Sample ID:	AD2074	AC5368	AD2077	AC4841	AC4941	AC5363
Date Sampled:	12/03/94	10/24/94	12/03/94	10/21/94	10/22/94	10/23/94

UNITS

SEMIVOLATILES Cont.

Compound	274-FB-01	7-FB-01	7-RS-06	7-TB-01	7-TB-02	7-TB-03
2,4-Dinitrophenol	UG/L 25 U	25 U	25 U	25 U	NA	NA
4-Nitrophenol	UG/L 25 U	25 U	25 U	25 U	NA	NA
Dibenzofuran	UG/L 10 U	10 U	10 U	10 U	NA	NA
2,4-Dinitrotoluene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Diethylphthalate	UG/L 10 U	10 U	10 U	10 U	NA	NA
4-Chlorophenyl phenyl ether	UG/L 10 UJ	10 U	10 U	10 UJ	NA	NA
Fluorene	UG/L 10 U	10 U	10 U	10 U	NA	NA
4-Nitroaniline	UG/L 25 U	25 U	25 U	25 U	NA	NA
4,6-Dinitro-2-methylphenol	UG/L 25 U	25 U	25 U	25 U	NA	NA
N-nitrosodiphenylamine	UG/L 10 U	10 U	10 U	10 U	NA	NA
4-Bromophenyl-phenylether	UG/L 10 U	10 U	10 U	10 U	NA	NA
Hexachlorobenzene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Pentachlorophenol	UG/L 25 U	1 J	25 U	25 U	NA	NA
Phenanthrene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Anthracene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Carbazole	UG/L 10 U	10 U	10 U	10 U	NA	NA
di-n-Butylphthalate	UG/L 10 U	10 U	10 U	10 U	NA	NA
Fluoranthene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Pyrene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Butyl benzyl phthalate	UG/L 10 U	10 U	10 U	10 U	NA	NA
3,3'-Dichlorobenzidine	UG/L 10 U	10 U	10 U	10 U	NA	NA
Benzo[a]anthracene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Chrysene	UG/L 10 U	10 U	10 U	10 U	NA	NA
bis(2-Ethylhexyl)phthalate	UG/L 10 U	2 J	1 J	1 J	NA	NA
di-n-Octylphthalate	UG/L 10 U	10 U	10 U	10 U	NA	NA
Benzo[b]fluoranthene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Benzo[k]fluoranthene	UG/L 10 UJ	10 U	10 U	10 UJ	NA	NA
Benzo[a]pyrene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Indeno[1,2,3-cd]pyrene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Dibenz[a,h]anthracene	UG/L 10 U	10 U	10 U	10 U	NA	NA
Benzo[g,h,i]perylene	UG/L 10 U	10 U	10 U	10 U	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	274-FB-01	7-FB-01	7-RS-06	7-TB-01	7-TB-02	7-TB-03
Laboratory Sample ID:	AD2074	AC5368	AD2077	AC4841	AC4941	AC5363
Date Sampled:	12/03/94	10/24/94	12/03/94	10/21/94	10/22/94	10/23/94

PESTICIDES/PCBs	UNITS						
	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
alpha-BHC	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
beta-BHC	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
delta-BHC	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
Lindane (gamma-BHC)	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
Heptachlor	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
Aldrin	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
Heptachlor epoxide	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
Endosulfan I	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
Dieldrin	UG/L	0.1 U	0.1 UJ	0.1 U	NA	NA	NA
4,4'-DDE	UG/L	0.1 U	0.1 UJ	0.1 U	NA	NA	NA
Endrin	UG/L	0.1 U	0.1 UJ	0.1 U	NA	NA	NA
Endosulfan II	UG/L	0.1 U	0.1 UJ	0.1 U	NA	NA	NA
4,4'-DDD	UG/L	0.1 U	0.1 UJ	0.1 U	NA	NA	NA
Endosulfan sulfate	UG/L	0.1 U	0.1 UJ	0.1 U	NA	NA	NA
4,4'-DDT	UG/L	0.1 U	0.1 UJ	0.1 U	NA	NA	NA
Methoxychlor	UG/L	0.5 U	0.5 UJ	0.5 U	NA	NA	NA
Endrin ketone	UG/L	0.1 U	0.1 UJ	0.1 U	NA	NA	NA
Endrin aldehyde	UG/L	0.1 U	0.1 UJ	0.1 U	NA	NA	NA
alpha-Chlordane	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
gamma-Chlordane	UG/L	0.05 U	0.05 UJ	0.05 U	NA	NA	NA
Toxaphene	UG/L	5 U	5 UJ	5 U	NA	NA	NA
Aroclor 1016	UG/L	1 U	1 UJ	1 U	NA	NA	NA
Aroclor 1221	UG/L	2 U	2 UJ	2 U	NA	NA	NA
Aroclor 1232	UG/L	1 U	1 UJ	1 U	NA	NA	NA
Aroclor 1242	UG/L	1 U	1 UJ	1 U	NA	NA	NA
Aroclor 1248	UG/L	1 U	1 UJ	1 U	NA	NA	NA
Aroclor 1254	UG/L	1 U	1 UJ	1 U	NA	NA	NA
Aroclor 1260	UG/L	1 U	1 UJ	1 U	NA	NA	NA



FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-TB-04	7-TB-05	7-TB-06	7-TB-10	7-TK-01
Laboratory Sample ID:	AC5362	AC5491	Q41118803	AD2102	AD2057
Date Sampled:	10/24/94	10/25/94	11/03/94	12/03/94	12/03/94

UNITS

VOLATILES

Chloromethane	UG/L	10 U	13 J	10 U	10 U	10 U
Bromomethane	UG/L	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	UG/L	10 U	10 U	10 U	10 U	10 U
Chloroethane	UG/L	10 U	10 U	10 U	10 UJ	10 U
Methylene chloride	UG/L	10 U	2 J	10 U	3 J	10 U
Acetone	UG/L	10 U	7 J	10 U	10 U	140
Carbon Disulfide	UG/L	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	UG/L	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	UG/L	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene(total)	UG/L	10 U	10 U	10 U	10 U	10 U
Chloroform	UG/L	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	UG/L	10 U	5 J	2 J	3 J	10 U
2-Butanone	UG/L	10 U	10 U	10 U	10	9 J
1,1,1-Trichloroethane	UG/L	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	UG/L	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	UG/L	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	UG/L	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	UG/L	10 U	10 U	10 U	10 U	10 U
Trichloroethene	UG/L	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	UG/L	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	UG/L	10 U	1 J	10 U	10 U	10 U
Benzene	UG/L	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	UG/L	10 U	10 UJ	10 U	10 U	10 U
Bromoform	UG/L	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	UG/L	10 U	10 U	10 U	10 U	10 U
2-Hexanone	UG/L	10 U	4 J	10 U	10 U	10 U
Tetrachloroethene	UG/L	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	UG/L	10 U	10 UJ	10 U	10 U	10 U
Toluene	UG/L	10 U	1 J	10 U	10 U	10 U
Chlorobenzene	UG/L	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	UG/L	10 U	10 U	10 U	10 U	10 U
Styrene	UG/L	10 U	10 U	10 U	10 U	10 U
Xylenes (total)	UG/L	10 U	2 J	10 U	10 U	10 U

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-TB-04	7-TB-05	7-TB-06	7-TB-10	7-TK-01
Laboratory Sample ID:	AC5362	AC5491	Q41118803	AD2102	AD2057
Date Sampled:	10/24/94	10/25/94	11/03/94	12/03/94	12/03/94

		<u>UNITS</u>				
<u>SEMIVOLATILES</u>						
Phenol	UG/L	NA	NA	NA	NA	10 U
bis(2-Chloroethyl) ether	UG/L	NA	NA	NA	NA	10 U
2-Chlorophenol	UG/L	NA	NA	NA	NA	10 U
1,3-Dichlorobenzene	UG/L	NA	NA	NA	NA	10 U
1,4-Dichlorobenzene	UG/L	NA	NA	NA	NA	10 U
1,2-Dichlorobenzene	UG/L	NA	NA	NA	NA	10 U
2-Methylphenol	UG/L	NA	NA	NA	NA	10 U
2,2'-oxybis-(1-chloropropane)	UG/L	NA	NA	NA	NA	10 U
4-Methylphenol	UG/L	NA	NA	NA	NA	10 U
N-Nitroso-di-n-propylamine	UG/L	NA	NA	NA	NA	10 U
Hexachloroethane	UG/L	NA	NA	NA	NA	10 U
Nitrobenzene	UG/L	NA	NA	NA	NA	10 U
Isophorone	UG/L	NA	NA	NA	NA	10 U
2-Nitrophenol	UG/L	NA	NA	NA	NA	10 U
2,4-Dimethylphenol	UG/L	NA	NA	NA	NA	10 U
bis(2-Chloroethoxy) methane	UG/L	NA	NA	NA	NA	10 U
2,4-Dichlorophenol	UG/L	NA	NA	NA	NA	10 U
1,2,4-Trichlorobenzene	UG/L	NA	NA	NA	NA	10 U
Naphthalene	UG/L	NA	NA	NA	NA	10 U
4-Chloroaniline	UG/L	NA	NA	NA	NA	10 U
Hexachlorobutadiene	UG/L	NA	NA	NA	NA	10 U
4-Chloro-3-methylphenol	UG/L	NA	NA	NA	NA	10 U
2-Methylnaphthalene	UG/L	NA	NA	NA	NA	10 U
Hexachlorocyclopentadiene	UG/L	NA	NA	NA	NA	10 U
2,4,6-Trichlorophenol	UG/L	NA	NA	NA	NA	10 U
2,4,5-Trichlorophenol	UG/L	NA	NA	NA	NA	25 U
2-Chloronaphthalene	UG/L	NA	NA	NA	NA	10 U
2-Nitroaniline	UG/L	NA	NA	NA	NA	25 U
Dimethyl phthalate	UG/L	NA	NA	NA	NA	10 U
Acenaphthylene	UG/L	NA	NA	NA	NA	10 U
2,6-Dinitrotoluene	UG/L	NA	NA	NA	NA	10 U
3-Nitroaniline	UG/L	NA	NA	NA	NA	25 U
Acenaphthene	UG/L	NA	NA	NA	NA	10 U

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-TB-04	7-TB-05	7-TB-06	7-TB-10	7-TK-01
Laboratory Sample ID:	AC5362	AC5491	Q41118803	AD2102	AD2057
Date Sampled:	10/24/94	10/25/94	11/03/94	12/03/94	12/03/94

	UNITS					
<u>SEMIVOLATILES Cont.</u>						
2,4-Dinitrophenol	UG/L	NA	NA	NA	NA	25 U
4-Nitrophenol	UG/L	NA	NA	NA	NA	25 U
Dibenzofuran	UG/L	NA	NA	NA	NA	10 U
2,4-Dinitrotoluene	UG/L	NA	NA	NA	NA	10 U
Diethylphthalate	UG/L	NA	NA	NA	NA	10 U
4-Chlorophenyl phenyl ether	UG/L	NA	NA	NA	NA	10 UJ
Fluorene	UG/L	NA	NA	NA	NA	10 U
4-Nitroaniline	UG/L	NA	NA	NA	NA	25 U
4,6-Dinitro-2-methylphenol	UG/L	NA	NA	NA	NA	25 U
N-nitrosodiphenylamine	UG/L	NA	NA	NA	NA	10 U
4-Bromophenyl-phenylether	UG/L	NA	NA	NA	NA	10 U
Hexachlorobenzene	UG/L	NA	NA	NA	NA	10 U
Pentachlorophenol	UG/L	NA	NA	NA	NA	25 U
Phenanthrene	UG/L	NA	NA	NA	NA	10 U
Anthracene	UG/L	NA	NA	NA	NA	10 U
Carbazole	UG/L	NA	NA	NA	NA	10 U
di-n-Butylphthalate	UG/L	NA	NA	NA	NA	10 U
Fluoranthene	UG/L	NA	NA	NA	NA	10 U
Pyrene	UG/L	NA	NA	NA	NA	10 U
Butyl benzyl phthalate	UG/L	NA	NA	NA	NA	10 U
3,3'-Dichlorobenzidine	UG/L	NA	NA	NA	NA	10 U
Benzo[a]anthracene	UG/L	NA	NA	NA	NA	10 U
Chrysene	UG/L	NA	NA	NA	NA	10 U
bis(2-Ethylhexyl)phthalate	UG/L	NA	NA	NA	NA	10 U
di-n-Octylphthalate	UG/L	NA	NA	NA	NA	10 U
Benzo[b]fluoranthene	UG/L	NA	NA	NA	NA	10 U
Benzo[k]fluoranthene	UG/L	NA	NA	NA	NA	10 UJ
Benzo[a]pyrene	UG/L	NA	NA	NA	NA	10 U
Indeno[1,2,3-cd]pyrene	UG/L	NA	NA	NA	NA	10 U
Dibenz[a,h]anthracene	UG/L	NA	NA	NA	NA	10 U
Benzo[g,h,i]perylene	UG/L	NA	NA	NA	NA	10 U

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-TB-04	7-TB-05	7-TB-06	7-TB-10	7-TK-01
Laboratory Sample ID:	AC5362	AC5491	Q41118803	AD2102	AD2057
Date Sampled:	10/24/94	10/25/94	11/03/94	12/03/94	12/03/94

PESTICIDES/PCBs	UNITS					
alpha-BHC	UG/L	NA	NA	NA	NA	0.05 U
beta-BHC	UG/L	NA	NA	NA	NA	0.05 U
delta-BHC	UG/L	NA	NA	NA	NA	0.05 U
Lindane (gamma-BHC)	UG/L	NA	NA	NA	NA	0.05 U
Heptachlor	UG/L	NA	NA	NA	NA	0.05 U
Aldrin	UG/L	NA	NA	NA	NA	0.05 U
Heptachlor epoxide	UG/L	NA	NA	NA	NA	0.05 U
Endosulfan I	UG/L	NA	NA	NA	NA	0.05 U
Dieldrin	UG/L	NA	NA	NA	NA	0.1 U
4,4'-DDE	UG/L	NA	NA	NA	NA	0.1 U
Endrin	UG/L	NA	NA	NA	NA	0.1 U
Endosulfan II	UG/L	NA	NA	NA	NA	0.1 U
4,4'-DDD	UG/L	NA	NA	NA	NA	0.1 U
Endosulfan sulfate	UG/L	NA	NA	NA	NA	0.1 U
4,4'-DDT	UG/L	NA	NA	NA	NA	0.1 U
Methoxychlor	UG/L	NA	NA	NA	NA	0.5 U
Endrin ketone	UG/L	NA	NA	NA	NA	0.1 U
Endrin aldehyde	UG/L	NA	NA	NA	NA	0.1 U
alpha-Chlordane	UG/L	NA	NA	NA	NA	0.05 U
gamma-Chlordane	UG/L	NA	NA	NA	NA	0.05 U
Toxaphene	UG/L	NA	NA	NA	NA	5 U
Aroclor 1016	UG/L	NA	NA	NA	NA	1 U
Aroclor 1221	UG/L	NA	NA	NA	NA	2 U
Aroclor 1232	UG/L	NA	NA	NA	NA	1 U
Aroclor 1242	UG/L	NA	NA	NA	NA	1 U
Aroclor 1248	UG/L	NA	NA	NA	NA	1 U
Aroclor 1254	UG/L	NA	NA	NA	NA	1 U
Aroclor 1260	UG/L	NA	NA	NA	NA	1 U

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
	<u>VOLATILES</u>					
Chloromethane	UG/L	10 U	10 U	9 J	13 J	7-TB-05 2/11
Bromomethane	UG/L	10 U	10 U	ND	ND	0/11
Vinyl chloride	UG/L	10 U	10 U	ND	ND	0/11
Chloroethane	UG/L	10 UJ	10 UJ	ND	ND	0/11
Methylene chloride	UG/L	10 U	10 U	2 J	4 J	7-TB-02 5/11
Acetone	UG/L	10 U	10 U	7 J	140	7-TK-01 4/11
Carbon Disulfide	UG/L	10 U	10 U	ND	ND	0/11
1,1-Dichloroethene	UG/L	10 U	10 U	ND	ND	0/11
1,1-Dichloroethane	UG/L	10 U	10 U	ND	ND	0/11
1,2-Dichloroethene(total)	UG/L	10 U	10 U	ND	ND	0/11
Chloroform	UG/L	10 U	10 U	6 J	6 J	7-FB-01 1/11
1,2-Dichloroethane	UG/L	10 U	10 U	2 J	5 J	7-TB-05 4/11
2-Butanone	UG/L	10 U	10 U	9 J	15	7-RS-06 4/11
1,1,1-Trichloroethane	UG/L	10 U	10 U	ND	ND	0/11
Carbon tetrachloride	UG/L	10 U	10 U	ND	ND	0/11
Bromodichloromethane	UG/L	10 U	10 U	ND	ND	0/11
1,2-Dichloropropane	UG/L	10 U	10 U	ND	ND	0/11
cis-1,3-Dichloropropene	UG/L	10 U	10 U	ND	ND	0/11
Trichloroethene	UG/L	10 U	10 U	ND	ND	0/11
Dibromochloromethane	UG/L	10 U	10 U	ND	ND	0/11
1,1,2-Trichloroethane	UG/L	10 U	10 U	1 J	1 J	7-TB-05 1/11
Benzene	UG/L	10 U	10 U	ND	ND	0/11
trans-1,3-Dichloropropene	UG/L	10 U	10 U	ND	ND	0/11
Bromoform	UG/L	10 U	10 U	ND	ND	0/11
4-Methyl-2-pentanone	UG/L	10 U	10 U	ND	ND	0/11
2-Hexanone	UG/L	10 U	10 U	4 J	4 J	7-TB-05 1/11
Tetrachloroethene	UG/L	10 U	10 U	ND	ND	0/11
1,1,2,2-Tetrachloroethane	UG/L	10 U	10 U	ND	ND	0/11
Toluene	UG/L	10 U	10 U	1 J	1 J	7-TB-05 1/11
Chlorobenzene	UG/L	10 U	10 U	ND	ND	0/11
Ethylbenzene	UG/L	10 U	10 U	ND	ND	0/11
Styrene	UG/L	10 U	10 U	ND	ND	0/11
Xylenes (total)	UG/L	10 U	10 U	2 J	2 J	7-TB-05 1/11

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
	<u>SEMIVOLATILES</u>					
Phenol	UG/L	10 U	10 U	ND	ND	0/4
bis(2-Chloroethyl) ether	UG/L	10 U	10 U	ND	ND	0/4
2-Chlorophenol	UG/L	10 U	10 U	ND	ND	0/4
1,3-Dichlorobenzene	UG/L	10 U	10 U	ND	ND	0/4
1,4-Dichlorobenzene	UG/L	10 U	10 U	ND	ND	0/4
1,2-Dichlorobenzene	UG/L	10 U	10 U	ND	ND	0/4
2-Methylphenol	UG/L	10 U	10 U	ND	ND	0/4
2,2'-oxybis-(1-chloropropane)	UG/L	10 U	10 U	ND	ND	0/4
4-Methylphenol	UG/L	10 U	10 U	ND	ND	0/4
N-Nitroso-di-n-propylamine	UG/L	10 U	10 U	ND	ND	0/4
Hexachloroethane	UG/L	10 U	10 U	ND	ND	0/4
Nitrobenzene	UG/L	10 U	10 U	ND	ND	0/4
Isophorone	UG/L	10 U	10 U	ND	ND	0/4
2-Nitrophenol	UG/L	10 U	10 U	ND	ND	0/4
2,4-Dimethylphenol	UG/L	10 U	10 U	ND	ND	0/4
bis(2-Chloroethoxy) methane	UG/L	10 U	10 U	ND	ND	0/4
2,4-Dichlorophenol	UG/L	10 U	10 U	ND	ND	0/4
1,2,4-Trichlorobenzene	UG/L	10 U	10 U	ND	ND	0/4
Naphthalene	UG/L	10 U	10 U	ND	ND	0/4
4-Chloroaniline	UG/L	10 U	10 U	ND	ND	0/4
Hexachlorobutadiene	UG/L	10 U	10 U	ND	ND	0/4
4-Chloro-3-methylphenol	UG/L	10 U	10 U	ND	ND	0/4
2-Methylnaphthalene	UG/L	10 U	10 U	ND	ND	0/4
Hexachlorocyclopentadiene	UG/L	10 U	10 U	ND	ND	0/4
2,4,6-Trichlorophenol	UG/L	10 U	10 U	ND	ND	0/4
2,4,5-Trichlorophenol	UG/L	25 U	25 U	ND	ND	0/4
2-Chloronaphthalene	UG/L	10 U	10 U	ND	ND	0/4
2-Nitroaniline	UG/L	25 U	25 U	ND	ND	0/4
Dimethyl phthalate	UG/L	10 U	10 U	ND	ND	0/4
Acenaphthylene	UG/L	10 U	10 U	ND	ND	0/4
2,6-Dinitrotoluene	UG/L	10 U	10 U	ND	ND	0/4
3-Nitroaniline	UG/L	25 U	25 U	ND	ND	0/4
Acenaphthene	UG/L	10 U	10 U	ND	ND	0/4

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<u>UNITS</u>						
<u>SEMIVOLATILES Cont.</u>						
2,4-Dinitrophenol	UG/L	25 U	25 U	ND		0/4
4-Nitrophenol	UG/L	25 U	25 U	ND		0/4
Dibenzofuran	UG/L	10 U	10 U	ND		0/4
2,4-Dinitrotoluene	UG/L	10 U	10 U	ND		0/4
Diethylphthalate	UG/L	10 U	10 U	ND		0/4
4-Chlorophenyl phenyl ether	UG/L	10 UJ	10 UJ	ND		0/4
Fluorene	UG/L	10 U	10 U	ND		0/4
4-Nitroaniline	UG/L	25 U	25 U	ND		0/4
4,6-Dinitro-2-methylphenol	UG/L	25 U	25 U	ND		0/4
N-nitrosodiphenylamine	UG/L	10 U	10 U	ND		0/4
4-Bromophenyl-phenylether	UG/L	10 U	10 U	ND		0/4
Hexachlorobenzene	UG/L	10 U	10 U	ND		0/4
Pentachlorophenol	UG/L	25 U	25 U	1 J	7-FB-01	1/4
Phenanthrene	UG/L	10 U	10 U	ND		0/4
Anthracene	UG/L	10 U	10 U	ND		0/4
Carbazole	UG/L	10 U	10 U	ND		0/4
di-n-Butylphthalate	UG/L	10 U	10 U	ND		0/4
Fluoranthene	UG/L	10 U	10 U	ND		0/4
Pyrene	UG/L	10 U	10 U	ND		0/4
Butyl benzyl phthalate	UG/L	10 U	10 U	ND		0/4
3,3'-Dichlorobenzidine	UG/L	10 U	10 U	ND		0/4
Benzo[a]anthracene	UG/L	10 U	10 U	ND		0/4
Chrysene	UG/L	10 U	10 U	ND		0/4
bis(2-Ethylhexyl)phthalate	UG/L	10 U	10 U	1 J	7-FB-01	2/4
di-n-Octylphthalate	UG/L	10 U	10 U	ND		0/4
Benzo[b]fluoranthene	UG/L	10 U	10 U	ND		0/4
Benzo[k]fluoranthene	UG/L	10 UJ	10 UJ	ND		0/4
Benzo[a]pyrene	UG/L	10 U	10 U	ND		0/4
Indeno[1,2,3-cd]pyrene	UG/L	10 U	10 U	ND		0/4
Dibenz[a,h]anthracene	UG/L	10 U	10 U	ND		0/4
Benzo[g,h,i]perylene	UG/L	10 U	10 U	ND		0/4

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
	<u>PESTICIDES/PCBs</u>					
alpha-BHC	UG/L	0.05 U	0.05 U	ND	ND	0/4
beta-BHC	UG/L	0.05 U	0.05 U	ND	ND	0/4
delta-BHC	UG/L	0.05 U	0.05 U	ND	ND	0/4
Lindane (gamma-BHC)	UG/L	0.05 U	0.05 U	ND	ND	0/4
Heptachlor	UG/L	0.05 U	0.05 U	ND	ND	0/4
Aldrin	UG/L	0.05 U	0.05 U	ND	ND	0/4
Heptachlor epoxide	UG/L	0.05 U	0.05 U	ND	ND	0/4
Endosulfan I	UG/L	0.05 U	0.05 U	ND	ND	0/4
Dieldrin	UG/L	0.1 U	0.1 U	ND	ND	0/4
4,4'-DDE	UG/L	0.1 U	0.1 U	ND	ND	0/4
Endrin	UG/L	0.1 U	0.1 U	ND	ND	0/4
Endosulfan II	UG/L	0.1 U	0.1 U	ND	ND	0/4
4,4'-DDD	UG/L	0.1 U	0.1 U	ND	ND	0/4
Endosulfan sulfate	UG/L	0.1 U	0.1 U	ND	ND	0/4
4,4'-DDT	UG/L	0.1 U	0.1 U	ND	ND	0/4
Methoxychlor	UG/L	0.5 U	0.5 U	ND	ND	0/4
Endrin ketone	UG/L	0.1 U	0.1 U	ND	ND	0/4
Endrin aldehyde	UG/L	0.1 U	0.1 U	ND	ND	0/4
alpha-Chlordane	UG/L	0.05 U	0.05 U	ND	ND	0/4
gamma-Chlordane	UG/L	0.05 U	0.05 U	ND	ND	0/4
Toxaphene	UG/L	5 U	5 U	ND	ND	0/4
Aroclor 1016	UG/L	1 U	1 U	ND	ND	0/4
Aroclor 1221	UG/L	2 U	2 U	ND	ND	0/4
Aroclor 1232	UG/L	1 U	1 U	ND	ND	0/4
Aroclor 1242	UG/L	1 U	1 U	ND	ND	0/4
Aroclor 1248	UG/L	1 U	1 U	ND	ND	0/4
Aroclor 1254	UG/L	1 U	1 U	ND	ND	0/4
Aroclor 1260	UG/L	1 U	1 U	ND	ND	0/4



**APPENDIX K.2**  
**SOIL METALS**

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FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	274-FB-01	274-FBD-01	7-FB-01	7-RS-06	7-RSD-06	7-TK-01
Laboratory Sample ID:	AD2075	AD2086	AC5369	AD2078	AD2089	AD2058
Date Sampled:	12/03/94	12/01/94	10/24/94	12/03/94	12/01/94	12/03/94

	UNITS	274-FB-01	274-FBD-01	7-FB-01	7-RS-06	7-RSD-06	7-TK-01
Aluminum	UG/L	40 U	41.7	50.8	40 U	53.9	1130
Antimony	UG/L	50 U	50 U	50 U	50 U	50 U	50 U
Arsenic	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Barium	UG/L	2 U	2 U	4.2	2 U	2 U	23.5 J
Beryllium	UG/L	1 UJ	1 UJ	1 U	1 UJ	1 UJ	1 U
Cadmium	UG/L	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	UG/L	59.3	76.4	17000	89.4	79.6	14400
Chromium	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Copper	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Iron	UG/L	10 U	28	382	56.1	60.6	392
Lead	UG/L	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	UG/L	50 U	50 U	1430	50 U	50 U	2380
Manganese	UG/L	2 U	2 U	11.1	2 U	2 U	7.6 J
Mercury	UG/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	UG/L	20 U	20 U	20 U	20 U	20 U	20 U
Potassium	UG/L	1000 U	1000 U	1440	1000 U	1000 U	2070
Selenium	UG/L	5.9	5 U	5 U	5.9	5 U	5 U
Silver	UG/L	5 U	5 U	5 U	5 U	5 U	5 U
Sodium	UG/L	100 U	113	8130	100 U	100 U	19300
Thallium	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Vanadium	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
Zinc	UG/L	30.8 J	26.2 J	54.7 UJ	37.8 J	24.4 J	61.1 J

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
Aluminum	UG/L	40 U	40 U	41.7	1130	7-TK-01 4/6
Antimony	UG/L	50 U	50 U	ND	ND	0/6
Arsenic	UG/L	10 U	10 U	ND	ND	0/6
Barium	UG/L	2 U	2 U	4.2	23.5 J	7-TK-01 2/6
Beryllium	UG/L	1 UJ	1 UJ	ND	ND	0/6
Cadmium	UG/L	5 U	5 U	ND	ND	0/6
Calcium	UG/L	NA	NA	59.3	17000	7-FB-01 6/6
Chromium	UG/L	10 U	10 U	ND	ND	0/6
Cobalt	UG/L	10 U	10 U	ND	ND	0/6
Copper	UG/L	10 U	10 U	ND	ND	0/6
Iron	UG/L	10 U	10 U	28	392	7-TK-01 5/6
Lead	UG/L	3 U	3 U	ND	ND	0/6
Magnesium	UG/L	50 U	50 U	1430	2380	7-TK-01 2/6
Manganese	UG/L	2 U	2 U	7.6 J	11.1	7-FB-01 2/6
Mercury	UG/L	0.2 U	0.2 U	ND	ND	0/6
Nickel	UG/L	20 U	20 U	ND	ND	0/6
Potassium	UG/L	1000 U	1000 U	1440	2070	7-TK-01 2/6
Selenium	UG/L	5 U	5 U	5.9	5.9	7-RS-06 2/6
Silver	UG/L	5 U	5 U	ND	ND	0/6
Sodium	UG/L	100 U	100 U	113	19300	7-TK-01 3/6
Thallium	UG/L	10 U	10 U	ND	ND	0/6
Vanadium	UG/L	10 U	10 U	ND	ND	0/6
Zinc	UG/L	54.7 UJ	54.7 UJ	24.4 J	61.1 J	7-TK-01 5/6

**APPENDIX K.3**  
**GROUNDWATER ORGANICS**

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FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-RS-04	7-RS-05	7-TB-07	7-TB-08	7-TB-09
Laboratory Sample ID:	AC7820	AD1980	AC7835	AD1661	AD1989
Date Sampled:	11/07/94	12/01/94	11/07/94	12/01/94	12/02/94

UNITS

SEMIVOLATILES

Compound	7-RS-04	7-RS-05	7-TB-07	7-TB-08	7-TB-09
Phenol	UG/L	10 U	10 U	NA	NA
bis(2-Chloroethyl) ether	UG/L	10 U	10 U	NA	NA
2-Chlorophenol	UG/L	10 U	10 U	NA	NA
1,3-Dichlorobenzene	UG/L	10 U	10 U	NA	NA
1,4-Dichlorobenzene	UG/L	10 U	10 U	NA	NA
1,2-Dichlorobenzene	UG/L	10 U	10 U	NA	NA
2-Methylphenol	UG/L	10 U	10 UJ	NA	NA
2,2'-oxybis-(1-chloropropane)	UG/L	10 U	10 U	NA	NA
4-Methylphenol	UG/L	10 U	10 U	NA	NA
N-Nitroso-di-n-propylamine	UG/L	10 U	10 U	NA	NA
Hexachloroethane	UG/L	10 U	10 U	NA	NA
Nitrobenzene	UG/L	10 U	10 U	NA	NA
Isophorone	UG/L	10 U	10 U	NA	NA
2-Nitrophenol	UG/L	10 U	10 U	NA	NA
2,4-Dimethylphenol	UG/L	10 U	10 U	NA	NA
bis(2-Chloroethoxy) methane	UG/L	10 U	10 U	NA	NA
2,4-Dichlorophenol	UG/L	10 U	10 U	NA	NA
1,2,4-Trichlorobenzene	UG/L	10 U	10 U	NA	NA
Naphthalene	UG/L	10 U	10 U	NA	NA
4-Chloroaniline	UG/L	10 U	10 U	NA	NA
Hexachlorobutadiene	UG/L	10 U	10 U	NA	NA
4-Chloro-3-methylphenol	UG/L	10 U	10 U	NA	NA
2-Methylnaphthalene	UG/L	10 U	10 U	NA	NA
Hexachlorocyclopentadiene	UG/L	10 U	10 UJ	NA	NA
2,4,6-Trichlorophenol	UG/L	10 U	10 U	NA	NA
2,4,5-Trichlorophenol	UG/L	25 U	25 U	NA	NA
2-Chloronaphthalene	UG/L	10 U	10 U	NA	NA
2-Nitroaniline	UG/L	25 U	25 U	NA	NA
Dimethyl phthalate	UG/L	10 U	10 U	NA	NA
Acenaphthylene	UG/L	10 U	10 U	NA	NA
2,6-Dinitrotoluene	UG/L	10 U	10 U	NA	NA
3-Nitroaniline	UG/L	25 U	25 U	NA	NA
Acenaphthene	UG/L	10 U	10 U	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-RS-04	7-RS-05	7-TB-07	7-TB-08	7-TB-09
Laboratory Sample ID:	AC7820	AD1980	AC7835	AD1661	AD1989
Date Sampled:	11/07/94	12/01/94	11/07/94	12/01/94	12/02/94

	<u>UNITS</u>					
<u>SEMIVOLATILES Cont.</u>						
2,4-Dinitrophenol	UG/L	25 U	25 UJ	NA	NA	NA
4-Nitrophenol	UG/L	25 U	25 U	NA	NA	NA
Dibenzofuran	UG/L	10 U	10 U	NA	NA	NA
2,4-Dinitrotoluene	UG/L	10 U	10 U	NA	NA	NA
Diethylphthalate	UG/L	10 U	1 J	NA	NA	NA
4-Chlorophenyl phenyl ether	UG/L	10 U	10 UJ	NA	NA	NA
Fluorene	UG/L	10 U	10 U	NA	NA	NA
4-Nitroaniline	UG/L	25 U	25 U	NA	NA	NA
4,6-Dinitro-2-methylphenol	UG/L	25 U	25 U	NA	NA	NA
N-nitrosodiphenylamine	UG/L	10 U	10 U	NA	NA	NA
4-Bromophenyl-phenylether	UG/L	10 U	10 U	NA	NA	NA
Hexachlorobenzene	UG/L	10 U	10 UJ	NA	NA	NA
Pentachlorophenol	UG/L	25 U	25 U	NA	NA	NA
Phenanthrene	UG/L	10 U	10 U	NA	NA	NA
Anthracene	UG/L	10 U	10 U	NA	NA	NA
Carbazole	UG/L	10 U	10 U	NA	NA	NA
di-n-Butylphthalate	UG/L	10 U	10 U	NA	NA	NA
Fluoranthene	UG/L	10 U	10 U	NA	NA	NA
Pyrene	UG/L	10 U	10 U	NA	NA	NA
Butyl benzyl phthalate	UG/L	10 U	10 U	NA	NA	NA
3,3'-Dichlorobenzidine	UG/L	10 U	10 U	NA	NA	NA
Benzo[a]anthracene	UG/L	10 U	10 U	NA	NA	NA
Chrysene	UG/L	10 U	10 U	NA	NA	NA
bis(2-Ethylhexyl)phthalate	UG/L	2 J	15	NA	NA	NA
di-n-Octylphthalate	UG/L	10 U	10 U	NA	NA	NA
Benzo[b]fluoranthene	UG/L	10 U	10 U	NA	NA	NA
Benzo[k]fluoranthene	UG/L	10 U	10 U	NA	NA	NA
Benzo[a]pyrene	UG/L	10 U	10 U	NA	NA	NA
Indeno[1,2,3-cd]pyrene	UG/L	10 U	10 U	NA	NA	NA
Dibenz[a,h]anthracene	UG/L	10 U	10 U	NA	NA	NA
Benzo[g,h,i]perylene	UG/L	10 U	10 U	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-RS-04	7-RS-05	7-TB-07	7-TB-08	7-TB-09
Laboratory Sample ID:	AC7820	AD1980	AC7835	AD1661	AD1989
Date Sampled:	11/07/94	12/01/94	11/07/94	12/01/94	12/02/94

UNITS

PESTICIDES/PCBs

	7-RS-04	7-RS-05	7-TB-07	7-TB-08	7-TB-09
alpha-BHC	UG/L	0.05 UJ	0.05 U	NA	NA
beta-BHC	UG/L	0.05 UJ	0.05 U	NA	NA
delta-BHC	UG/L	0.05 UJ	0.05 U	NA	NA
Lindane (gamma-BHC)	UG/L	0.05 UJ	0.05 U	NA	NA
Heptachlor	UG/L	0.05 UJ	0.05 U	NA	NA
Aldrin	UG/L	0.05 UJ	0.05 U	NA	NA
Heptachlor epoxide	UG/L	0.05 UJ	0.05 U	NA	NA
Endosulfan I	UG/L	0.05 UJ	0.05 U	NA	NA
Dieldrin	UG/L	0.1 UJ	0.1 U	NA	NA
4,4'-DDE	UG/L	0.1 UJ	0.1 U	NA	NA
Endrin	UG/L	0.1 UJ	0.1 U	NA	NA
Endosulfan II	UG/L	0.1 UJ	0.1 U	NA	NA
4,4'-DDD	UG/L	0.1 UJ	0.1 U	NA	NA
Endosulfan sulfate	UG/L	0.1 UJ	0.1 U	NA	NA
4,4'-DDT	UG/L	0.1 UJ	0.1 U	NA	NA
Methoxychlor	UG/L	0.5 UJ	0.5 U	NA	NA
Endrin ketone	UG/L	0.1 UJ	0.1 U	NA	NA
Endrin aldehyde	UG/L	0.1 UJ	0.1 U	NA	NA
alpha-Chlordane	UG/L	0.05 UJ	0.05 U	NA	NA
gamma-Chlordane	UG/L	0.05 UJ	0.05 U	NA	NA
Toxaphene	UG/L	5 UJ	5 U	NA	NA
Aroclor 1016	UG/L	1 UJ	1 U	NA	NA
Aroclor 1221	UG/L	2 UJ	2 U	NA	NA
Aroclor 1232	UG/L	1 UJ	1 U	NA	NA
Aroclor 1242	UG/L	1 UJ	1 U	NA	NA
Aroclor 1248	UG/L	1 UJ	1 U	NA	NA
Aroclor 1254	UG/L	1 UJ	1 U	NA	NA
Aroclor 1260	UG/L	1 UJ	1 U	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
	<u>VOLATILES</u>					
Chloromethane	UG/L	10 U	10 U	ND		0/5
Bromomethane	UG/L	10 U	10 U	ND		0/5
Vinyl chloride	UG/L	10 U	10 U	ND		0/5
Chloroethane	UG/L	10 U	10 U	ND		0/5
Methylene chloride	UG/L	10 UJ	10 UJ	2 J	7-TB-07	4/5
Acetone	UG/L	10 U	10 U	7 J	7-RS-04	3/5
Carbon Disulfide	UG/L	10 U	10 U	1 J	7-TB-07	1/5
1,1-Dichloroethene	UG/L	10 U	10 U	ND		0/5
1,1-Dichloroethane	UG/L	10 U	10 U	ND		0/5
1,2-Dichloroethene(total)	UG/L	10 U	10 U	ND		0/5
Chloroform	UG/L	10 U	10 U	ND		0/5
1,2-Dichloroethane	UG/L	NA	NA	1 J	7-TB-09	5/5
2-Butanone	UG/L	10 UJ	10 UJ	11	7-RS-04	4/5
1,1,1-Trichloroethane	UG/L	10 U	10 U	ND		0/5
Carbon tetrachloride	UG/L	10 U	10 U	ND		0/5
Bromodichloromethane	UG/L	10 U	10 U	ND		0/5
1,2-Dichloropropane	UG/L	10 U	10 U	ND		0/5
cis-1,3-Dichloropropene	UG/L	10 U	10 U	ND		0/5
Trichloroethene	UG/L	10 U	10 U	ND		0/5
Dibromochloromethane	UG/L	10 U	10 U	ND		0/5
1,1,2-Trichloroethane	UG/L	10 U	10 U	ND		0/5
Benzene	UG/L	10 U	10 U	ND		0/5
trans-1,3-Dichloropropene	UG/L	10 U	10 U	ND		0/5
Bromoform	UG/L	10 U	10 U	ND		0/5
4-Methyl-2-pentanone	UG/L	10 U	10 U	ND		0/5
2-Hexanone	UG/L	10 UJ	10 UJ	1 J	7-RS-04	1/5
Tetrachloroethene	UG/L	10 U	10 U	ND		0/5
1,1,2,2-Tetrachloroethane	UG/L	10 U	10 U	ND		0/5
Toluene	UG/L	10 U	10 U	ND		0/5
Chlorobenzene	UG/L	10 U	10 U	ND		0/5
Ethylbenzene	UG/L	10 U	10 U	ND		0/5
Styrene	UG/L	10 U	10 U	ND		0/5
Xylenes (total)	UG/L	10 U	10 U	ND		0/5



FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>						
	<u>SEMIVOLATILES</u>						
	Phenol	UG/L	10 U	10 U	ND	ND	0/2
	bis(2-Chloroethyl) ether	UG/L	10 U	10 U	ND	ND	0/2
	2-Chlorophenol	UG/L	10 U	10 U	ND	ND	0/2
	1,3-Dichlorobenzene	UG/L	10 U	10 U	ND	ND	0/2
	1,4-Dichlorobenzene	UG/L	10 U	10 U	ND	ND	0/2
	1,2-Dichlorobenzene	UG/L	10 U	10 U	ND	ND	0/2
	2-Methylphenol	UG/L	10 U	10 U	ND	ND	0/2
	2,2'-oxybis-(1-chloropropane)	UG/L	10 U	10 U	ND	ND	0/2
	4-Methylphenol	UG/L	10 U	10 U	ND	ND	0/2
	N-Nitroso-di-n-propylamine	UG/L	10 U	10 U	ND	ND	0/2
	Hexachloroethane	UG/L	10 U	10 U	ND	ND	0/2
	Nitrobenzene	UG/L	10 U	10 U	ND	ND	0/2
	Isophorone	UG/L	10 U	10 U	ND	ND	0/2
	2-Nitrophenol	UG/L	10 U	10 U	ND	ND	0/2
	2,4-Dimethylphenol	UG/L	10 U	10 U	ND	ND	0/2
	bis(2-Chloroethoxy) methane	UG/L	10 U	10 U	ND	ND	0/2
	2,4-Dichlorophenol	UG/L	10 U	10 U	ND	ND	0/2
	1,2,4-Trichlorobenzene	UG/L	10 U	10 U	ND	ND	0/2
	Naphthalene	UG/L	10 U	10 U	ND	ND	0/2
	4-Chloroaniline	UG/L	10 U	10 U	ND	ND	0/2
	Hexachlorobutadiene	UG/L	10 U	10 U	ND	ND	0/2
	4-Chloro-3-methylphenol	UG/L	10 U	10 U	ND	ND	0/2
	2-Methylnaphthalene	UG/L	10 U	10 U	ND	ND	0/2
	Hexachlorocyclopentadiene	UG/L	10 U	10 U	ND	ND	0/2
	2,4,6-Trichlorophenol	UG/L	10 U	10 U	ND	ND	0/2
	2,4,5-Trichlorophenol	UG/L	25 U	25 U	ND	ND	0/2
	2-Chloronaphthalene	UG/L	10 U	10 U	ND	ND	0/2
	2-Nitroaniline	UG/L	25 U	25 U	ND	ND	0/2
	Dimethyl phthalate	UG/L	10 U	10 U	ND	ND	0/2
	Acenaphthylene	UG/L	10 U	10 U	ND	ND	0/2
	2,6-Dinitrotoluene	UG/L	10 U	10 U	ND	ND	0/2
	3-Nitroaniline	UG/L	25 U	25 U	ND	ND	0/2
	Acenaphthene	UG/L	10 U	10 U	ND	ND	0/2

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<u>UNITS</u>						
<u>SEMIVOLATILES Cont.</u>						
2,4-Dinitrophenol	UG/L	25 U	25 U	ND	ND	0/2
4-Nitrophenol	UG/L	25 U	25 U	ND	ND	0/2
Dibenzofuran	UG/L	10 U	10 U	ND	ND	0/2
2,4-Dinitrotoluene	UG/L	10 U	10 U	ND	ND	0/2
Diethylphthalate	UG/L	10 U	10 U	1 J	1 J	7-RS-05 1/2
4-Chlorophenyl phenyl ether	UG/L	10 U	10 U	ND	ND	0/2
Fluorene	UG/L	10 U	10 U	ND	ND	0/2
4-Nitroaniline	UG/L	25 U	25 U	ND	ND	0/2
4,6-Dinitro-2-methylphenol	UG/L	25 U	25 U	ND	ND	0/2
N-nitrosodiphenylamine	UG/L	10 U	10 U	ND	ND	0/2
4-Bromophenyl-phenylether	UG/L	10 U	10 U	ND	ND	0/2
Hexachlorobenzene	UG/L	10 U	10 U	ND	ND	0/2
Pentachlorophenol	UG/L	25 U	25 U	ND	ND	0/2
Phenanthrene	UG/L	10 U	10 U	ND	ND	0/2
Anthracene	UG/L	10 U	10 U	ND	ND	0/2
Carbazole	UG/L	10 U	10 U	ND	ND	0/2
di-n-Butylphthalate	UG/L	10 U	10 U	ND	ND	0/2
Fluoranthene	UG/L	10 U	10 U	ND	ND	0/2
Pyrene	UG/L	10 U	10 U	ND	ND	0/2
Butyl benzyl phthalate	UG/L	10 U	10 U	ND	ND	0/2
3,3'-Dichlorobenzidine	UG/L	10 U	10 U	ND	ND	0/2
Benzo[a]anthracene	UG/L	10 U	10 U	ND	ND	0/2
Chrysene	UG/L	10 U	10 U	ND	ND	0/2
bis(2-Ethylhexyl)phthalate	UG/L	NA	NA	2 J	15	7-RS-05 2/2
di-n-Octylphthalate	UG/L	10 U	10 U	ND	ND	0/2
Benzo[b]fluoranthene	UG/L	10 U	10 U	ND	ND	0/2
Benzo[k]fluoranthene	UG/L	10 U	10 U	ND	ND	0/2
Benzo[a]pyrene	UG/L	10 U	10 U	ND	ND	0/2
Indeno[1,2,3-cd]pyrene	UG/L	10 U	10 U	ND	ND	0/2
Dibenz[a,h]anthracene	UG/L	10 U	10 U	ND	ND	0/2
Benzo[g,h,i]perylene	UG/L	10 U	10 U	ND	ND	0/2

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - QA/QC - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>						
	<u>PESTICIDES/PCBs</u>						
	alpha-BHC	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	beta-BHC	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	delta-BHC	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	Lindane (gamma-BHC)	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	Heptachlor	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	Aldrin	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	Heptachlor epoxide	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	Endosulfan I	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	Dieldrin	UG/L	0.1 UJ	0.1 UJ	ND	ND	0/2
	4,4'-DDE	UG/L	0.1 UJ	0.1 UJ	ND	ND	0/2
	Endrin	UG/L	0.1 UJ	0.1 UJ	ND	ND	0/2
	Endosulfan II	UG/L	0.1 UJ	0.1 UJ	ND	ND	0/2
	4,4'-DDD	UG/L	0.1 UJ	0.1 UJ	ND	ND	0/2
	Endosulfan sulfate	UG/L	0.1 UJ	0.1 UJ	ND	ND	0/2
	4,4'-DDT	UG/L	0.1 UJ	0.1 UJ	ND	ND	0/2
	Methoxychlor	UG/L	0.5 UJ	0.5 UJ	ND	ND	0/2
	Endrin ketone	UG/L	0.1 UJ	0.1 UJ	ND	ND	0/2
	Endrin aldehyde	UG/L	0.1 UJ	0.1 UJ	ND	ND	0/2
	alpha-Chlordane	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	gamma-Chlordane	UG/L	0.05 UJ	0.05 UJ	ND	ND	0/2
	Toxaphene	UG/L	5 UJ	5 UJ	ND	ND	0/2
	Aroclor 1016	UG/L	1 UJ	1 UJ	ND	ND	0/2
	Aroclor 1221	UG/L	2 UJ	2 UJ	ND	ND	0/2
	Aroclor 1232	UG/L	1 UJ	1 UJ	ND	ND	0/2
	Aroclor 1242	UG/L	1 UJ	1 UJ	ND	ND	0/2
	Aroclor 1248	UG/L	1 UJ	1 UJ	ND	ND	0/2
	Aroclor 1254	UG/L	1 UJ	1 UJ	ND	ND	0/2
	Aroclor 1260	UG/L	1 UJ	1 UJ	ND	ND	0/2

**APPENDIX K.4**  
**GROUNDWATER TOTAL AND DISSOLVED METALS**

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FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No.11  
 SITE 7 - QA/QC - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL TOTAL & DISSOLVED INORGANICS

Client Sample ID:	7-RS-04	7-RS-05	7-RSD-04	7-RSD-05
Laboratory Sample ID:	AC7821	AD1981	AC7831	AD1998
Date Sampled:	11/07/94	12/01/94	11/07/94	12/01/94

	UNITS				
Aluminum	UG/L	40 U	40 U	57.8	44.2
Antimony	UG/L	50 U	50 U	50 U	50 U
Arsenic	UG/L	10 U	10 U	10 U	10 U
Barium	UG/L	2 U	2 UJ	2 U	2 U
Beryllium	UG/L	1 U	1 U	1 U	1 U
Cadmium	UG/L	5 U	5 UJ	5 U	5 UJ
Calcium	UG/L	25.9	67.4	26.2	89.3
Chromium	UG/L	10 U	10 U	10 U	10 U
Cobalt	UG/L	10 U	10 U	10 U	10 U
Copper	UG/L	10 U	10 U	10 U	10 U
Iron	UG/L	31.8	34.3	97.8	37.7
Lead	UG/L	4.1 J	3 U	3 U	3 U
Magnesium	UG/L	50 U	50 U	50 U	50 U
Manganese	UG/L	2 U	2 UJ	2 U	2 U
Mercury	UG/L	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	UG/L	20 U	20 U	20 U	20 U
Potassium	UG/L	1000 U	1000 U	1000 U	1000 U
Selenium	UG/L	5 U	5 U	5 U	5 U
Silver	UG/L	5 U	5 U	5 U	5 U
Sodium	UG/L	100 U	100 U	100 U	130
Thallium	UG/L	10 U	10 U	10 U	10 U
Vanadium	UG/L	10 U	10 U	10 U	10 U
Zinc	UG/L	32 J	39.1 J	43 J	31.1 J

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No.11  
 SITE 7 - QA/QC - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL TOTAL & DISSOLVED INORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION	
	<u>UNITS</u>						
Aluminum	UG/L	40 U	40 U	44.2	57.8	7-RSD-04	2/4
Antimony	UG/L	50 U	50 U	ND	ND		0/4
Arsenic	UG/L	10 U	10 U	ND	ND		0/4
Barium	UG/L	2 U	2 U	ND	ND		0/4
Beryllium	UG/L	1 U	1 U	ND	ND		0/4
Cadmium	UG/L	5 U	5 U	ND	ND		0/4
Calcium	UG/L	NA	NA	25.9	89.3	7-RSD-05	4/4
Chromium	UG/L	10 U	10 U	ND	ND		0/4
Cobalt	UG/L	10 U	10 U	ND	ND		0/4
Copper	UG/L	10 U	10 U	ND	ND		0/4
Iron	UG/L	NA	NA	31.8	97.8	7-RSD-04	4/4
Lead	UG/L	3 U	3 U	4.1 J	4.1 J	7-RS-04	1/4
Magnesium	UG/L	50 U	50 U	ND	ND		0/4
Manganese	UG/L	2 U	2 U	ND	ND		0/4
Mercury	UG/L	0.2 U	0.2 U	ND	ND		0/4
Nickel	UG/L	20 U	20 U	ND	ND		0/4
Potassium	UG/L	1000 U	1000 U	ND	ND		0/4
Selenium	UG/L	5 U	5 U	ND	ND		0/4
Silver	UG/L	5 U	5 U	ND	ND		0/4
Sodium	UG/L	100 U	100 U	130	130	7-RSD-05	1/4
Thallium	UG/L	10 U	10 U	ND	ND		0/4
Vanadium	UG/L	10 U	10 U	ND	ND		0/4
Zinc	UG/L	NA	NA	31.1 J	43 J	7-RSD-04	4/4

**APPENDIX K.5**  
**NORTHEAST CREEK, EAST AND WEST TRIBUTARIES,**  
**DRAINAGE DITCH, AND MARSH AREA SURFACE WATER**  
**AND SEDIMENT ORGANICS**

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FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-ER01	7-TB01	7-TB02	7-TB03	7-TB04	7-TB05
Laboratory Sample ID:	AB1387	AB1383	AB1415	AB1696	AB1695	AB2054
Date Sampled:	6/23/94	6/22/94	6/23/94	6/24/94	6/24/94	6/27/94

UNITS

VOLATILES

	7-ER01	7-TB01	7-TB02	7-TB03	7-TB04	7-TB05
Chloromethane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	UG/L 10 U	10 U	10 UJ	10 U	10 U	10 U
Chloroethane	UG/L 10 U	10 U	10 U.	10 U	10 U	10 U
Methylene chloride	UG/L 3 J	3 BJ	2 J	2 J	2 J	12
Acetone	UG/L 7 J	6 J	31 NJ	9 J	7 J	4 J
Carbon Disulfide	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene(total)	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	UG/L 10 U	10 U	28	10 U	10 U	10 U
1,2-Dichloroethane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Benzene	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	UG/L 10 U	10 UJ	10 U	10 U	10 U	10 U
Bromoform	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Toluene	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Styrene	UG/L 10 U	10 U	10 U	10 U	10 U	10 U
Xylenes (total)	UG/L 10 U	10 U	10 U	10 U	10 U	10 U



FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-ER01	7-TB01	7-TB02	7-TB03	7-TB04	7-TB05
Laboratory Sample ID:	AB1387	AB1383	AB1415	AB1696	AB1695	AB2054
Date Sampled:	6/23/94	6/22/94	6/23/94	6/24/94	6/24/94	6/27/94

	UNITS					
<u>SEMIVOLATILES</u>						
Phenol	UG/L	10 U	NA	NA	NA	NA
bis(2-Chloroethyl) ether	UG/L	10 U	NA	NA	NA	NA
2-Chlorophenol	UG/L	10 U	NA	NA	NA	NA
1,3-Dichlorobenzene	UG/L	10 U	NA	NA	NA	NA
1,4-Dichlorobenzene	UG/L	10 U	NA	NA	NA	NA
1,2-Dichlorobenzene	UG/L	10 U	NA	NA	NA	NA
2-Methylphenol	UG/L	10 U	NA	NA	NA	NA
2,2'-oxybis-(1-chloropropane)	UG/L	10 U	NA	NA	NA	NA
4-Methylphenol	UG/L	10 U	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	UG/L	10 U	NA	NA	NA	NA
Hexachloroethane	UG/L	10 U	NA	NA	NA	NA
Nitrobenzene	UG/L	10 U	NA	NA	NA	NA
Isophorone	UG/L	10 U	NA	NA	NA	NA
2-Nitrophenol	UG/L	10 U	NA	NA	NA	NA
2,4-Dimethylphenol	UG/L	10 U	NA	NA	NA	NA
bis(2-Chloroethoxy) methane	UG/L	10 U	NA	NA	NA	NA
2,4-Dichlorophenol	UG/L	10 U	NA	NA	NA	NA
1,2,4-Trichlorobenzene	UG/L	10 U	NA	NA	NA	NA
Naphthalene	UG/L	10 U	NA	NA	NA	NA
4-Chloroaniline	UG/L	10 U	NA	NA	NA	NA
Hexachlorobutadiene	UG/L	10 U	NA	NA	NA	NA
4-Chloro-3-methylphenol	UG/L	10 U	NA	NA	NA	NA
2-Methylnaphthalene	UG/L	10 U	NA	NA	NA	NA
Hexachlorocyclopentadiene	UG/L	10 U	NA	NA	NA	NA
2,4,6-Trichlorophenol	UG/L	10 U	NA	NA	NA	NA
2,4,5-Trichlorophenol	UG/L	25 U	NA	NA	NA	NA
2-Chloronaphthalene	UG/L	10 U	NA	NA	NA	NA
2-Nitroaniline	UG/L	25 U	NA	NA	NA	NA
Dimethyl phthalate	UG/L	10 U	NA	NA	NA	NA
Acenaphthylene	UG/L	10 U	NA	NA	NA	NA
2,6-Dinitrotoluene	UG/L	10 U	NA	NA	NA	NA
3-Nitroaniline	UG/L	25 U	NA	NA	NA	NA
Acenaphthene	UG/L	10 U	NA	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-ER01	7-TB01	7-TB02	7-TB03	7-TB04	7-TB05
Laboratory Sample ID:	AB1387	AB1383	AB1415	AB1696	AB1695	AB2054
Date Sampled:	6/23/94	6/22/94	6/23/94	6/24/94	6/24/94	6/27/94

	UNITS					
<u>SEMIVOLATILES Cont.</u>						
2,4-Dinitrophenol	UG/L	25 UJ	NA	NA	NA	NA
4-Nitrophenol	UG/L	25 U	NA	NA	NA	NA
Dibenzofuran	UG/L	10 U	NA	NA	NA	NA
2,4-Dinitrotoluene	UG/L	10 U	NA	NA	NA	NA
Diethylphthalate	UG/L	10 U	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	UG/L	10 U	NA	NA	NA	NA
Fluorene	UG/L	10 U	NA	NA	NA	NA
4-Nitroaniline	UG/L	25 U	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	UG/L	25 U	NA	NA	NA	NA
N-nitrosodiphenylamine	UG/L	10 U	NA	NA	NA	NA
4-Bromophenyl-phenylether	UG/L	10 U	NA	NA	NA	NA
Hexachlorobenzene	UG/L	10 U	NA	NA	NA	NA
Pentachlorophenol	UG/L	25 U	NA	NA	NA	NA
Phenanthrene	UG/L	10 U	NA	NA	NA	NA
Anthracene	UG/L	10 U	NA	NA	NA	NA
Carbazole	UG/L	10 UJ	NA	NA	NA	NA
di-n-Butylphthalate	UG/L	10 U	NA	NA	NA	NA
Fluoranthene	UG/L	10 U	NA	NA	NA	NA
Pyrene	UG/L	10 U	NA	NA	NA	NA
Butyl benzyl phthalate	UG/L	10 U	NA	NA	NA	NA
3,3'-Dichlorobenzidine	UG/L	10 U	NA	NA	NA	NA
Benzo[a]anthracene	UG/L	10 U	NA	NA	NA	NA
Chrysene	UG/L	10 U	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	UG/L	1 J	NA	NA	NA	NA
di-n-Octylphthalate	UG/L	10 U	NA	NA	NA	NA
Benzo[b]fluoranthene	UG/L	10 U	NA	NA	NA	NA
Benzo[k]fluoranthene	UG/L	10 U	NA	NA	NA	NA
Benzo[a]pyrene	UG/L	10 U	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	UG/L	10 U	NA	NA	NA	NA
Dibenz[a,h]anthracene	UG/L	10 U	NA	NA	NA	NA
Benzo[g,h,i]perylene	UG/L	10 U	NA	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:	7-ER01	7-TB01	7-TB02	7-TB03	7-TB04	7-TB05
Laboratory Sample ID:	AB1387	AB1383	AB1415	AB1696	AB1695	AB2054
Date Sampled:	6/23/94	6/22/94	6/23/94	6/24/94	6/24/94	6/27/94

	<u>UNITS</u>						
<u>PESTICIDES/PCBs</u>							
alpha-BHC	UG/L	0.058 UJ	NA	NA	NA	NA	NA
beta-BHC	UG/L	0.058 UJ	NA	NA	NA	NA	NA
delta-BHC	UG/L	0.058 UJ	NA	NA	NA	NA	NA
Lindane (gamma-BHC)	UG/L	0.058 UJ	NA	NA	NA	NA	NA
Heptachlor	UG/L	0.058 UJ	NA	NA	NA	NA	NA
Aldrin	UG/L	0.058 UJ	NA	NA	NA	NA	NA
Heptachlor epoxide	UG/L	0.058 UJ	NA	NA	NA	NA	NA
Endosulfan I	UG/L	0.058 UJ	NA	NA	NA	NA	NA
Dieldrin	UG/L	0.12 UJ	NA	NA	NA	NA	NA
4,4'-DDE	UG/L	0.12 UJ	NA	NA	NA	NA	NA
Endrin	UG/L	0.12 UJ	NA	NA	NA	NA	NA
Endosulfan II	UG/L	0.12 UJ	NA	NA	NA	NA	NA
4,4'-DDD	UG/L	0.12 UJ	NA	NA	NA	NA	NA
Endosulfan sulfate	UG/L	0.12 UJ	NA	NA	NA	NA	NA
4,4'-DDT	UG/L	0.12 UJ	NA	NA	NA	NA	NA
Methoxychlor	UG/L	0.58 UJ	NA	NA	NA	NA	NA
Endrin ketone	UG/L	0.12 UJ	NA	NA	NA	NA	NA
Endrin aldehyde	UG/L	0.12 UJ	NA	NA	NA	NA	NA
alpha-Chlordane	UG/L	0.058 UJ	NA	NA	NA	NA	NA
gamma-Chlordane	UG/L	0.058 UJ	NA	NA	NA	NA	NA
Toxaphene	UG/L	5.8 UJ	NA	NA	NA	NA	NA
Aroclor 1016	UG/L	1.2 UJ	NA	NA	NA	NA	NA
Aroclor 1221	UG/L	2.3 UJ	NA	NA	NA	NA	NA
Aroclor 1232	UG/L	1.2 UJ	NA	NA	NA	NA	NA
Aroclor 1242	UG/L	1.2 UJ	NA	NA	NA	NA	NA
Aroclor 1248	UG/L	1.2 UJ	NA	NA	NA	NA	NA
Aroclor 1254	UG/L	1.2 UJ	NA	NA	NA	NA	NA
Aroclor 1260	UG/L	1.2 UJ	NA	NA	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: 7-TB06  
 Laboratory Sample ID: AB2055  
 Date Sampled: 6/27/94

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	<u>UNITS</u>	
<u>VOLATILES</u>		
Chloromethane	UG/L	10 U
Bromomethane	UG/L	10 U
Vinyl chloride	UG/L	10 U
Chloroethane	UG/L	10 U
Methylene chloride	UG/L	10
Acetone	UG/L	10 U
Carbon Disulfide	UG/L	10 U
1,1-Dichloroethene	UG/L	10 U
1,1-Dichloroethane	UG/L	10 U
1,2-Dichloroethene(total)	UG/L	10 U
Chloroform	UG/L	10 U
1,2-Dichloroethane	UG/L	10 U
2-Butanone	UG/L	10 U
1,1,1-Trichloroethane	UG/L	10 U
Carbon tetrachloride	UG/L	10 U
Bromodichloromethane	UG/L	10 U
1,2-Dichloropropane	UG/L	10 U
cis-1,3-Dichloropropene	UG/L	10 U
Trichloroethene	UG/L	10 U
Dibromochloromethane	UG/L	10 U
1,1,2-Trichloroethane	UG/L	10 U
Benzene	UG/L	10 U
trans-1,3-Dichloropropene	UG/L	10 U
Bromoform	UG/L	10 U
4-Methyl-2-pentanone	UG/L	10 U
2-Hexanone	UG/L	10 U
Tetrachloroethene	UG/L	10 U
1,1,2,2-Tetrachloroethane	UG/L	10 U
Toluene	UG/L	10 U
Chlorobenzene	UG/L	10 U
Ethylbenzene	UG/L	10 U
Styrene	UG/L	10 U
Xylenes (total)	UG/L	10 U

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: 7-TB06  
 Laboratory Sample ID: AB2055  
 Date Sampled: 6/27/94

	<u>UNITS</u>	
<u>SEMIVOLATILES</u>		
Phenol	UG/L	NA
bis(2-Chloroethyl) ether	UG/L	NA
2-Chlorophenol	UG/L	NA
1,3-Dichlorobenzene	UG/L	NA
1,4-Dichlorobenzene	UG/L	NA
1,2-Dichlorobenzene	UG/L	NA
2-Methylphenol	UG/L	NA
2,2'-oxybis-(1-chloropropane)	UG/L	NA
4-Methylphenol	UG/L	NA
N-Nitroso-di-n-propylamine	UG/L	NA
Hexachloroethane	UG/L	NA
Nitrobenzene	UG/L	NA
Isophorone	UG/L	NA
2-Nitrophenol	UG/L	NA
2,4-Dimethylphenol	UG/L	NA
bis(2-Chloroethoxy) methane	UG/L	NA
2,4-Dichlorophenol	UG/L	NA
1,2,4-Trichlorobenzene	UG/L	NA
Naphthalene	UG/L	NA
4-Chloroaniline	UG/L	NA
Hexachlorobutadiene	UG/L	NA
4-Chloro-3-methylphenol	UG/L	NA
2-Methylnaphthalene	UG/L	NA
Hexachlorocyclopentadiene	UG/L	NA
2,4,6-Trichlorophenol	UG/L	NA
2,4,5-Trichlorophenol	UG/L	NA
2-Chloronaphthalene	UG/L	NA
2-Nitroaniline	UG/L	NA
Dimethyl phthalate	UG/L	NA
Acenaphthylene	UG/L	NA
2,6-Dinitrotoluene	UG/L	NA
3-Nitroaniline	UG/L	NA
Acenaphthene	UG/L	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: 7-TB06  
 Laboratory Sample ID: AB2055  
 Date Sampled: 6/27/94

	<u>UNITS</u>	
<u>SEMIVOLATILES Cont.</u>		
2,4-Dinitrophenol	UG/L	NA
4-Nitrophenol	UG/L	NA
Dibenzofuran	UG/L	NA
2,4-Dinitrotoluene	UG/L	NA
Diethylphthalate	UG/L	NA
4-Chlorophenyl phenyl ether	UG/L	NA
Fluorene	UG/L	NA
4-Nitroaniline	UG/L	NA
4,6-Dinitro-2-methylphenol	UG/L	NA
N-nitrosodiphenylamine	UG/L	NA
4-Bromophenyl-phenylether	UG/L	NA
Hexachlorobenzene	UG/L	NA
Pentachlorophenol	UG/L	NA
Phenanthrene	UG/L	NA
Anthracene	UG/L	NA
Carbazole	UG/L	NA
di-n-Butylphthalate	UG/L	NA
Fluoranthene	UG/L	NA
Pyrene	UG/L	NA
Butyl benzyl phthalate	UG/L	NA
3,3'-Dichlorobenzidine	UG/L	NA
Benzo[a]anthracene	UG/L	NA
Chrysene	UG/L	NA
bis(2-Ethylhexyl)phthalate	UG/L	NA
di-n-Octylphthalate	UG/L	NA
Benzo[b]fluoranthene	UG/L	NA
Benzo[k]fluoranthene	UG/L	NA
Benzo[a]pyrene	UG/L	NA
Indeno[1,2,3-cd]pyrene	UG/L	NA
Dibenz[a,h]anthracene	UG/L	NA
Benzo[g,h,i]perylene	UG/L	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: 7-TB06  
 Laboratory Sample ID: AB2055  
 Date Sampled: 6/27/94

PESTICIDES/PCBs	UNITS	
alpha-BHC	UG/L	NA
beta-BHC	UG/L	NA
delta-BHC	UG/L	NA
Lindane (gamma-BHC)	UG/L	NA
Heptachlor	UG/L	NA
Aldrin	UG/L	NA
Heptachlor epoxide	UG/L	NA
Endosulfan I	UG/L	NA
Dieldrin	UG/L	NA
4,4'-DDE	UG/L	NA
Endrin	UG/L	NA
Endosulfan II	UG/L	NA
4,4'-DDD	UG/L	NA
Endosulfan sulfate	UG/L	NA
4,4'-DDT	UG/L	NA
Methoxychlor	UG/L	NA
Endrin ketone	UG/L	NA
Endrin aldehyde	UG/L	NA
alpha-Chlordane	UG/L	NA
gamma-Chlordane	UG/L	NA
Toxaphene	UG/L	NA
Aroclor 1016	UG/L	NA
Aroclor 1221	UG/L	NA
Aroclor 1232	UG/L	NA
Aroclor 1242	UG/L	NA
Aroclor 1248	UG/L	NA
Aroclor 1254	UG/L	NA
Aroclor 1260	UG/L	NA

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<u>UNITS</u>						
<u>VOLATILES</u>						
Chloromethane	UG/L	10 U	10 U	ND		0/7
Bromomethane	UG/L	10 U	10 U	ND		0/7
Vinyl chloride	UG/L	10 U	10 U	ND		0/7
Chloroethane	UG/L	10 U	10 U	ND		0/7
Methylene chloride	UG/L	NA	NA	2 J	7-TB05	7/7
Acetone	UG/L	10 U	10 U	4 J	7-TB02	6/7
Carbon Disulfide	UG/L	10 U	10 U	ND		0/7
1,1-Dichloroethene	UG/L	10 U	10 U	ND		0/7
1,1-Dichloroethane	UG/L	10 U	10 U	ND		0/7
1,2-Dichloroethene(total)	UG/L	10 U	10 U	ND		0/7
Chloroform	UG/L	10 U	10 U	28	7-TB02	1/7
1,2-Dichloroethane	UG/L	10 U	10 U	ND		0/7
2-Butanone	UG/L	10 U	10 U	ND		0/7
1,1,1-Trichloroethane	UG/L	10 U	10 U	ND		0/7
Carbon tetrachloride	UG/L	10 U	10 U	ND		0/7
Bromodichloromethane	UG/L	10 U	10 U	ND		0/7
1,2-Dichloropropane	UG/L	10 U	10 U	ND		0/7
cis-1,3-Dichloropropene	UG/L	10 U	10 U	ND		0/7
Trichloroethene	UG/L	10 U	10 U	ND		0/7
Dibromochloromethane	UG/L	10 U	10 U	ND		0/7
1,1,2-Trichloroethane	UG/L	10 U	10 U	ND		0/7
Benzene	UG/L	10 U	10 U	ND		0/7
trans-1,3-Dichloropropene	UG/L	10 U	10 U	ND		0/7
Bromoform	UG/L	10 U	10 U	ND		0/7
4-Methyl-2-pentanone	UG/L	10 U	10 U	ND		0/7
2-Hexanone	UG/L	10 U	10 U	ND		0/7
Tetrachloroethene	UG/L	10 U	10 U	ND		0/7
1,1,2,2-Tetrachloroethane	UG/L	10 U	10 U	ND		0/7
Toluene	UG/L	10 U	10 U	ND		0/7
Chlorobenzene	UG/L	10 U	10 U	ND		0/7
Ethylbenzene	UG/L	10 U	10 U	ND		0/7
Styrene	UG/L	10 U	10 U	ND		0/7
Xylenes (total)	UG/L	10 U	10 U	ND		0/7



FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
	<u>SEMIVOLATILES</u>					
Phenol	UG/L	10 U	10 U	ND	ND	0/1
bis(2-Chloroethyl) ether	UG/L	10 U	10 U	ND	ND	0/1
2-Chlorophenol	UG/L	10 U	10 U	ND	ND	0/1
1,3-Dichlorobenzene	UG/L	10 U	10 U	ND	ND	0/1
1,4-Dichlorobenzene	UG/L	10 U	10 U	ND	ND	0/1
1,2-Dichlorobenzene	UG/L	10 U	10 U	ND	ND	0/1
2-Methylphenol	UG/L	10 U	10 U	ND	ND	0/1
2,2'-oxybis-(1-chloropropane)	UG/L	10 U	10 U	ND	ND	0/1
4-Methylphenol	UG/L	10 U	10 U	ND	ND	0/1
N-Nitroso-di-n-propylamine	UG/L	10 U	10 U	ND	ND	0/1
Hexachloroethane	UG/L	10 U	10 U	ND	ND	0/1
Nitrobenzene	UG/L	10 U	10 U	ND	ND	0/1
Isophorone	UG/L	10 U	10 U	ND	ND	0/1
2-Nitrophenol	UG/L	10 U	10 U	ND	ND	0/1
2,4-Dimethylphenol	UG/L	10 U	10 U	ND	ND	0/1
bis(2-Chloroethoxy) methane	UG/L	10 U	10 U	ND	ND	0/1
2,4-Dichlorophenol	UG/L	10 U	10 U	ND	ND	0/1
1,2,4-Trichlorobenzene	UG/L	10 U	10 U	ND	ND	0/1
Naphthalene	UG/L	10 U	10 U	ND	ND	0/1
4-Chloroaniline	UG/L	10 U	10 U	ND	ND	0/1
Hexachlorobutadiene	UG/L	10 U	10 U	ND	ND	0/1
4-Chloro-3-methylphenol	UG/L	10 U	10 U	ND	ND	0/1
2-Methylnaphthalene	UG/L	10 U	10 U	ND	ND	0/1
Hexachlorocyclopentadiene	UG/L	10 U	10 U	ND	ND	0/1
2,4,6-Trichlorophenol	UG/L	10 U	10 U	ND	ND	0/1
2,4,5-Trichlorophenol	UG/L	25 U	25 U	ND	ND	0/1
2-Chloronaphthalene	UG/L	10 U	10 U	ND	ND	0/1
2-Nitroaniline	UG/L	25 U	25 U	ND	ND	0/1
Dimethyl phthalate	UG/L	10 U	10 U	ND	ND	0/1
Acenaphthylene	UG/L	10 U	10 U	ND	ND	0/1
2,6-Dinitrotoluene	UG/L	10 U	10 U	ND	ND	0/1
3-Nitroaniline	UG/L	25 U	25 U	ND	ND	0/1
Acenaphthene	UG/L	10 U	10 U	ND	ND	0/1

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>						
	<u>SEMIVOLATILES Cont.</u>						
	2,4-Dinitrophenol	UG/L	25 UJ	25 UJ	ND	ND	0/1
	4-Nitrophenol	UG/L	25 U	25 U	ND	ND	0/1
	Dibenzofuran	UG/L	10 U	10 U	ND	ND	0/1
	2,4-Dinitrotoluene	UG/L	10 U	10 U	ND	ND	0/1
	Diethylphthalate	UG/L	10 U	10 U	ND	ND	0/1
	4-Chlorophenyl phenyl ether	UG/L	10 U	10 U	ND	ND	0/1
	Fluorene	UG/L	10 U	10 U	ND	ND	0/1
	4-Nitroaniline	UG/L	25 U	25 U	ND	ND	0/1
	4,6-Dinitro-2-methylphenol	UG/L	25 U	25 U	ND	ND	0/1
	N-nitrosodiphenylamine	UG/L	10 U	10 U	ND	ND	0/1
	4-Bromophenyl-phenylether	UG/L	10 U	10 U	ND	ND	0/1
	Hexachlorobenzene	UG/L	10 U	10 U	ND	ND	0/1
	Pentachlorophenol	UG/L	25 U	25 U	ND	ND	0/1
	Phenanthrene	UG/L	10 U	10 U	ND	ND	0/1
	Anthracene	UG/L	10 U	10 U	ND	ND	0/1
	Carbazole	UG/L	10 UJ	10 UJ	ND	ND	0/1
	di-n-Butylphthalate	UG/L	10 U	10 U	ND	ND	0/1
	Fluoranthene	UG/L	10 U	10 U	ND	ND	0/1
	Pyrene	UG/L	10 U	10 U	ND	ND	0/1
	Butyl benzyl phthalate	UG/L	10 U	10 U	ND	ND	0/1
	3,3'-Dichlorobenzidine	UG/L	10 U	10 U	ND	ND	0/1
	Benzo[a]anthracene	UG/L	10 U	10 U	ND	ND	0/1
	Chrysene	UG/L	10 U	10 U	ND	ND	0/1
	bis(2-Ethylhexyl)phthalate	UG/L	NA	NA	1 J	1 J	7-ER01 1/1
	di-n-Octylphthalate	UG/L	10 U	10 U	ND	ND	0/1
	Benzo[b]fluoranthene	UG/L	10 U	10 U	ND	ND	0/1
	Benzo[k]fluoranthene	UG/L	10 U	10 U	ND	ND	0/1
	Benzo[a]pyrene	UG/L	10 U	10 U	ND	ND	0/1
	Indeno[1,2,3-cd]pyrene	UG/L	10 U	10 U	ND	ND	0/1
	Dibenz[a,h]anthracene	UG/L	10 U	10 U	ND	ND	0/1
	Benzo[g,h,i]perylene	UG/L	10 U	10 U	ND	ND	0/1

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
	<u>PESTICIDES/PCBs</u>					
alpha-BHC	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
beta-BHC	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
delta-BHC	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
Lindane (gamma-BHC)	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
Heptachlor	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
Aldrin	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
Heptachlor epoxide	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
Endosulfan I	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
Dieldrin	UG/L	0.12 UJ	0.12 UJ	ND	ND	0/1
4,4'-DDE	UG/L	0.12 UJ	0.12 UJ	ND	ND	0/1
Endrin	UG/L	0.12 UJ	0.12 UJ	ND	ND	0/1
Endosulfan II	UG/L	0.12 UJ	0.12 UJ	ND	ND	0/1
4,4'-DDD	UG/L	0.12 UJ	0.12 UJ	ND	ND	0/1
Endosulfan sulfate	UG/L	0.12 UJ	0.12 UJ	ND	ND	0/1
4,4'-DDT	UG/L	0.12 UJ	0.12 UJ	ND	ND	0/1
Methoxychlor	UG/L	0.58 UJ	0.58 UJ	ND	ND	0/1
Endrin ketone	UG/L	0.12 UJ	0.12 UJ	ND	ND	0/1
Endrin aldehyde	UG/L	0.12 UJ	0.12 UJ	ND	ND	0/1
alpha-Chlordane	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
gamma-Chlordane	UG/L	0.058 UJ	0.058 UJ	ND	ND	0/1
Toxaphene	UG/L	5.8 UJ	5.8 UJ	ND	ND	0/1
Aroclor 1016	UG/L	1.2 UJ	1.2 UJ	ND	ND	0/1
Aroclor 1221	UG/L	2.3 UJ	2.3 UJ	ND	ND	0/1
Aroclor 1232	UG/L	1.2 UJ	1.2 UJ	ND	ND	0/1
Aroclor 1242	UG/L	1.2 UJ	1.2 UJ	ND	ND	0/1
Aroclor 1248	UG/L	1.2 UJ	1.2 UJ	ND	ND	0/1
Aroclor 1254	UG/L	1.2 UJ	1.2 UJ	ND	ND	0/1
Aroclor 1260	UG/L	1.2 UJ	1.2 UJ	ND	ND	0/1

**APPENDIX K.6**  
**NORTHEAST CREEK, EAST AND WEST TRIBUTARIES,**  
**DRAINAGE DITCH, AND MARSH AREA SURFACE WATER**  
**AND SEDIMENT METALS**

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FREQUENCY OF DETECTION SUMMARY  
OPERABLE UNIT No. 11 (SITE 7)  
QA/QC SAMPLES  
REMEDIAL INVESTIGATION CTO-0274  
MCB CAMP LEJEUNE, NORTH CAROLINA  
TAL INORGANICS

Client Sample ID: 7-ER01  
Laboratory Sample ID: AB1389  
Date Sampled: 6/23/94

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	<u>UNITS</u>	
Aluminum	UG/L	40 U
Antimony	UG/L	50 U
Arsenic	UG/L	2 U
Barium	UG/L	2 U
Beryllium	UG/L	1 U
Cadmium	UG/L	5 U
Calcium	UG/L	101
Chromium	UG/L	10 U
Cobalt	UG/L	10 U
Copper	UG/L	10 U
Iron	UG/L	10 U
Lead	UG/L	2 U
Magnesium	UG/L	30 U
Manganese	UG/L	2 U
Mercury	UG/L	0.2 U
Nickel	UG/L	20 U
Potassium	UG/L	1000 U
Selenium	UG/L	2 U
Silver	UG/L	5 U
Sodium	UG/L	179
Thallium	UG/L	2 U
Vanadium	UG/L	10 U
Zinc	UG/L	5 U

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 QA/QC SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
Aluminum	UG/L	40 U	40 U	ND		0/1
Antimony	UG/L	50 U	50 U	ND		0/1
Arsenic	UG/L	2 U	2 U	ND		0/1
Barium	UG/L	2 U	2 U	ND		0/1
Beryllium	UG/L	1 U	1 U	ND		0/1
Cadmium	UG/L	5 U	5 U	ND		0/1
Calcium	UG/L	NA	NA	101	7-ER01	1/1
Chromium	UG/L	10 U	10 U	ND		0/1
Cobalt	UG/L	10 U	10 U	ND		0/1
Copper	UG/L	10 U	10 U	ND		0/1
Iron	UG/L	10 U	10 U	ND		0/1
Lead	UG/L	2 U	2 U	ND		0/1
Magnesium	UG/L	30 U	30 U	ND		0/1
Manganese	UG/L	2 U	2 U	ND		0/1
Mercury	UG/L	0.2 U	0.2 U	ND		0/1
Nickel	UG/L	20 U	20 U	ND		0/1
Potassium	UG/L	1000 U	1000 U	ND		0/1
Selenium	UG/L	2 U	2 U	ND		0/1
Silver	UG/L	5 U	5 U	ND		0/1
Sodium	UG/L	NA	NA	179	7-ER01	1/1
Thallium	UG/L	2 U	2 U	ND		0/1
Vanadium	UG/L	10 U	10 U	ND		0/1
Zinc	UG/L	5 U	5 U	ND		0/1

**APPENDIX L**  
**COPC WORKSHEETS**

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check of vs. newest HMI table  
 Site Surface Soil

CONTAMINANT	RANGE	log Normal 95% UCL	FREQUENCY	BLANK	2x average BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COFC	RFDo / CSF <sub>0</sub> (mg/kg/day) (mg/kg)
Acetone	150-170	18.7	2/31	1401	NA					1,800,000			
2-Butanone	52	9.0	1/31	15	NA					47,000,000			
Trichloroethene	15	8.4	1/30	ND	NA					58,000			
Toluene	9J-46J	9.1	3/30	15	NA					6,000,000			
Phenol	170NJ	353.3	1/32	ND	NA					47,000,000			
Acenaphthene	37J	377.9	1/32	ND	NA					4,200,000			
Fluorene	38J	377.3	1/32	ND	NA					6,100,000			
Phenanthrene	63J-400	378.3	3/32	ND	NA				-	NA	Notox	X	-/-
Anthracene	100J	363.4	1/32	ND	NA					23,000,000			
Carbazole	110J	358.8	1/32	ND	NA					32,000			
di-n-butylphthalate	170J	375.8	1/32	ND	NA					1,800,000			
Fluoranthene	110-750	389.3	4/32	ND	NA					3,100,000			
Pyrene	85J-580	381.4	4/32	ND	NA					6,300,000			
Benzo(a)anthracene	50J-420	391.8	4/32	ND	NA					880			
Chrysene	55J-420	381.3	4/32	ND	NA					188,000			
bis(2-ethylhexyl)phthalate	38J-600	367.2	8/32	2J	NA					46,000			
Benzo(b)fluoranthene	45J-380	389.8	4/32	ND	NA					880			
Benzo(k)fluoranthene	60J-370	386.0	4/32	ND	NA					8800			
Benzo(a)pyrene	55J-340J	380.7	3/32	ND	NA				C	88		X	-/19.30E+1
Indeno(1,2,3-cd)pyrene	41J-250J	390.9	3/32	ND	NA					880			
benzo(g,h,i)perylene	44J-220J	375.2	2/32	ND	NA					NA	Notox	X	-/-
delta-BHC	3.3NJ	2.0	1/30	ND	NA					NA	350 freq		-/-
Aldrin	3	2.0	1/30	ND	NA					38			
Dieldrin	4.7J-57	7.8	7/30	ND	NA				C	40		X	5.00E-05/1.60E
4,4'-DDE	3.8-65J	10.5	7/30	ND	NA					1900			

discussed in uncertainty

↑  
 Fed in  
 lens



# Site 7 Surface Soil

CONTAMINANT	RANGE	log Normal 95% UCL	FREQUENCY	2. BLANK	1. 2X average BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	3. RBC	ARAR	COPC	APD <sub>0</sub> /CSF <sub>0</sub> (mg/kg day) (mg/kg/d)
Endosulfan II <sup>(1)</sup>	7.9J-37NT	5.9	3/30	ND	NA					470,000			
4,4'-DDP	4.3J-94T	5.7	3/31	ND	NA					2700			
4,4'-DDT	14J-280J	14.3	4/30	ND	NA					1900			
Endrin Aldehyde <sup>(2)</sup>	3.9NT	5.0	1/30	ND	NA					23,000			
alpha-Chlordane <sup>(3)</sup>	11J-26J	4.1	3/30	ND	NA					1490			
gamma-Chlordane <sup>(3)</sup>	6.9-22J	3.5	3/30	ND	NA					1490			
Aroclor 1254	48J	37.2	1/30	ND	NA					11600			
Aroclor 1260 <sup>(4)</sup>	80NJ	39.6	1/30	ND	NA					83			
Aluminum	690J-1290J	719.9	32/32	1130	4209,010					28,000			
Arsenic <sup>(5)</sup>	1.1-5.1J	2.2	6/32	ND	1.3*				C	0.37		X	3.00E-04/1.75E+1
Barium	5.2-172	36.8	29/32	23.5J	14,192					5500			
Beryllium	0.15-1.9	0.4	10/32	ND	0.22*				C	0.15		X	5.00E-03/4.30E+1
Calcium	72.7-206,000J	42008.7	19/32	17,000	1068,920					NA			
Chromium <sup>(6)</sup>	2.5-23.1	11.5	23/32	ND	4,765					390			
Cobalt	1.6-4.4	1.8	2/32	ND	2,348					4700			
Copper	2.6-7.6	2.7	7/32	ND	9,016					2900			
Iron	14.4-17,600J	9871.2	32/32	392	2514,673					NA			
Lead	4.2-2620	101.1	29/32	ND	21.8*				-	400(7)	no toxic		-/-
Magnesium	36.1-110	449.8	15/32	2380	169,397					NA			
Manganese	1.7J-42.9	15.7	18/32	11.1	14,088					390			
Mercury	0.23	0.1	2/32	ND	0.078					23			
Nickel	6.3-13.8	4.1	2/32	ND	3,092					600			
Potassium	246J-776J	254.9	3/32	2070	159,363					NA			
Selenium	1.1-2.1	1.1	7/32	5.9	0,739					390			
Silver	1.2	0.9	1/32	ND	0,960					390			
Sodium	248-153	81.1	15/32	19300	68,263					NA			
Vanadium	2.5-41J	16.7	28/32	ND	6,541					550			
Zinc	7.8-58.9J	18.9	15/32	61.1J	9,839					23,000			

mg/kg (n)

nutrient

nutrient

nutrient

5) Arsenic was evaluated as a carcinogen nutrient

nutrient

human  
lines

(1) US EPA Region III RBC for endosulfan used as a surrogate.  
 (2) US EPA Region III RBC for endrin used as a surrogate.  
 (3) US EPA Region III RBC for chlordane used as a surrogate.  
 (4) US EPA Region III RBC for polychlorinated biphenyls.

ND = Nondetect  
 NA = Not Available

Checked 15. newest RBC tab  
 Site 7 Subsurface Soil - blanks Hg/L  
 - organic PCBs  
 in mg/kg

p. 1 of 2

CONTAMINANT	RANGE	95% UCL	FREQUENCY	BLANK	2X average BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COPC	RFD, ICSF <sub>0</sub> (mg/kg/day) (mg/kg/day)
Methylene Chloride	12J	12.2	1/30	4J	NA					85,000			
Acetone	13-2300	815.9	11/30	140	NA					1,800,000			
Naphthalene	120J	186.6	1/29	ND	NA					3,100,000			
2-Methylnaphthalene	48J	196.8	1/29	ND	NA				-	NA	freq		-/-
Acenaphthene	190J	186.4	1/29	ND	NA					4,700,000			
Dibenzofuran	120J	186.6	1/29	ND	NA					300,000			
Fluorene	260J	190.8	1/29	ND	NA					3,100,000			
Phenanthrene	1700	251.9	1/29	ND	NA				-	NA	freq		-/-
Anthracene	350J	197.0	1/29	ND	NA					23,000,000			
Carbazole	450	203.0	1/29	ND	NA					32,600			
di-n-butyl phthalate	42J-220	196.9	3/29	ND	NA					4,800,000			fall in lines
Fluoranthene	1800	254.6	1/29	ND	NA					3,100,000			
Pyrene	1300	238.9	1/29	ND	NA					2,300,000			
Benzo(a)anthracene	770	217.7	1/29	ND	NA					880			
Chrysene	770	219.0	1/29	ND	NA					88,000			
bis(2-ethylhexyl) phthalate	39J-80J	196.6	5/29	2J	NA					46,000			
benzo(b)fluoranthene	690	215.6	1/29	ND	NA					880			
benzo(k)fluoranthene	610	211.8	1/29	ND	NA					8800			
benzo(a)pyrene	460	203.6	1/29	ND	NA				C	98	freq		-/7.30E+00
ideno(1,2,3-cd)pyrene	390	199.5	1/29	ND	NA					880			
dibenzo(a,h)anthracene	210J	187.5	1/29	ND	NA				C	88	freq		-/7.30E+01
benzo(g,h,i)perylene	330J	195.7	1/29	ND	NA				-	NA	freq		-/-
delta-BHC	3J	1.1	1/28	ND	NA				-	NA	freq		-/-
Aldrin	6.3	1.2	1/28	ND	NA					38			
Dieldrin	17-98J	8.1	3/28	ND	NA				C	40		X	5.00E-05/1.60E1

# Site 7 Subsurface Soil

CONTAMINANT	RANGE	95% UCL	FREQUENCY	BLANK	BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COC	AFD <sub>0</sub> / CSF <sub>0</sub> (mg/kg/day) (mg/kg/d)
4,4'-DDE	0.82J-38	4.1	4/28	ND	NA					1900			fill in lines
Endrin	4.8	2.1	1/28	ND	NA				23,000				
Endosulfan II <sup>(1)</sup>	17J-19J	3.4	2/28	ND	NA				470,000				
4,4'-DDD	1.9J-15J	3.3	4/28	ND	NA				12700				
4,4'-DDT	1.7J-18J	2.6	2/28	ND	NA				1900				
Endrin Aldehyde <sup>(2)</sup>	8.1J	2.2	1/28	ND	NA				23,000				
alpha-chlordane <sup>(3)</sup>	120J	2.7	1/28	ND	NA				1490				
gamma-chlordane <sup>(3)</sup>	29-110J	2.8	2/28	ND	NA				1490				
Aroclor-1260 <sup>(4)</sup>	91J	22.7 <sup>v</sup>	11/28	ND	NA				C 83	freq.		-1.70E+00	
(nut) Aluminum	607-11,600	4258.9	29/29	1130	7126.505					48,000			
Arsenic <sup>(5)</sup>	2.4J-2.6	1.3	2/29	ND	7.3*				C	0.37		X	3.00E-04/1.75E+
Barium	5.7-147	47.2	28/29	23.5J	11.295					5500			
Beryllium	0.08-0.74	0.2	7/29	ND	0.21*				C	0.15		X	5.00E-03/4.30E+
(nut) Calcium	45.5-93,300	28780.3	16/29	17000	553.524					NA			
Chromium <sup>(6)</sup>	21-15.2	7.3	26/29	ND	8.371					390			
Copper	0.43-74.7	4.3	6/29	ND	2.152					2900			
(nut) Iron	163-8000	4087.5	26/29	392	2132.543					NA			
Lead	1-18.3	5.6	24/29	ND	7.273					11000			
(nut) Magnesium	24.3-662	240.7	17/29	2380	211.929					NA			
Manganese	1.7-47.6	11.0	18/29	11.1	7.073					390			
Mercury	0.56	0.1	1/29	ND	0.150					23			
Nickel	6.8	2.6	1/29	ND	2.610					1600			
(nut) Potassium	369-462J	142.9	2/29	2070	238.252					NA			
Selenium	1.2	0.6	1/29	5.9	0.792					390			
(nut) Sodium	22.7-81.2	28.1	9/29	19300	45.533					NA			
Vanadium	1.5-18.2	8.1	22/29	ND	9.530					350			
Zinc	4.5-135	17.3	11/29	61.1J	4.323					23,000			

(5) Arsenic was evaluated as a carcinogen

(1) USEPA Region III RBC for endosulfan used as a surrogate.  
 (2) USEPA Region III RBC for endrin used as a surrogate.  
 (3) USEPA Region III RBC for chlordane used as a surrogate.  
 (4) USEPA Region III RBC for polychlorinated biphenyls.

(7) Lead action level for residential soils.  
 ND = Nondetect  
 \* new or be

# Site 7 Groundwater

\* Soil QA/QC Data

CONTAMINANT (ug/l)	RANGE	95% UCL	FREQUENCY	BLANK	(ug/l) Tap Water RBC BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COPC	RFD/CSF
Chloroform	4J-7J	5.7	2/8	ND	0.15				N/C				TE-02/6.0E
2-Hexanone	1J	8.4	1/8	1J	-								
Toluene	4J	5.2	1/8	ND	750V								
Phenol	4J	5.2	1/8	ND	22000V								
4-methylphenol	10	6.8	1/8	ND	180V								
Dieldrin	0.41	0.20	1/8	ND	0.0042				N/C			X	SE-05/1.6E
nutrient Aluminum	1660-88800	3857251668.3	5/8	57.8	37000								
Barium	3.2J-370	8642.6	8/8		2600V								
Beryllium	1.2-3	2.3	3/8		0.016				N/C			X	SE-03/4.30
nutrient Calcium	570-174000	7691427	8/8	89.3									
Chromium	11.7-164	105.1	4/8		180V								
Copper	10.6-20.8	12.7	2/8		1400V								
nutrient Iron	969-25,400	168638548.5	8/8	97.8									
Lead	27.1J-675J	954.1	3/8	4.1	<del>60037</del>				N		notox	X	TE-02/NI
nutrient Magnesium	1860-13000	7449.6	8/8										
Manganese	5J-445	857.0	8/8		180				N			X	SE-03/NE
Mercury	0.32-0.4	0.3	2/8		11V								
nutrient Potassium	1020-6430	4550.1	8/8										
Selenium	9.4	5.0	1/8		180V								
nutrient Sodium	4420-39800	28718.6	8/8	130									
Vanadium	24.1-167	305.3	3/8		260V								
Zinc	167-180	885.1	2/8	43J	11000V								

6J x 5 = 30

site 7 - Northeast Creek Surface Water

p. 1 of 1  
(use downstream B)

	CONTAMINANT (ug/l)	RANGE	95% UCL	FREQUENCY	BLANK	(mean) BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COPC	RFD/CSF
(Vocs)	Chloroform	1J	12.5	1/6	28✓									
	2-Butanone	2J	7.0	1/6	ND					—				6.7E-1 RFD 2.8E-1 CSF
	2-Hexanone	1J	12.5	1/6	ND					—				NE
nutrient	Aluminum	270-2200	4896.8	6/6		ND						no tox		
	Arsenic	2.1-2.4J	2.4	2/6		8.13 ✓								
nutrient	Barium	x 18.9-37.2	31.4	6/6		(2188) 24.25				N				7E-02 / N1
nutrient	Calcium	147000-171000	167641.9	6/6	101	134,025.00								
	Iron	208-2160	5735.3	6/6	ND	317.75								
	Lead (1)	x 4.2J-27.1	213.7	5/6		(2188) 16.41				—		no tox		NE-01 / NE
nutrient	Magnesium	476000-573000	562260.6	6/6		571,200.00								
	Manganese	x 10.1-68.9	72.5	6/6		ND				N				5E-03 / NE
	Potassium	147000-179000	173277.1	6/6		207,250.00								
	Silver	5.1-9.6	11.0	5/6		19.13								
nutrient	Sodium	380000-465000	4477083.1	6/6	179	3073,750.00								
	Zinc	x 22.5J-32.9	174.3	3/6		ND				N				3E-01 / N1

(1) evaluate in uncertainty section

# Site 7 - Northeast Creek Sediment

p. 1 of 2  
(use downstream BG)

(ug/kg)  
↓  
not in  
SD

RFD/CSF

CONTAMINANT	RANGE	95% UCL	FREQUENCY	BLANK	(mean) BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COPC
2-Butanone (MEK)	1J-53J	134.6	4/12	ND								X
Phenanthrene	91J	3696.6	1/12								not ok	X
Fluoranthene	42J-120J	5948.5	2/12		ND							X
Pyrene	43J-110J	7312.5	3/12		ND							X
Butyl benzy phthalate	47J	5368.2	1/12									X
Benzo(a)anthracene	74J	3883.4	1/12									X
Chrysene	70J	3939.0	1/12									X
di-n-Octylphthalate	500J	2777.5	1/12									X
benzo(k)fluoranthene	46J	5407.5	1/12									X
benzo(e)fluoranthene	57J	4106.7	1/12									X
Indeno(1,2,3-cd)pyrene	53J	5159.7	1/12									X
Dieldrin	5.7-7.9J	21.0	2/11		ND							X
4,4'-DDE	4.5-20J	24.7	3/11		ND							X
4,4'-DDD	4.3-44J	39.4	3/11		3.38							X
4,4'-DDT	8.8	21.5	1/11		4.12							X
alpha-Chlordane	4.9J-14	20.4	3/11		ND							X
gamma-Chlordane	5.2-11	17.6	2/11		ND							X
Aluminium	320J-5480J	3185.0	12/12		9864.29							X
Arsenic	0.8-1.3J	2.6	2/12		ND							X
Barium	1.4-14.8	13.3	2/12		12.44							X
Beryllium	0.28	1.2	1/12	✓	ND							X
Calcium	347-39500	64380.9	12/12	101	2832.86							X
Chromium	2.9-10	10.9	6/12	ND	30.87							X
Copper	3.7J-9.3J	13.8	3/12	✓	ND							X
Iron	197-2370J	2194.1	12/12	✓	12868.57							X

6x10<sup>-1</sup> RFD  
2.4x10<sup>-1</sup> RFD

NE

4x10<sup>-2</sup> / -

3x10<sup>-2</sup> / -

2x10<sup>-1</sup> / -

7.3x10<sup>-1</sup>

17.3x10<sup>-1</sup>

2x10<sup>-2</sup> / -

17.3x10<sup>-1</sup>

17.3x10<sup>-1</sup>

17.3x10<sup>-1</sup>

5x10<sup>-5</sup> / 16

3.4x10<sup>-1</sup>

12.4x10<sup>-1</sup>

5x10<sup>-4</sup> / 3x10<sup>-1</sup>

6x10<sup>-5</sup> / 1.3

1.3

1

3E-04 / 1.75

7E-02 / 11

5E-03 / 4.3

3.71x10<sup>-2</sup> NE

nutrient

(mg/kg)  
↓

# Site 7 - Northeast Creek Sediment

p. 2 of 2  
(use downstream B)

(mg/kg)  
↓  
nutrient  
nutrient

CONTAMINANT	RANGE	95% UCL	FREQUENCY	BLANK	BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COPC	RFD/CS
Lead <sup>(1)</sup>	3.9J-86J	32.3	12/12 8 <sup>↑</sup> 86	ND	5.75				N		Not on	X	<del>1E-05</del> / NE
Magnesium	540-13900	77,729.2	10/12	↓	5081.43								
Manganese	1.9-15.2	11.9	12/12	↓	45.66								
Sodium	1290-48,700	115,434.0	12/12	179	ND								which?
Thallium	0.61J-4.9J	6.7	5/12 5 <sup>↑</sup> 86	ND	0.25				N			X	8E-05 / NE
Vanadium	3-10.1	13.4	5/12	↓	26.59								
Zinc	2.9J-74J	34.0	3 <sup>↑</sup> 86 11/12	↓	30.66				N			X	3E-01 / NE

(1) evaluate discuss in uncertainty section

# Site 7 - Tributary Surface Water

p. 81  
 (use upstream BG)

Bogalified

CONTAMINANT (ug/l)	RANGE	95% UCL	FREQUENCY	BLANK	BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COPC	RFD/csl
Chloroform	2J-3J	6.1	2/7	28 ✓	ND								
Xylenes	1J	9.8	1/7		ND				N			X	2.0/NE
<del>Bis(2-ethylhexyl)phthalate</del>	<del>77J</del>	<del>81.6</del>	<del>1/7</del>	<del>1J</del>	<del>ND</del>				N,C				<del>2E-02/1.4E-0</del>
Dieldrin	x 0.4-0.5	1.11	2/7		ND				N,C			X	5E-05/1.6E-4
Endrin ketone <sup>(1)</sup>	x 0.12-0.13	0.11	2/7		ND						no tox	X	NE
nutrient Aluminum	77.1-1860	2423.5	7/7		333.17			✓					
Barium	x 16.4-28.9	27.4	7/7		25.67				N			X	7E-02/NE
nutrient Calcium	5940-149000	117372.8	7/7	101	17566.67			✓					
Copper	x 12.3	8.3	1/7		ND				N			X	3.7E-02/NE
nutrient Iron	175J-1630	1881.8	7/7		575.67			✓					
Lead (1)	x 2.5J-15.9	43.7	5/7		ND				N		no tox	X	<del>1E-02</del> /NE
nutrient Magnesium	1680-468000	—	7/7		1744.67			✓					
Manganese	x 11.2-21.3	17.2	7/7		ND				N			X	5E-03/NE
nutrient Potassium	32600-144000	—	3/7		ND			✓					
Silver	x 6.6J	4.3	1/7		ND				N			X	5E-03/NE
nutrient Sodium	7100-3730000	—	7/7	179	9830.00			✓					
Zinc	x 6.4-16.8J	810.4	6/7		ND				N			X	3E-01/NE

(1). Discuss in uncertainty section.

Xylenes  
 Oxidant  
 Barium  
 Copper  
 Manganese  
 Silver



# Site 7 - Tributary Sediment

p. 1 of 2  
(use upstream B6)

CONTAMINANT	RANGE	95% UCL	FREQUENCY	BLANK	(mean) BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COPC	AD/CSF
2-Butanone (MEK)	77-250J	462.2	10/15		ND							X	$6 \times 10^{-1}$
Toluene	10J-39J	32.6	9/15									X	$2 \times 10^{-1}$
Styrene	28J	47.7	1/15									X	$2 \times 10^{-1}$
Acenaphthylene	250J	1423.5	1/15									X	$6 \times 10^{-2}$
Dibenzofuran	130J	4743.0	1/15									X	$4 \times 10^{-3}$
Phenanthrene	100J-210J	1622.3	2/15								no tox	X	-
Fluoranthene	350J	1412.9	1/15									X	$3 \times 10^{-1}$
Di-n-butylphthalate	76J-1300J	1268.9	9/15									X	$1 \times 10^{-1}$
Fluoranthene	72J-450J	1786.6	3/15									X	$4 \times 10^{-2}$
pyrene	87J-480J	1720.5	3/15									X	$3 \times 10^{-2}$
butylbenzylphthalate	47J	2229.5	1/15									X	$2 \times 10^{-1}$
3,3'-dichlorobenzidine	110J	1628.8	1/15									X	-
Chrysene	110J-320J	1523.3	2/15									X	$4.5 \times 10^{-1}$
bis(1,2-ethylhexyl)phthalate	510-810	1404.0	2/15	1J(330)	ND							X	$7.3 \times 10^{-2}$
benzo(b)fluoranthene	85J-270J	1649.2	2/15		ND							X	$1.4 \times 10^{-2}$
benzo(k)fluoranthene	110J-230J	1593.3	2/15									X	$7.3 \times 10^{-2}$
benzo(a)pyrene	110J	1628.8	1/15									X	7.3
benzo(g,h,i)perylene	65J	1858.5	1/15		ND						no tox	X	-
Aldrin	3.1J	7.5	1/15		1.05							X	$3 \times 10^{-5}$
Dieldrin	5.4-71	27.5	6/15		1.96							X	$5 \times 10^{-5}$
4,4'-DDE	11-180J	202.7	10/15		2.42							X	0.34
4,4'-DDD	8.4-120J	80.0	8/15		1.57							X	0.24
4,4'-DDT	2.3J-110J	93.2	6/15		2.20							X	$5 \times 10^{-4}$
Endrin ketone	6.5J	14.5	1/15		ND						no tox	X	-
alpha-chlordane	2.7-42J	35.0	8/15		1.20							X	$6 \times 10^{-5}$

(ug/kg)



# Site 7-Tributary Sediment

p. 2 of 2  
(use upstream BG)

	CONTAMINANT	RANGE	95% UCL	FREQUENCY	BLANK	BACKGROUND	HISTORY	ANTHROPOGENIC	NUTRIENT	TOXICITY	RBC	ARAR	COPC	
(ug/kg)	gamma-Chlordane	4.7-225	12.1	3/15		1.44							X	6x10 <sup>-5</sup>   1.3
	Chlorocyclohexane	4505	216.9	1/15		ND							X	-7   7.7
nutrient	Aluminum	1170-10,500	7067.0	15/15		1165.57								
	Arsenic	3	2.1	1/15		0.37				N,C			X	3E-04   1.75
nutrient	Barium	7-279	548.6	15/15		6.46				N			X	7E-02   NE
	Beryllium	0.44-8	2.4	3/15		0.09				N,C			X	5E-03   4.30
nutrient	Calcium	299-13,400	21460.8	15/15	101	1967.14								
	Chromium	4.2-19.4	9.6	5/15		1.86				N			X	5E-03   NE
nutrient	Copper	3.2-95.8	32.7	4/15		0.75				N			X	3.7 E-02   NE
	Iron	570-6060	3368.7	15/15		433.71								
nutrient	Lead	4.85-90.8	61.1	15/15		0.79				N	NO TOX		X	1E-02   NE
	Magnesium	138-6180	14977.4	15/15		45.25								
nutrient	Manganese	3.4-30.6	17.2	15/15		3.63				N			X	5E-03   NE
	Mercury	1.6-2.6	1.2	2/15		0.14				N			X	3E-04   NE
nutrient	Potassium	1540-1780	1492.2	3/15		ND								
	Selenium	23.4	5.0	1/15		0.19				N			X	5E-03   NE
nutrient	Sodium	29.2-20,700	75861.7	15/15	179	ND								
	Thallium	0.665	1.7	1/15		0.10				N			X	8E-05   NE
mg/kg	Vanadium	2.9-37.5	15.2	9/15		1.52				N			X	7E-03   NE
	Zinc	4.1-536	263.5	15/15		5.11				N			X	3E-01   NE

**APPENDIX M**  
**STATISTICAL SUMMARIES**

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**APPENDIX M.1**  
**SURFACE SOIL ORGANICS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - SURFACE SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>				
<u>VOLATILES</u>					
Chloromethane	UG/KG	ND	NA	NA	NA
Bromomethane	UG/KG	ND	NA	NA	NA
Vinyl chloride	UG/KG	ND	NA	NA	NA
Chloroethane	UG/KG	ND	NA	NA	NA
Methylene chloride	UG/KG	ND	NA	NA	NA
Acetone	UG/KG	170	18.0	39.7	30.1
Carbon Disulfide	UG/KG	ND	NA	NA	NA
1,1-Dichloroethene	UG/KG	ND	NA	NA	NA
1,1-Dichloroethane	UG/KG	ND	NA	NA	NA
1,2-Dichloroethene(total)	UG/KG	ND	NA	NA	NA
Chloroform	UG/KG	ND	NA	NA	NA
1,2-Dichloroethane	UG/KG	ND	NA	NA	NA
2-Butanone	UG/KG	52	8.2	9.0	10.9
1,1,1-Trichloroethane	UG/KG	ND	NA	NA	NA
Carbon tetrachloride	UG/KG	ND	NA	NA	NA
Bromodichloromethane	UG/KG	ND	NA	NA	NA
1,2-Dichloropropane	UG/KG	ND	NA	NA	NA
cis-1,3-Dichloropropene	UG/KG	ND	NA	NA	NA
Trichloroethene	UG/KG	1 J	7.0	4.9	8.5
Dibromochloromethane	UG/KG	ND	NA	NA	NA
1,1,2-Trichloroethane	UG/KG	ND	NA	NA	NA
Benzene	UG/KG	ND	NA	NA	NA
trans-1,3-Dichloropropene	UG/KG	ND	NA	NA	NA
Bromoform	UG/KG	ND	NA	NA	NA
4-Methyl-2-pentanone	UG/KG	ND	NA	NA	NA
2-Hexanone	UG/KG	ND	NA	NA	NA
Tetrachloroethene	UG/KG	ND	NA	NA	NA
1,1,2,2-Tetrachloroethane	UG/KG	ND	NA	NA	NA
Toluene	UG/KG	46 J	8.2	8.2	10.7
Chlorobenzene	UG/KG	ND	NA	NA	NA
Ethylbenzene	UG/KG	ND	NA	NA	NA
Styrene	UG/KG	ND	NA	NA	NA
Xylenes (total)	UG/KG	ND	NA	NA	NA

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - SURFACE SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL	
	<u>UNITS</u>					
	<u>SEMIVOLATILES</u>					
Phenol	UG/KG	170 NJ	308.8	345.4	412.4	353.3
bis(2-Chloroethyl) ether	UG/KG	ND	NA	NA	NA	NA
2-Chlorophenol	UG/KG	ND	NA	NA	NA	NA
1,3-Dichlorobenzene	UG/KG	ND	NA	NA	NA	NA
1,4-Dichlorobenzene	UG/KG	ND	NA	NA	NA	NA
1,2-Dichlorobenzene	UG/KG	ND	NA	NA	NA	NA
2-Methylphenol	UG/KG	ND	NA	NA	NA	NA
2,2'-oxybis-(1-chloropropane)	UG/KG	ND	NA	NA	NA	NA
4-Methylphenol	UG/KG	ND	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	UG/KG	ND	NA	NA	NA	NA
Hexachloroethane	UG/KG	ND	NA	NA	NA	NA
Nitrobenzene	UG/KG	ND	NA	NA	NA	NA
Isophorone	UG/KG	ND	NA	NA	NA	NA
2-Nitrophenol	UG/KG	ND	NA	NA	NA	NA
2,4-Dimethylphenol	UG/KG	ND	NA	NA	NA	NA
bis(2-Chloroethoxy) methane	UG/KG	ND	NA	NA	NA	NA
2,4-Dichlorophenol	UG/KG	ND	NA	NA	NA	NA
1,2,4-Trichlorobenzene	UG/KG	ND	NA	NA	NA	NA
Naphthalene	UG/KG	ND	NA	NA	NA	NA
4-Chloroaniline	UG/KG	ND	NA	NA	NA	NA
Hexachlorobutadiene	UG/KG	ND	NA	NA	NA	NA
4-Chloro-3-methylphenol	UG/KG	ND	NA	NA	NA	NA
2-Methylnaphthalene	UG/KG	ND	NA	NA	NA	NA
Hexachlorocyclopentadiene	UG/KG	ND	NA	NA	NA	NA
2,4,6-Trichlorophenol	UG/KG	ND	NA	NA	NA	NA
2,4,5-Trichlorophenol	UG/KG	ND	NA	NA	NA	NA
2-Chloronaphthalene	UG/KG	ND	NA	NA	NA	NA
2-Nitroaniline	UG/KG	ND	NA	NA	NA	NA
Dimethyl phthalate	UG/KG	ND	NA	NA	NA	NA
Acenaphthylene	UG/KG	ND	NA	NA	NA	NA
2,6-Dinitrotoluene	UG/KG	ND	NA	NA	NA	NA
3-Nitroaniline	UG/KG	ND	NA	NA	NA	NA
Acenaphthene	UG/KG	37 J	308.5	347.3	412.7	377.9

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - SURFACE SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>				
<u>SEMIVOLATILES Cont.</u>					
2,4-Dinitrophenol	UG/KG	ND	NA	NA	NA
4-Nitrophenol	UG/KG	ND	NA	NA	NA
Dibenzofuran	UG/KG	ND	NA	NA	NA
2,4-Dinitrotoluene	UG/KG	ND	NA	NA	NA
Diethylphthalate	UG/KG	ND	NA	NA	NA
4-Chlorophenyl phenyl ether	UG/KG	ND	NA	NA	NA
Fluorene	UG/KG	38 J	308.5	347.3	412.7
4-Nitroaniline	UG/KG	ND	NA	NA	NA
4,6-Dinitro-2-methylphenol	UG/KG	ND	NA	NA	NA
N-nitrosodiphenylamine	UG/KG	ND	NA	NA	NA
4-Bromophenyl-phenylether	UG/KG	ND	NA	NA	NA
Hexachlorobenzene	UG/KG	ND	NA	NA	NA
Pentachlorophenol	UG/KG	ND	NA	NA	NA
Phenanthrene	UG/KG	400	312.2	348.2	416.6
Anthracene	UG/KG	100 J	310.5	345.9	414.2
Carbazole	UG/KG	110 J	310.8	345.7	414.5
di-n-Butylphthalate	UG/KG	170 J	322.0	357.4	429.2
Fluoranthene	UG/KG	750	325.9	354.5	432.3
Pyrene	UG/KG	580	317.3	350.9	422.6
Butyl benzyl phthalate	UG/KG	ND	NA	NA	NA
3,3'-Dichlorobenzidine	UG/KG	ND	NA	NA	NA
Benzo[a]anthracene	UG/KG	420	308.0	351.0	413.3
Chrysene	UG/KG	420	308.9	350.3	414.0
bis(2-Ethylhexyl)phthalate	UG/KG	600	263.9	217.2	329.0
di-n-Octylphthalate	UG/KG	ND	NA	NA	NA
Benzo[b]fluoranthene	UG/KG	380	306.9	350.5	412.1
Benzo[k]fluoranthene	UG/KG	370	306.6	350.5	411.7
Benzo[a]pyrene	UG/KG	340 J	309.3	348.6	413.8
Indeno[1,2,3-cd]pyrene	UG/KG	250 J	305.6	349.3	410.4
Dibenz[a,h]anthracene	UG/KG	ND	NA	NA	NA
Benzo[g,h,i]perylene	UG/KG	220 J	309.5	346.9	413.6

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - SURFACE SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
<u>PESTICIDES/PCBs</u>	<u>UNITS</u>				
alpha-BHC	UG/KG	ND	NA	NA	NA
beta-BHC	UG/KG	ND	NA	NA	NA
delta-BHC	UG/KG	3.3 NJ	1.7	1.7	2.2
Lindane (gamma-BHC)	UG/KG	ND	NA	NA	NA
Heptachlor	UG/KG	ND	NA	NA	NA
Aldrin	UG/KG	3	1.7	1.7	2.2
Heptachlor epoxide	UG/KG	ND	NA	NA	NA
Endosulfan I	UG/KG	ND	NA	NA	NA
Dieldrin	UG/KG	57	6.0	10.4	9.2
4,4'-DDE	UG/KG	65 J	7.6	14.2	12.0
Endrin	UG/KG	ND	NA	NA	NA
Endosulfan II	UG/KG	37 NJ	4.7	7.1	6.9
4,4'-DDD	UG/KG	94 J	5.9	16.5	10.9
Endosulfan sulfate	UG/KG	ND	NA	NA	NA
4,4'-DDT	UG/KG	280 J	14.7	50.9	30.4
Methoxychlor	UG/KG	ND	NA	NA	NA
Endrin ketone	UG/KG	ND	NA	NA	NA
Endrin aldehyde	UG/KG	39 NJ	4.3	7.3	6.6
alpha-Chlordane	UG/KG	26 J	3.1	5.3	4.8
gamma-Chlordane	UG/KG	22 J	2.7	4.3	4.1
Toxaphene	UG/KG	ND	NA	NA	NA
Aroclor 1016	UG/KG	ND	NA	NA	NA
Aroclor 1221	UG/KG	ND	NA	NA	NA
Aroclor 1232	UG/KG	ND	NA	NA	NA
Aroclor 1242	UG/KG	ND	NA	NA	NA
Aroclor 1248	UG/KG	ND	NA	NA	NA
Aroclor 1254	UG/KG	43 J	31.8	33.2	42.1
Aroclor 1260	UG/KG	80 NJ	33.0	34.3	43.7



**APPENDIX M.2**  
**SURFACE SOIL METALS**

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**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11**  
**SITE 7 - SURFACE SOIL**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TAL INORGANICS**

Client Sample ID:					NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
Laboratory Sample ID:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION			
Date Sampled:						
	<u>UNITS</u>					
Aluminum	MG/KG 12900 J	5114.4	3199.1	6074.1	7191.9	
Antimony	MG/KG ND	NA	NA	NA	NA	
Arsenic	MG/KG 5.1 J	1.9	1.4	2.3	2.2	
Barium	MG/KG 172	27.0	41.6	39.5	36.8	
Beryllium	MG/KG 1.9	0.3	0.4	0.4	0.4	
Cadmium	MG/KG ND	NA	NA	NA	NA	
Calcium	MG/KG 206000 J	12027.4	42844.5	24880.3	42008.7	
Chromium	MG/KG 23.1 J	6.9	5.3	8.5	11.5	
Cobalt	MG/KG 4.4	1.6	1.2	2.0	1.8	
Copper	MG/KG 7.6	2.2	1.8	2.7	2.7	
Iron	MG/KG 17600 J	3752.7	3440.3	4784.8	9871.2	
Lead	MG/KG 2620	94.8	461.0	233.0	101.1	
Magnesium	MG/KG 1110	238.0	257.1	315.1	449.8	
Manganese	MG/KG 42.9	10.0	10.1	13.1	15.7	
Mercury	MG/KG 0.23	0.1	0.1	0.1	0.1	
Nickel	MG/KG 13.8	3.5	3.0	4.4	4.1	
Potassium	MG/KG 776 J	209.6	161.4	258.0	254.9	
Selenium	MG/KG 2.1	0.9	0.7	1.1	1.1	
Silver	MG/KG 1.2	0.8	0.6	0.9	0.9	
Sodium	MG/KG 153	59.0	63.5	78.1	81.1	
Thallium	MG/KG ND	NA	NA	NA	NA	
Vanadium	MG/KG 41 J	10.3	8.5	12.8	16.7	
Zinc	MG/KG 58.9 J	14.5	11.9	18.1	18.9	

Moisture            %

**APPENDIX M.3**  
**SUBSURFACE SOIL ORGANICS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - SUBSURFACE SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>VOLATILES</u>					
	Chloromethane	UG/KG	ND	NA	NA	NA
	Bromomethane	UG/KG	ND	NA	NA	NA
	Vinyl chloride	UG/KG	ND	NA	NA	NA
	Chloroethane	UG/KG	ND	NA	NA	NA
	Methylene chloride	UG/KG	12 J	10.0	9.7	13.0
	Acetone	UG/KG	2300	236.7	578.1	416.0
	Carbon Disulfide	UG/KG	ND	NA	NA	NA
	1,1-Dichloroethene	UG/KG	ND	NA	NA	NA
	1,1-Dichloroethane	UG/KG	ND	NA	NA	NA
	1,2-Dichloroethene(total)	UG/KG	ND	NA	NA	NA
	Chloroform	UG/KG	ND	NA	NA	NA
	1,2-Dichloroethane	UG/KG	ND	NA	NA	NA
	2-Butanone	UG/KG	ND	NA	NA	NA
	1,1,1-Trichloroethane	UG/KG	ND	NA	NA	NA
	Carbon tetrachloride	UG/KG	ND	NA	NA	NA
	Bromodichloromethane	UG/KG	ND	NA	NA	NA
	1,2-Dichloropropane	UG/KG	ND	NA	NA	NA
	cis-1,3-Dichloropropene	UG/KG	ND	NA	NA	NA
	Trichloroethene	UG/KG	ND	NA	NA	NA
	Dibromochloromethane	UG/KG	ND	NA	NA	NA
	1,1,2-Trichloroethane	UG/KG	ND	NA	NA	NA
	Benzene	UG/KG	ND	NA	NA	NA
	trans-1,3-Dichloropropene	UG/KG	ND	NA	NA	NA
	Bromoform	UG/KG	ND	NA	NA	NA
	4-Methyl-2-pentanone	UG/KG	ND	NA	NA	NA
	2-Hexanone	UG/KG	ND	NA	NA	NA
	Tetrachloroethene	UG/KG	ND	NA	NA	NA
	1,1,2,2-Tetrachloroethane	UG/KG	ND	NA	NA	NA
	Toluene	UG/KG	ND	NA	NA	NA
	Chlorobenzene	UG/KG	ND	NA	NA	NA
	Ethylbenzene	UG/KG	ND	NA	NA	NA
	Styrene	UG/KG	ND	NA	NA	NA
	Xylenes (total)	UG/KG	ND	NA	NA	NA

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - SUBSURFACE SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
<u>UNITS</u>					
<u>SEMIVOLATILES</u>					
Phenol	UG/KG	ND	NA	NA	NA
bis(2-Chloroethyl) ether	UG/KG	ND	NA	NA	NA
2-Chlorophenol	UG/KG	ND	NA	NA	NA
1,3-Dichlorobenzene	UG/KG	ND	NA	NA	NA
1,4-Dichlorobenzene	UG/KG	ND	NA	NA	NA
1,2-Dichlorobenzene	UG/KG	ND	NA	NA	NA
2-Methylphenol	UG/KG	ND	NA	NA	NA
2,2'-oxybis-(1-chloropropane)	UG/KG	ND	NA	NA	NA
4-Methylphenol	UG/KG	ND	NA	NA	NA
N-Nitroso-di-n-propylamine	UG/KG	ND	NA	NA	NA
Hexachloroethane	UG/KG	ND	NA	NA	NA
Nitrobenzene	UG/KG	ND	NA	NA	NA
Isophorone	UG/KG	ND	NA	NA	NA
2-Nitrophenol	UG/KG	ND	NA	NA	NA
2,4-Dimethylphenol	UG/KG	ND	NA	NA	NA
bis(2-Chloroethoxy) methane	UG/KG	ND	NA	NA	NA
2,4-Dichlorophenol	UG/KG	ND	NA	NA	NA
1,2,4-Trichlorobenzene	UG/KG	ND	NA	NA	NA
Naphthalene	UG/KG	120 J	180.9	15.2	185.7
4-Chloroaniline	UG/KG	ND	NA	NA	NA
Hexachlorobutadiene	UG/KG	ND	NA	NA	NA
4-Chloro-3-methylphenol	UG/KG	ND	NA	NA	NA
2-Methylnaphthalene	UG/KG	48 J	178.4	26.9	186.9
Hexachlorocyclopentadiene	UG/KG	ND	NA	NA	NA
2,4,6-Trichlorophenol	UG/KG	ND	NA	NA	NA
2,4,5-Trichlorophenol	UG/KG	ND	NA	NA	NA
2-Chloronaphthalene	UG/KG	ND	NA	NA	NA
2-Nitroaniline	UG/KG	ND	NA	NA	NA
Dimethyl phthalate	UG/KG	ND	NA	NA	NA
Acenaphthylene	UG/KG	ND	NA	NA	NA
2,6-Dinitrotoluene	UG/KG	ND	NA	NA	NA
3-Nitroaniline	UG/KG	ND	NA	NA	NA
Acenaphthene	UG/KG	190 J	183.3	9.8	186.4

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - SUBSURFACE SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>SEMIVOLATILES Cont.</u>					
	2,4-Dinitrophenol	UG/KG ND	NA	NA	NA	NA
	4-Nitrophenol	UG/KG ND	NA	NA	NA	NA
	Dibenzofuran	UG/KG 120 J	180.9	15.2	185.7	186.6
	2,4-Dinitrotoluene	UG/KG ND	NA	NA	NA	NA
	Diethylphthalate	UG/KG ND	NA	NA	NA	NA
	4-Chlorophenyl phenyl ether	UG/KG ND	NA	NA	NA	NA
	Fluorene	UG/KG 260 J	185.7	17.3	191.2	190.8
	4-Nitroaniline	UG/KG ND	NA	NA	NA	NA
	4,6-Dinitro-2-methylphenol	UG/KG ND	NA	NA	NA	NA
	N-nitrosodiphenylamine	UG/KG ND	NA	NA	NA	NA
	4-Bromophenyl-phenylether	UG/KG ND	NA	NA	NA	NA
	Hexachlorobenzene	UG/KG ND	NA	NA	NA	NA
	Pentachlorophenol	UG/KG ND	NA	NA	NA	NA
	Phenanthrene	UG/KG 1700	235.3	281.9	324.4	251.9
	Anthracene	UG/KG 350 J	188.8	32.5	199.1	197.0
	Carbazole	UG/KG 450	192.2	50.5	208.2	203.0
	di-n-Butylphthalate	UG/KG 220 J	175.2	31.6	185.2	196.9
	Fluoranthene	UG/KG 1800	238.8	300.4	333.7	254.6
	Pyrene	UG/KG 1300	221.6	207.6	287.1	238.9
	Butyl benzyl phthalate	UG/KG ND	NA	NA	NA	NA
	3,3'-Dichlorobenzidine	UG/KG ND	NA	NA	NA	NA
	Benzo[a]anthracene	UG/KG 740	202.2	103.9	235.1	217.7
	Chrysene	UG/KG 770	203.3	109.4	237.8	219.0
	bis(2-Ethylhexyl)phthalate	UG/KG 80 J	160.8	48.3	176.1	196.6
	di-n-Octylphthalate	UG/KG ND	NA	NA	NA	NA
	Benzo[b]fluoranthene	UG/KG 690	200.5	94.6	230.4	215.6
	Benzo[k]fluoranthene	UG/KG 610	197.8	79.9	223.0	211.8
	Benzo[a]pyrene	UG/KG 460	192.6	52.3	209.1	203.6
	Indeno[1,2,3-cd]pyrene	UG/KG 390	190.2	39.7	202.7	199.5
	Dibenz[a,h]anthracene	UG/KG 210 J	184.0	11.0	187.4	187.5
	Benzo[g,h,i]perylene	UG/KG 330 J	188.1	29.0	197.3	195.7

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - SUBSURFACE SOIL  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
<u>UNITS</u>					
<u>PESTICIDES/PCBs</u>					
alpha-BHC	UG/KG	ND	NA	NA	NA
beta-BHC	UG/KG	ND	NA	NA	NA
delta-BHC	UG/KG	3 J	1.0	0.4	1.1
Lindane (gamma-BHC)	UG/KG	ND	NA	NA	NA
Heptachlor	UG/KG	ND	NA	NA	NA
Aldrin	UG/KG	6.3	1.1	1.0	1.5
Heptachlor epoxide	UG/KG	ND	NA	NA	NA
Endosulfan I	UG/KG	ND	NA	NA	NA
Dieldrin	UG/KG	98 J	7.9	21.0	14.7
4,4'-DDE	UG/KG	38	3.8	7.5	6.2
Endrin	UG/KG	4.8 J	1.9	0.6	2.1
Endosulfan II	UG/KG	19 J	3.0	4.2	4.4
4,4'-DDD	UG/KG	15 J	2.9	3.2	3.9
Endosulfan sulfate	UG/KG	ND	NA	NA	NA
4,4'-DDT	UG/KG	19 J	2.5	3.2	3.5
Methoxychlor	UG/KG	ND	NA	NA	NA
Endrin ketone	UG/KG	ND	NA	NA	NA
Endrin aldehyde	UG/KG	8.1 J	2.0	1.2	2.4
alpha-Chlordane	UG/KG	120 J	5.2	22.5	12.4
gamma-Chlordane	UG/KG	110 J	4.9	20.6	11.5
Toxaphene	UG/KG	ND	NA	NA	NA
Aroclor 1016	UG/KG	ND	NA	NA	NA
Aroclor 1221	UG/KG	ND	NA	NA	NA
Aroclor 1232	UG/KG	ND	NA	NA	NA
Aroclor 1242	UG/KG	ND	NA	NA	NA
Aroclor 1248	UG/KG	ND	NA	NA	NA
Aroclor 1254	UG/KG	ND	NA	NA	NA
Aroclor 1260	UG/KG	91 J	20.9	13.8	25.3

**APPENDIX M.4**  
**SUBSURFACE SOIL METALS**

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**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11**  
**SITE 7 - SUBSURFACE SOIL**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TAL INORGANICS**

Client Sample ID:					NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
Laboratory Sample ID:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION		
Date Sampled:						
	<u>UNITS</u>					
Aluminum	MG/KG	11600	3060.4	2547.9	3865.2	4258.9
Antimony	MG/KG	ND	NA	NA	NA	NA
Arsenic	MG/KG	2.6	1.1	0.4	1.3	1.3
Barium	MG/KG	147	28.6	31.2	38.5	47.2
Beryllium	MG/KG	0.74	0.2	0.1	0.2	0.2
Cadmium	MG/KG	ND	NA	NA	NA	NA
Calcium	MG/KG	93300	6252.4	20792.3	12820.0	28780.3
Chromium	MG/KG	15.2	5.4	3.2	6.4	7.3
Cobalt	MG/KG	ND	NA	NA	NA	NA
Copper	MG/KG	74.7	4.5	14.1	9.0	4.3
Iron	MG/KG	8000	1833.2	1987.2	2460.9	4087.5
Lead	MG/KG	18.3	3.8	4.0	5.1	5.6
Magnesium	MG/KG	662	122.6	163.8	174.4	240.7
Manganese	MG/KG	47.6	6.4	9.3	9.4	11.0
Mercury	MG/KG	0.56	0.1	0.1	0.1	0.1
Nickel	MG/KG	6.8	2.3	0.9	2.5	2.6
Potassium	MG/KG	462 J	127.2	81.9	153.1	142.9
Selenium	MG/KG	1.2	0.6	0.1	0.6	0.6
Silver	MG/KG	ND	NA	NA	NA	NA
Sodium	MG/KG	81.2	23.6	14.6	28.2	28.1
Thallium	MG/KG	ND	NA	NA	NA	NA
Vanadium	MG/KG	18.2	5.1	4.8	6.6	8.1
Zinc	MG/KG	135	14.7	31.9	24.8	17.3
Moisture	%					

**APPENDIX M.5**  
**GROUNDWATER ORGANICS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
<u>UNITS</u>					
<u>VOLATILES</u>					
Chloromethane	UG/L	ND	NA	NA	NA
Bromomethane	UG/L	ND	NA	NA	NA
Vinyl chloride	UG/L	ND	NA	NA	NA
Chloroethane	UG/L	ND	NA	NA	NA
Methylene chloride	UG/L	ND	NA	NA	NA
Acetone	UG/L	ND	NA	NA	NA
Carbon Disulfide	UG/L	ND	NA	NA	NA
1,1-Dichloroethene	UG/L	ND	NA	NA	NA
1,1-Dichloroethane	UG/L	ND	NA	NA	NA
1,2-Dichloroethene(total)	UG/L	ND	NA	NA	NA
Chloroform	UG/L	7 J	5.1	0.8	5.7
1,2-Dichloroethane	UG/L	ND	NA	NA	NA
2-Butanone	UG/L	ND	NA	NA	NA
1,1,1-Trichloroethane	UG/L	ND	NA	NA	NA
Carbon tetrachloride	UG/L	ND	NA	NA	NA
Bromodichloromethane	UG/L	ND	NA	NA	NA
1,2-Dichloropropane	UG/L	ND	NA	NA	NA
cis-1,3-Dichloropropene	UG/L	ND	NA	NA	NA
Trichloroethene	UG/L	ND	NA	NA	NA
Dibromochloromethane	UG/L	ND	NA	NA	NA
1,1,2-Trichloroethane	UG/L	ND	NA	NA	NA
Benzene	UG/L	ND	NA	NA	NA
trans-1,3-Dichloropropene	UG/L	ND	NA	NA	NA
Bromoform	UG/L	ND	NA	NA	NA
4-Methyl-2-pentanone	UG/L	ND	NA	NA	NA
2-Hexanone	UG/L	1 J	4.5	1.4	5.4
Tetrachloroethene	UG/L	ND	NA	NA	NA
1,1,2,2-Tetrachloroethane	UG/L	ND	NA	NA	NA
Toluene	UG/L	4 J	4.9	0.4	5.1
Chlorobenzene	UG/L	ND	NA	NA	NA
Ethylbenzene	UG/L	ND	NA	NA	NA
Styrene	UG/L	ND	NA	NA	NA
Xylenes (total)	UG/L	ND	NA	NA	NA

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL	
<u>UNITS</u>						
<u>SEMIVOLATILES</u>						
Phenol	UG/L	4 J	4.9	0.4	5.1	5.2
bis(2-Chloroethyl) ether	UG/L	ND	NA	NA	NA	NA
2-Chlorophenol	UG/L	ND	NA	NA	NA	NA
1,3-Dichlorobenzene	UG/L	ND	NA	NA	NA	NA
1,4-Dichlorobenzene	UG/L	ND	NA	NA	NA	NA
1,2-Dichlorobenzene	UG/L	ND	NA	NA	NA	NA
2-Methylphenol	UG/L	ND	NA	NA	NA	NA
2,2'-oxybis-(1-chloropropane)	UG/L	ND	NA	NA	NA	NA
4-Methylphenol	UG/L	10	5.6	1.8	6.8	6.8
N-Nitroso-di-n-propylamine	UG/L	ND	NA	NA	NA	NA
Hexachloroethane	UG/L	ND	NA	NA	NA	NA
Nitrobenzene	UG/L	ND	NA	NA	NA	NA
Isophorone	UG/L	ND	NA	NA	NA	NA
2-Nitrophenol	UG/L	ND	NA	NA	NA	NA
2,4-Dimethylphenol	UG/L	ND	NA	NA	NA	NA
bis(2-Chloroethoxy) methane	UG/L	ND	NA	NA	NA	NA
2,4-Dichlorophenol	UG/L	ND	NA	NA	NA	NA
1,2,4-Trichlorobenzene	UG/L	ND	NA	NA	NA	NA
Naphthalene	UG/L	ND	NA	NA	NA	NA
4-Chloroaniline	UG/L	ND	NA	NA	NA	NA
Hexachlorobutadiene	UG/L	ND	NA	NA	NA	NA
4-Chloro-3-methylphenol	UG/L	ND	NA	NA	NA	NA
2-Methylnaphthalene	UG/L	ND	NA	NA	NA	NA
Hexachlorocyclopentadiene	UG/L	ND	NA	NA	NA	NA
2,4,6-Trichlorophenol	UG/L	ND	NA	NA	NA	NA
2,4,5-Trichlorophenol	UG/L	ND	NA	NA	NA	NA
2-Chloronaphthalene	UG/L	ND	NA	NA	NA	NA
2-Nitroaniline	UG/L	ND	NA	NA	NA	NA
Dimethyl phthalate	UG/L	ND	NA	NA	NA	NA
Acenaphthylene	UG/L	ND	NA	NA	NA	NA
2,6-Dinitrotoluene	UG/L	ND	NA	NA	NA	NA
3-Nitroaniline	UG/L	ND	NA	NA	NA	NA
Acenaphthene	UG/L	ND	NA	NA	NA	NA

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>SEMIVOLATILES Cont.</u>					
	2,4-Dinitrophenol	UG/L	ND	NA	NA	NA
	4-Nitrophenol	UG/L	ND	NA	NA	NA
	Dibenzofuran	UG/L	ND	NA	NA	NA
	2,4-Dinitrotoluene	UG/L	ND	NA	NA	NA
	Diethylphthalate	UG/L	ND	NA	NA	NA
	4-Chlorophenyl phenyl ether	UG/L	ND	NA	NA	NA
	Fluorene	UG/L	ND	NA	NA	NA
	4-Nitroaniline	UG/L	ND	NA	NA	NA
	4,6-Dinitro-2-methylphenol	UG/L	ND	NA	NA	NA
	N-nitrosodiphenylamine	UG/L	ND	NA	NA	NA
	4-Bromophenyl-phenylether	UG/L	ND	NA	NA	NA
	Hexachlorobenzene	UG/L	ND	NA	NA	NA
	Pentachlorophenol	UG/L	ND	NA	NA	NA
	Phenanthrene	UG/L	ND	NA	NA	NA
	Anthracene	UG/L	ND	NA	NA	NA
	Carbazole	UG/L	ND	NA	NA	NA
	di-n-Butylphthalate	UG/L	ND	NA	NA	NA
	Fluoranthene	UG/L	ND	NA	NA	NA
	Pyrene	UG/L	ND	NA	NA	NA
	Butyl benzyl phthalate	UG/L	ND	NA	NA	NA
	3,3'-Dichlorobenzidine	UG/L	ND	NA	NA	NA
	Benzo[a]anthracene	UG/L	ND	NA	NA	NA
	Chrysene	UG/L	ND	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	UG/L	ND	NA	NA	NA
	di-n-Octylphthalate	UG/L	ND	NA	NA	NA
	Benzo[b]fluoranthene	UG/L	ND	NA	NA	NA
	Benzo[k]fluoranthene	UG/L	ND	NA	NA	NA
	Benzo[a]pyrene	UG/L	ND	NA	NA	NA
	Indeno[1,2,3-cd]pyrene	UG/L	ND	NA	NA	NA
	Dibenz[a,h]anthracene	UG/L	ND	NA	NA	NA
	Benzo[g,h,i]perylene	UG/L	ND	NA	NA	NA

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID:					NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
Laboratory Sample ID:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION		
Date Sampled:						
	<u>UNITS</u>					
	<u>PESTICIDES/PCBs</u>					
alpha-BHC	UG/L	ND	NA	NA	NA	NA
beta-BHC	UG/L	ND	NA	NA	NA	NA
delta-BHC	UG/L	ND	NA	NA	NA	NA
Lindane (gamma-BHC)	UG/L	ND	NA	NA	NA	NA
Heptachlor	UG/L	ND	NA	NA	NA	NA
Aldrin	UG/L	ND	NA	NA	NA	NA
Heptachlor epoxide	UG/L	ND	NA	NA	NA	NA
Endosulfan I	UG/L	ND	NA	NA	NA	NA
Dieldrin	UG/L	0.41	0.10	0.13	0.18	0.20
4,4'-DDE	UG/L	ND	NA	NA	NA	NA
Endrin	UG/L	ND	NA	NA	NA	NA
Endosulfan II	UG/L	ND	NA	NA	NA	NA
4,4'-DDD	UG/L	ND	NA	NA	NA	NA
Endosulfan sulfate	UG/L	ND	NA	NA	NA	NA
4,4'-DDT	UG/L	ND	NA	NA	NA	NA
Methoxychlor	UG/L	ND	NA	NA	NA	NA
Endrin ketone	UG/L	ND	NA	NA	NA	NA
Endrin aldehyde	UG/L	ND	NA	NA	NA	NA
alpha-Chlordane	UG/L	ND	NA	NA	NA	NA
gamma-Chlordane	UG/L	ND	NA	NA	NA	NA
Toxaphene	UG/L	ND	NA	NA	NA	NA
Aroclor 1016	UG/L	ND	NA	NA	NA	NA
Aroclor 1221	UG/L	ND	NA	NA	NA	NA
Aroclor 1232	UG/L	ND	NA	NA	NA	NA
Aroclor 1242	UG/L	ND	NA	NA	NA	NA
Aroclor 1248	UG/L	ND	NA	NA	NA	NA
Aroclor 1254	UG/L	ND	NA	NA	NA	NA
Aroclor 1260	UG/L	ND	NA	NA	NA	NA

**APPENDIX M.6**  
**GROUNDWATER TOTAL METALS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:					NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
Laboratory Sample ID:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION			
Date Sampled:						
	<u>UNITS</u>					
Aluminum	UG/L	88800	16071.4	30243.7	36334.2	38577251668.3
Antimony	UG/L	ND	NA	NA	NA	NA
Arsenic	UG/L	ND	NA	NA	NA	NA
Barium	UG/L	370	133.2	135.5	224.0	8642.6
Beryllium	UG/L	3	1.0	0.9	1.6	2.3
Cadmium	UG/L	ND	NA	NA	NA	NA
Calcium	UG/L	174000	27948.8	59168.4	67590.6	769149.7
Chromium	UG/L	104	21.3	33.9	44.0	105.1
Cobalt	UG/L	ND	NA	NA	NA	NA
Copper	UG/L	20.8	7.7	5.7	11.5	12.7
Iron	UG/L	25400	5993.6	8564.7	11731.8	168633548.7
Lead	UG/L	67.5 J	18.0	25.2	34.9	954.1
Magnesium	UG/L	13000	3840.0	3811.1	6393.4	7449.6
Manganese	UG/L	445	83.5	147.1	182.0	857.0
Mercury	UG/L	0.4	0.2	0.1	0.2	0.3
Nickel	UG/L	ND	NA	NA	NA	NA
Potassium	UG/L	6430	2383.8	1834.9	3613.1	4550.1
Selenium	UG/L	9.4	3.4	2.4	5.0	5.0
Silver	UG/L	ND	NA	NA	NA	NA
Sodium	UG/L	39800	12645.0	12077.8	20736.9	28718.6
Thallium	UG/L	ND	NA	NA	NA	NA
Vanadium	UG/L	167	30.6	56.0	68.1	305.3
Zinc	UG/L	180	67.7	70.7	115.1	885.1



**APPENDIX M.7**  
**GROUNDWATER DISSOLVED METALS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - GROUNDWATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL DISSOLVED INORGANICS

Client Sample ID:					NORMAL	LOG NORMAL
Laboratory Sample ID:		MAXIMUM	ARITHMETIC	STANDARD	UPPER 95%	UPPER 95%
Date Sampled:		DETECTED	MEAN	DEVIATION	CONFIDENCE	CONFIDENCE
					INTERVAL	INTERVAL
	<u>UNITS</u>					
Aluminum	UG/L	1400	325.9	524.2	677.1	10645.9
Antimony	UG/L	ND	NA	NA	NA	NA
Arsenic	UG/L	ND	NA	NA	NA	NA
Barium	UG/L	212	41.0	70.5	88.2	1664.4
Beryllium	UG/L	ND	NA	NA	NA	NA
Cadmium	UG/L	ND	NA	NA	NA	NA
Calcium	UG/L	201000	30168.3	69191.7	76525.5	2867079.4
Chromium	UG/L	11.7	5.8	2.4	7.4	7.5
Cobalt	UG/L	ND	NA	NA	NA	NA
Copper	UG/L	16.2	6.4	4.0	9.1	9.2
Iron	UG/L	2250	933.0	817.2	1480.5	135595.9
Lead	UG/L	5.2 J	2.0	1.3	2.8	2.9
Magnesium	UG/L	14800	3261.6	4732.9	6432.6	18929.0
Manganese	UG/L	497	80.7	169.5	194.3	2567.5
Mercury	UG/L	ND	NA	NA	NA	NA
Nickel	UG/L	ND	NA	NA	NA	NA
Potassium	UG/L	7010	1801.3	2160.3	3248.6	4923.0
Selenium	UG/L	ND	NA	NA	NA	NA
Silver	UG/L	ND	NA	NA	NA	NA
Sodium	UG/L	45300	13323.8	13599.5	22435.2	30542.0
Thallium	UG/L	ND	NA	NA	NA	NA
Vanadium	UG/L	ND	NA	NA	NA	NA
Zinc	UG/L	ND	NA	NA	NA	NA

**APPENDIX M.8**  
**NORTHEAST CREEK SURFACE WATER ORGANICS**

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>VOLATILES</u>					
	Chloromethane	UG/L	ND	NA	NA	NA
	Bromomethane	UG/L	ND	NA	NA	NA
	Vinyl chloride	UG/L	ND	NA	NA	NA
	Chloroethane	UG/L	ND	NA	NA	NA
	Methylene chloride	UG/L	ND	NA	NA	NA
	Acetone	UG/L	ND	NA	NA	NA
	Carbon Disulfide	UG/L	ND	NA	NA	NA
	1,1-Dichloroethene	UG/L	ND	NA	NA	NA
	1,1-Dichloroethane	UG/L	ND	NA	NA	NA
	1,2-Dichloroethene(total)	UG/L	ND	NA	NA	NA
	Chloroform	UG/L	1 J	4.3	1.6	5.7
	1,2-Dichloroethane	UG/L	ND	NA	NA	NA
	2-Butanone	UG/L	2 J	4.5	1.2	5.5
	1,1,1-Trichloroethane	UG/L	ND	NA	NA	NA
	Carbon tetrachloride	UG/L	ND	NA	NA	NA
	Bromodichloromethane	UG/L	ND	NA	NA	NA
	1,2-Dichloropropane	UG/L	ND	NA	NA	NA
	cis-1,3-Dichloropropene	UG/L	ND	NA	NA	NA
	Trichloroethene	UG/L	ND	NA	NA	NA
	Dibromochloromethane	UG/L	ND	NA	NA	NA
	1,1,2-Trichloroethane	UG/L	ND	NA	NA	NA
	Benzene	UG/L	ND	NA	NA	NA
	trans-1,3-Dichloropropene	UG/L	ND	NA	NA	NA
	Bromoform	UG/L	ND	NA	NA	NA
	4-Methyl-2-pentanone	UG/L	ND	NA	NA	NA
	2-Hexanone	UG/L	1 J	4.3	1.6	5.7
	Tetrachloroethene	UG/L	ND	NA	NA	NA
	1,1,2,2-Tetrachloroethane	UG/L	ND	NA	NA	NA
	Toluene	UG/L	ND	NA	NA	NA
	Chlorobenzene	UG/L	ND	NA	NA	NA
	Ethylbenzene	UG/L	ND	NA	NA	NA
	Styrene	UG/L	ND	NA	NA	NA
	Xylenes (total)	UG/L	ND	NA	NA	NA

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>SEMIVOLATILES</u>					
	Phenol	UG/L	ND	NA	NA	NA
	bis(2-Chloroethyl) ether	UG/L	ND	NA	NA	NA
	2-Chlorophenol	UG/L	ND	NA	NA	NA
	1,3-Dichlorobenzene	UG/L	ND	NA	NA	NA
	1,4-Dichlorobenzene	UG/L	ND	NA	NA	NA
	1,2-Dichlorobenzene	UG/L	ND	NA	NA	NA
	2-Methylphenol	UG/L	ND	NA	NA	NA
	2,2'-oxybis-(1-chloropropane)	UG/L	ND	NA	NA	NA
	4-Methylphenol	UG/L	ND	NA	NA	NA
	N-Nitroso-di-n-propylamine	UG/L	ND	NA	NA	NA
	Hexachloroethane	UG/L	ND	NA	NA	NA
	Nitrobenzene	UG/L	ND	NA	NA	NA
	Isophorone	UG/L	ND	NA	NA	NA
	2-Nitrophenol	UG/L	ND	NA	NA	NA
	2,4-Dimethylphenol	UG/L	ND	NA	NA	NA
	bis(2-Chloroethoxy) methane	UG/L	ND	NA	NA	NA
	2,4-Dichlorophenol	UG/L	ND	NA	NA	NA
	1,2,4-Trichlorobenzene	UG/L	ND	NA	NA	NA
	Naphthalene	UG/L	ND	NA	NA	NA
	4-Chloroaniline	UG/L	ND	NA	NA	NA
	Hexachlorobutadiene	UG/L	ND	NA	NA	NA
	4-Chloro-3-methylphenol	UG/L	ND	NA	NA	NA
	2-Methylnaphthalene	UG/L	ND	NA	NA	NA
	Hexachlorocyclopentadiene	UG/L	ND	NA	NA	NA
	2,4,6-Trichlorophenol	UG/L	ND	NA	NA	NA
	2,4,5-Trichlorophenol	UG/L	ND	NA	NA	NA
	2-Chloronaphthalene	UG/L	ND	NA	NA	NA
	2-Nitroaniline	UG/L	ND	NA	NA	NA
	Dimethyl phthalate	UG/L	ND	NA	NA	NA
	Acenaphthylene	UG/L	ND	NA	NA	NA
	2,6-Dinitrotoluene	UG/L	ND	NA	NA	NA
	3-Nitroaniline	UG/L	ND	NA	NA	NA
	Acenaphthene	UG/L	ND	NA	NA	NA

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11 (SITE 7)**  
**NORTHEAST CREEK SURFACE WATER**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>SEMIVOLATILES Cont.</u>					
	2,4-Dinitrophenol	UG/L	ND	NA	NA	NA
	4-Nitrophenol	UG/L	ND	NA	NA	NA
	Dibenzofuran	UG/L	ND	NA	NA	NA
	2,4-Dinitrotoluene	UG/L	ND	NA	NA	NA
	Diethylphthalate	UG/L	ND	NA	NA	NA
	4-Chlorophenyl phenyl ether	UG/L	ND	NA	NA	NA
	Fluorene	UG/L	ND	NA	NA	NA
	4-Nitroaniline	UG/L	ND	NA	NA	NA
	4,6-Dinitro-2-methylphenol	UG/L	ND	NA	NA	NA
	N-nitrosodiphenylamine	UG/L	ND	NA	NA	NA
	4-Bromophenyl-phenylether	UG/L	ND	NA	NA	NA
	Hexachlorobenzene	UG/L	ND	NA	NA	NA
	Pentachlorophenol	UG/L	ND	NA	NA	NA
	Phenanthrene	UG/L	ND	NA	NA	NA
	Anthracene	UG/L	ND	NA	NA	NA
	Carbazole	UG/L	ND	NA	NA	NA
	di-n-Butylphthalate	UG/L	ND	NA	NA	NA
	Fluoranthene	UG/L	ND	NA	NA	NA
	Pyrene	UG/L	ND	NA	NA	NA
	Butyl benzyl phthalate	UG/L	ND	NA	NA	NA
	3,3'-Dichlorobenzidine	UG/L	ND	NA	NA	NA
	Benzo[a]anthracene	UG/L	ND	NA	NA	NA
	Chrysene	UG/L	ND	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	UG/L	ND	NA	NA	NA
	di-n-Octylphthalate	UG/L	ND	NA	NA	NA
	Benzo[b]fluoranthene	UG/L	ND	NA	NA	NA
	Benzo[k]fluoranthene	UG/L	ND	NA	NA	NA
	Benzo[a]pyrene	UG/L	ND	NA	NA	NA
	Indeno[1,2,3-cd]pyrene	UG/L	ND	NA	NA	NA
	Dibenz[a,h]anthracene	UG/L	ND	NA	NA	NA
	Benzo[g,h,i]perylene	UG/L	ND	NA	NA	NA

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11 (SITE 7)**  
**NORTHEAST CREEK SURFACE WATER**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>PESTICIDES/PCBs</u>					
	alpha-BHC	UG/L	ND	NA	NA	NA
	beta-BHC	UG/L	ND	NA	NA	NA
	delta-BHC	UG/L	ND	NA	NA	NA
	Lindane (gamma-BHC)	UG/L	ND	NA	NA	NA
	Heptachlor	UG/L	ND	NA	NA	NA
	Aldrin	UG/L	ND	NA	NA	NA
	Heptachlor epoxide	UG/L	ND	NA	NA	NA
	Endosulfan I	UG/L	ND	NA	NA	NA
	Dieldrin	UG/L	ND	NA	NA	NA
	4,4'-DDE	UG/L	ND	NA	NA	NA
	Endrin	UG/L	ND	NA	NA	NA
	Endosulfan II	UG/L	ND	NA	NA	NA
	4,4'-DDD	UG/L	ND	NA	NA	NA
	Endosulfan sulfate	UG/L	ND	NA	NA	NA
	4,4'-DDT	UG/L	ND	NA	NA	NA
	Methoxychlor	UG/L	ND	NA	NA	NA
	Endrin ketone	UG/L	ND	NA	NA	NA
	Endrin aldehyde	UG/L	ND	NA	NA	NA
	alpha-Chlordane	UG/L	ND	NA	NA	NA
	gamma-Chlordane	UG/L	ND	NA	NA	NA
	Toxaphene	UG/L	ND	NA	NA	NA
	Aroclor 1016	UG/L	ND	NA	NA	NA
	Aroclor 1221	UG/L	ND	NA	NA	NA
	Aroclor 1232	UG/L	ND	NA	NA	NA
	Aroclor 1242	UG/L	ND	NA	NA	NA
	Aroclor 1248	UG/L	ND	NA	NA	NA
	Aroclor 1254	UG/L	ND	NA	NA	NA
	Aroclor 1260	UG/L	ND	NA	NA	NA

**APPENDIX M.9**  
**NORTHEAST CREEK SURFACE WATER METALS**



STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:					NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
Laboratory Sample ID:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION		
Date Sampled:						
	<u>UNITS</u>					
Aluminum	UG/L	2200 J	1012.0	834.4	1698.4	4896.8
Antimony	UG/L	ND	NA	NA	NA	NA
Arsenic	UG/L	2.4 J	1.4	0.7	2.0	2.4
Barium	UG/L	37.2	23.5	7.5	29.7	31.4
Beryllium	UG/L	ND	NA	NA	NA	NA
Cadmium	UG/L	ND	NA	NA	NA	NA
Calcium	UG/L	171000 J	159500.0	8961.0	166871.5	167641.9
Chromium	UG/L	ND	NA	NA	NA	NA
Cobalt	UG/L	ND	NA	NA	NA	NA
Copper	UG/L	ND	NA	NA	NA	NA
Iron	UG/L	2160 J	846.5	817.6	1519.0	5735.3
Lead	UG/L	27.1	12.5	10.8	21.3	213.9
Magnesium	UG/L	573000	526166.7	38973.9	558227.4	562260.6
Manganese	UG/L	68.9	23.6	22.6	42.2	72.5
Mercury	UG/L	ND	NA	NA	NA	NA
Nickel	UG/L	ND	NA	NA	NA	NA
Potassium	UG/L	179000	162833.3	11600.3	172376.0	173277.1
Selenium	UG/L	ND	NA	NA	NA	NA
Silver	UG/L	9.6	6.2	2.3	8.1	11.0
Sodium	UG/L	4650000	4208333.3	295866.0	4451718.7	4477083.1
Thallium	UG/L	ND	NA	NA	NA	NA
Vanadium	UG/L	ND	NA	NA	NA	NA
Zinc	UG/L	32.9 J	21.9	10.3	30.4	174.3

**APPENDIX M.10**  
**EAST AND WEST TRIBUTARIES, AND DRAINAGE DITCH**  
**SURFACE WATER ORGANICS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>VOLATILES</u>					
	Chloromethane	UG/L	ND	NA	NA	NA
	Bromomethane	UG/L	ND	NA	NA	NA
	Vinyl Chloride	UG/L	ND	NA	NA	NA
	Chloroethane	UG/L	ND	NA	NA	NA
	Methylene Chloride	UG/L	ND	NA	NA	NA
	Acetone	UG/L	ND	NA	NA	NA
	Carbon Disulfide	UG/L	ND	NA	NA	NA
	1,1-Dichloroethene	UG/L	ND	NA	NA	NA
	1,1-Dichloroethane	UG/L	ND	NA	NA	NA
	1,2-Dichloroethene (total)	UG/L	ND	NA	NA	NA
	Chloroform	UG/L	3 J	4.3	1.3	5.2
	1,2-Dichloroethane	UG/L	ND	NA	NA	NA
	2-Butanone	UG/L	ND	NA	NA	NA
	1,1,1-Trichloroethane	UG/L	ND	NA	NA	NA
	Carbon Tetrachloride	UG/L	ND	NA	NA	NA
	Bromodichloromethane	UG/L	ND	NA	NA	NA
	1,2-Dichloropropane	UG/L	ND	NA	NA	NA
	cis-1,3-Dichloropropene	UG/L	ND	NA	NA	NA
	Trichloroethene	UG/L	ND	NA	NA	NA
	Dibromochloromethane	UG/L	ND	NA	NA	NA
	1,1,2-Trichloroethane	UG/L	ND	NA	NA	NA
	Benzene	UG/L	ND	NA	NA	NA
	trans-1,3-Dichloropropene	UG/L	ND	NA	NA	NA
	Bromoform	UG/L	ND	NA	NA	NA
	4-Methyl-2-Pentanone	UG/L	ND	NA	NA	NA
	2-Hexanone	UG/L	ND	NA	NA	NA
	Tetrachloroethene	UG/L	ND	NA	NA	NA
	1,1,2,2-Tetrachloroethane	UG/L	ND	NA	NA	NA
	Toluene	UG/L	ND	NA	NA	NA
	Chlorobenzene	UG/L	ND	NA	NA	NA
	Ethylbenzene	UG/L	ND	NA	NA	NA
	Styrene	UG/L	ND	NA	NA	NA
	Xylene (total)	UG/L	1 J	4.4	1.5	5.5

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11 (SITE 7)**  
**WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

Client Sample ID:					NORMAL UPPER 95%	LOG NORMAL UPPER 95%
Laboratory Sample ID:		MAXIMUM	ARITHMETIC	STANDARD	CONFIDENCE	CONFIDENCE
Date Sampled:		DETECTED	MEAN	DEVIATION	INTERVAL	INTERVAL
	<u>UNITS</u>					
	<u>SEMIVOLATILES</u>					
	Phenol	UG/L	ND	NA	NA	NA
	bis(2-Chloroethyl)ether	UG/L	ND	NA	NA	NA
	2-Chlorophenol	UG/L	ND	NA	NA	NA
	1,3-Dichlorobenzene	UG/L	ND	NA	NA	NA
	1,4-Dichlorobenzene	UG/L	ND	NA	NA	NA
	1,2-Dichlorobenzene	UG/L	ND	NA	NA	NA
	2-Methylphenol	UG/L	ND	NA	NA	NA
	2,2'-oxybis(1-Chloropropane)	UG/L	ND	NA	NA	NA
	4-Methylphenol	UG/L	ND	NA	NA	NA
	N-Nitroso-di-n-propylamine	UG/L	ND	NA	NA	NA
	Hexachloroethane	UG/L	ND	NA	NA	NA
	Nitrobenzene	UG/L	ND	NA	NA	NA
	Isophorone	UG/L	ND	NA	NA	NA
	2-Nitrophenol	UG/L	ND	NA	NA	NA
	2,4-Dimethylphenol	UG/L	ND	NA	NA	NA
	bis(2-Chloroethoxy)methane	UG/L	ND	NA	NA	NA
	2,4-Dichlorophenol	UG/L	ND	NA	NA	NA
	1,2,4-Trichlorobenzene	UG/L	ND	NA	NA	NA
	Naphthalene	UG/L	ND	NA	NA	NA
	4-Chloroaniline	UG/L	ND	NA	NA	NA
	Hexachlorobutadiene	UG/L	ND	NA	NA	NA
	4-Chloro-3-methylphenol	UG/L	ND	NA	NA	NA
	2-Methylnaphthalene	UG/L	ND	NA	NA	NA
	Hexachlorocyclopentadiene	UG/L	ND	NA	NA	NA
	2,4,6-Trichlorophenol	UG/L	ND	NA	NA	NA
	2,4,5-Trichlorophenol	UG/L	ND	NA	NA	NA
	2-Chloronaphthalene	UG/L	ND	NA	NA	NA
	2-Nitroaniline	UG/L	ND	NA	NA	NA
	Dimethylphthalate	UG/L	ND	NA	NA	NA
	Acenaphthylene	UG/L	ND	NA	NA	NA
	2,6-Dinitrotoluene	UG/L	ND	NA	NA	NA
	3-Nitroaniline	UG/L	ND	NA	NA	NA
	Acenaphthene	UG/L	ND	NA	NA	NA

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>SEMIVOLATILES Cont.</u>					
	2,4-Dinitrophenol	UG/L	ND	NA	NA	NA
	Dibenzofuran	UG/L	ND	NA	NA	NA
	4-Nitrophenol	UG/L	ND	NA	NA	NA
	2,4-Dinitrotoluene	UG/L	ND	NA	NA	NA
	Diethylphthalate	UG/L	ND	NA	NA	NA
	Fluorene	UG/L	ND	NA	NA	NA
	4-Chlorophenyl-phenylether	UG/L	ND	NA	NA	NA
	4-Nitroaniline	UG/L	ND	NA	NA	NA
	4,6-Dinitro-2-methylphenol	UG/L	ND	NA	NA	NA
	N-Nitrosodiphenylamine	UG/L	ND	NA	NA	NA
	4-Bromophenyl-phenylether	UG/L	ND	NA	NA	NA
	Hexachlorobenzene	UG/L	ND	NA	NA	NA
	Pentachlorophenol	UG/L	ND	NA	NA	NA
	Phenanthrene	UG/L	ND	NA	NA	NA
	Anthracene	UG/L	ND	NA	NA	NA
	Carbazole	UG/L	ND	NA	NA	NA
	Di-n-butylphthalate	UG/L	ND	NA	NA	NA
	Fluoranthene	UG/L	ND	NA	NA	NA
	Pyrene	UG/L	ND	NA	NA	NA
	Butylbenzylphthalate	UG/L	ND	NA	NA	NA
	Benzo(a)anthracene	UG/L	ND	NA	NA	NA
	3,3'-Dichlorobenzidine	UG/L	ND	NA	NA	NA
	Chrysene	UG/L	ND	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	UG/L	77 B	15.3	27.2	35.3
	Di-n-octylphthalate	UG/L	ND	NA	NA	NA
	Benzo(b)fluoranthene	UG/L	ND	NA	NA	NA
	Benzo(k)fluoranthene	UG/L	ND	NA	NA	NA
	Benzo(a)pyrene	UG/L	ND	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	UG/L	ND	NA	NA	NA
	Dibenz(a,h)anthracene	UG/L	ND	NA	NA	NA
	Benzo(g,h,i)perylene	UG/L	ND	NA	NA	NA

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11 (SITE 7)**  
**WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>PESTICIDE/PCBs</u>					
	alpha-BHC	UG/L	ND	NA	NA	NA
	beta-BHC	UG/L	ND	NA	NA	NA
	delta-BHC	UG/L	ND	NA	NA	NA
	Lindane (gamma-BHC)	UG/L	ND	NA	NA	NA
	Heptachlor	UG/L	ND	NA	NA	NA
	Aldrin	UG/L	ND	NA	NA	NA
	Heptachlor epoxide	UG/L	ND	NA	NA	NA
	Endosulfan I	UG/L	ND	NA	NA	NA
	Dieldrin	UG/L	0.5	0.17	0.20	0.31
	4,4'-DDE	UG/L	ND	NA	NA	1.11
	Endrin	UG/L	ND	NA	NA	NA
	Endosulfan II	UG/L	ND	NA	NA	NA
	4,4'-DDD	UG/L	ND	NA	NA	NA
	Endosulfan sulfate	UG/L	ND	NA	NA	NA
	4,4'-DDT	UG/L	ND	NA	NA	NA
	Methoxychlor	UG/L	ND	NA	NA	NA
	Endrin ketone	UG/L	0.13	0.07	0.04	0.10
	Endrin aldehyde	UG/L	ND	NA	NA	NA
	alpha-Chlordane	UG/L	ND	NA	NA	NA
	gamma-Chlordane	UG/L	ND	NA	NA	NA
	Toxaphene	UG/L	ND	NA	NA	NA
	Aroclor 1016	UG/L	ND	NA	NA	NA
	Aroclor 1221	UG/L	ND	NA	NA	NA
	Aroclor 1232	UG/L	ND	NA	NA	NA
	Aroclor 1242	UG/L	ND	NA	NA	NA
	Aroclor 1248	UG/L	ND	NA	NA	NA
	Aroclor 1254	UG/L	ND	NA	NA	NA
	Aroclor 1260	UG/L	ND	NA	NA	NA

**APPENDIX M.11**  
**EAST AND WEST TRIBUTARIES, AND DRAINAGE DITCH**  
**SURFACE WATER METALS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH SURFACE WATER  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL	
	<u>UNITS</u>					
Aluminum	UG/L	1860	409.9	643.1	882.2	2423.5
Antimony	UG/L	ND	NA	NA	NA	NA
Arsenic	UG/L	ND	NA	NA	NA	NA
Barium	UG/L	28.9	22.6	5.0	26.2	27.4
Beryllium	UG/L	ND	NA	NA	NA	NA
Cadmium	UG/L	ND	NA	NA	NA	NA
Calcium	UG/L	149000	54448.6	61854.6	99873.7	1173772.8
Chromium	UG/L	ND	NA	NA	NA	NA
Cobalt	UG/L	ND	NA	NA	NA	NA
Copper	UG/L	12.3	6.0	2.8	8.1	8.3
Iron	UG/L	1630	651.4	491.7	1012.5	1881.8
Lead	UG/L	15.9	5.7	5.3	9.5	43.7
Magnesium	UG/L	468000	144570.0	206747.3	296402.1	27128920978.9
Manganese	UG/L	21.3	14.0	3.6	16.7	17.2
Mercury	UG/L	ND	NA	NA	NA	NA
Nickel	UG/L	ND	NA	NA	NA	NA
Potassium	UG/L	144000	44752.9	63461.4	91358.0	4467892435.9
Selenium	UG/L	ND	NA	NA	NA	NA
Silver	UG/L	6.6 J	3.1	1.5	4.2	4.3
Sodium	UG/L	3730000	1161100.0	1647833.5	2371244.1	875852220108.7
Thallium	UG/L	ND	NA	NA	NA	NA
Vanadium	UG/L	ND	NA	NA	NA	NA
Zinc	UG/L	168 J	38.4	58.7	81.5	810.4



**APPENDIX M.12**  
**NORTHEAST CREEK SEDIMENT ORGANICS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SEDIMENT  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>VOLATILES</u>					
	Chloromethane	UG/KG	ND	NA	NA	NA
	Bromomethane	UG/KG	ND	NA	NA	NA
	Vinyl chloride	UG/KG	ND	NA	NA	NA
	Chloroethane	UG/KG	ND	NA	NA	NA
	Methylene chloride	UG/KG	ND	NA	NA	NA
	Acetone	UG/KG	ND	NA	NA	NA
	Carbon Disulfide	UG/KG	ND	NA	NA	NA
	1,1-Dichloroethene	UG/KG	ND	NA	NA	NA
	1,1-Dichloroethane	UG/KG	ND	NA	NA	NA
	1,2-Dichloroethene(total)	UG/KG	ND	NA	NA	NA
	Chloroform	UG/KG	ND	NA	NA	NA
	1,2-Dichloroethane	UG/KG	ND	NA	NA	NA
	2-Butanone	UG/KG	53 J	23.3	22.4	34.9
	1,1,1-Trichloroethane	UG/KG	ND	NA	NA	NA
	Carbon tetrachloride	UG/KG	ND	NA	NA	NA
	Bromodichloromethane	UG/KG	ND	NA	NA	NA
	1,2-Dichloropropane	UG/KG	ND	NA	NA	NA
	cis-1,3-Dichloropropene	UG/KG	ND	NA	NA	NA
	Trichloroethene	UG/KG	ND	NA	NA	NA
	Dibromochloromethane	UG/KG	ND	NA	NA	NA
	1,1,2-Trichloroethane	UG/KG	ND	NA	NA	NA
	Benzene	UG/KG	ND	NA	NA	NA
	trans-1,3-Dichloropropene	UG/KG	ND	NA	NA	NA
	Bromoform	UG/KG	ND	NA	NA	NA
	4-Methyl-2-pentanone	UG/KG	ND	NA	NA	NA
	2-Hexanone	UG/KG	ND	NA	NA	NA
	Tetrachloroethene	UG/KG	ND	NA	NA	NA
	1,1,2,2-Tetrachloroethane	UG/KG	ND	NA	NA	NA
	Toluene	UG/KG	ND	NA	NA	NA
	Chlorobenzene	UG/KG	ND	NA	NA	NA
	Ethylbenzene	UG/KG	ND	NA	NA	NA
	Styrene	UG/KG	ND	NA	NA	NA
	Xylenes (total)	UG/KG	ND	NA	NA	NA

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11 (SITE 7)**  
**NORTHEAST CREEK SEDIMENT**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>				
<u>SEMIVOLATILES</u>					
Phenol	UG/KG	ND	NA	NA	NA
bis(2-Chloroethyl) ether	UG/KG	ND	NA	NA	NA
2-Chlorophenol	UG/KG	ND	NA	NA	NA
1,3-Dichlorobenzene	UG/KG	ND	NA	NA	NA
1,4-Dichlorobenzene	UG/KG	ND	NA	NA	NA
1,2-Dichlorobenzene	UG/KG	ND	NA	NA	NA
2-Methylphenol	UG/KG	ND	NA	NA	NA
2,2'-oxybis-(1-chloropropane)	UG/KG	ND	NA	NA	NA
4-Methylphenol	UG/KG	ND	NA	NA	NA
N-Nitroso-di-n-propylamine	UG/KG	ND	NA	NA	NA
Hexachloroethane	UG/KG	ND	NA	NA	NA
Nitrobenzene	UG/KG	ND	NA	NA	NA
Isophorone	UG/KG	ND	NA	NA	NA
2-Nitrophenol	UG/KG	ND	NA	NA	NA
2,4-Dimethylphenol	UG/KG	ND	NA	NA	NA
bis(2-Chloroethoxy) methane	UG/KG	ND	NA	NA	NA
2,4-Dichlorophenol	UG/KG	ND	NA	NA	NA
1,2,4-Trichlorobenzene	UG/KG	ND	NA	NA	NA
Naphthalene	UG/KG	ND	NA	NA	NA
4-Chloroaniline	UG/KG	ND	NA	NA	NA
Hexachlorobutadiene	UG/KG	ND	NA	NA	NA
4-Chloro-3-methylphenol	UG/KG	ND	NA	NA	NA
2-Methylnaphthalene	UG/KG	ND	NA	NA	NA
Hexachlorocyclopentadiene	UG/KG	ND	NA	NA	NA
2,4,6-Trichlorophenol	UG/KG	ND	NA	NA	NA
2,4,5-Trichlorophenol	UG/KG	ND	NA	NA	NA
2-Chloronaphthalene	UG/KG	ND	NA	NA	NA
2-Nitroaniline	UG/KG	ND	NA	NA	NA
Dimethyl phthalate	UG/KG	ND	NA	NA	NA
Acenaphthylene	UG/KG	ND	NA	NA	NA
2,6-Dinitrotoluene	UG/KG	ND	NA	NA	NA
3-Nitroaniline	UG/KG	ND	NA	NA	NA
Acenaphthene	UG/KG	ND	NA	NA	NA

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11 (SITE 7)**  
**NORTHEAST CREEK SEDIMENT**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL	
	<u>UNITS</u>						
	<u>SEMIVOLATILES Cont.</u>						
	2,4-Dinitrophenol	UG/KG	ND	NA	NA	NA	
	4-Nitrophenol	UG/KG	ND	NA	NA	NA	
	Dibenzofuran	UG/KG	ND	NA	NA	NA	
	2,4-Dinitrotoluene	UG/KG	ND	NA	NA	NA	
	Diethylphthalate	UG/KG	ND	NA	NA	NA	
	4-Chlorophenyl phenyl ether	UG/KG	ND	NA	NA	NA	
	Fluorene	UG/KG	ND	NA	NA	NA	
	4-Nitroaniline	UG/KG	ND	NA	NA	NA	
	4,6-Dinitro-2-methylphenol	UG/KG	ND	NA	NA	NA	
	N-nitrosodiphenylamine	UG/KG	ND	NA	NA	NA	
	4-Bromophenyl-phenylether	UG/KG	ND	NA	NA	NA	
	Hexachlorobenzene	UG/KG	ND	NA	NA	NA	
	Pentachlorophenol	UG/KG	ND	NA	NA	NA	
	Phenanthrene	UG/KG	91 J	943.0	818.6	1367.4	3696.6
	Anthracene	UG/KG	ND	NA	NA	NA	NA
	Carbazole	UG/KG	ND	NA	NA	NA	NA
	di-n-Butylphthalate	UG/KG	ND	NA	NA	NA	NA
	Fluoranthene	UG/KG	120 J	931.8	830.6	1362.5	5948.5
	Pyrene	UG/KG	170 J	922.7	840.2	1358.3	7312.5
	Butyl benzyl phthalate	UG/KG	47 J	939.3	822.9	1366.0	5368.2
	3,3'-Dichlorobenzidine	UG/KG	ND	NA	NA	NA	NA
	Benzo[a]anthracene	UG/KG	74 J	941.6	820.3	1366.9	3883.4
	Chrysene	UG/KG	70 J	941.3	820.6	1366.7	3939.0
	bis(2-Ethylhexyl)phthalate	UG/KG	ND	NA	NA	NA	NA
	di-n-Octylphthalate	UG/KG	500 J	882.5	806.9	1300.9	2777.5
	Benzo[b]fluoranthene	UG/KG	46 J	939.3	823.0	1365.9	5407.5
	Benzo[k]fluoranthene	UG/KG	57 J	940.2	821.9	1366.3	4166.7
	Benzo[a]pyrene	UG/KG	ND	NA	NA	NA	NA
	Indeno[1,2,3-cd]pyrene	UG/KG	53 J	939.8	822.3	1366.2	5159.7
	Dibenz[a,h]anthracene	UG/KG	ND	NA	NA	NA	NA
	Benzo[g,h,i]perylene	UG/KG	ND	NA	NA	NA	NA

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11 (SITE 7)**  
**NORTHEAST CREEK SEDIMENT**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
<u>UNITS</u>					
<u>PESTICIDES/PCBs</u>					
alpha-BHC	UG/KG	ND	NA	NA	NA
beta-BHC	UG/KG	ND	NA	NA	NA
delta-BHC	UG/KG	ND	NA	NA	NA
Lindane (gamma-BHC)	UG/KG	ND	NA	NA	NA
Heptachlor	UG/KG	ND	NA	NA	NA
Aldrin	UG/KG	ND	NA	NA	NA
Heptachlor epoxide	UG/KG	ND	NA	NA	NA
Endosulfan I	UG/KG	ND	NA	NA	NA
Dieldrin	UG/KG	7.9 J	8.2	6.5	11.8
4,4'-DDE	UG/KG	20 J	9.5	7.2	13.4
Endrin	UG/KG	ND	NA	NA	NA
Endosulfan II	UG/KG	ND	NA	NA	NA
4,4'-DDD	UG/KG	44 J	11.7	12.4	18.5
Endosulfan sulfate	UG/KG	ND	NA	NA	NA
4,4'-DDT	UG/KG	8.8	8.0	6.7	11.7
Methoxychlor	UG/KG	ND	NA	NA	NA
Endrin ketone	UG/KG	ND	NA	NA	NA
Endrin aldehyde	UG/KG	ND	NA	NA	NA
alpha-Chlordane	UG/KG	14	5.7	4.3	8.0
gamma-Chlordane	UG/KG	11	5.1	3.9	7.3
Toxaphene	UG/KG	ND	NA	NA	NA
Aroclor 1016	UG/KG	ND	NA	NA	NA
Aroclor 1221	UG/KG	ND	NA	NA	NA
Aroclor 1232	UG/KG	ND	NA	NA	NA
Aroclor 1242	UG/KG	ND	NA	NA	NA
Aroclor 1248	UG/KG	ND	NA	NA	NA
Aroclor 1254	UG/KG	ND	NA	NA	NA
Aroclor 1260	UG/KG	ND	NA	NA	NA

**APPENDIX M.13**  
**NORTHEAST CREEK SEDIMENT METALS**

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 NORTHEAST CREEK SEDIMENT  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
Aluminum	MG/KG	5480 J	1696.5	1476.4	2462.0	3185.0
Antimony	MG/KG	ND	NA	NA	NA	NA
Arsenic	MG/KG	1.3 J	1.1	0.8	1.4	2.6
Barium	MG/KG	14.8	7.2	4.3	9.4	13.3
Beryllium	MG/KG	0.28	0.5	0.4	0.7	1.2
Cadmium	MG/KG	ND	NA	NA	NA	NA
Calcium	MG/KG	39500	9505.6	10747.9	15077.9	64380.9
Chromium	MG/KG	10	6.5	3.2	8.2	10.9
Cobalt	MG/KG	ND	NA	NA	NA	NA
Copper	MG/KG	9.3 J	6.0	3.7	8.0	13.8
Iron	MG/KG	2370 J	1005.3	703.8	1370.2	2194.1
Lead	MG/KG	86 J	16.6	22.9	28.5	32.3
Magnesium	MG/KG	13900	5370.8	5721.7	8337.3	77729.2
Manganese	MG/KG	15.2	7.3	3.8	9.3	11.9
Mercury	MG/KG	ND	NA	NA	NA	NA
Nickel	MG/KG	ND	NA	NA	NA	NA
Potassium	MG/KG	ND	NA	NA	NA	NA
Selenium	MG/KG	ND	NA	NA	NA	NA
Silver	MG/KG	ND	NA	NA	NA	NA
Sodium	MG/KG	48700	15917.5	17863.8	25179.2	115434.0
Thallium	MG/KG	4.9 J	1.8	1.9	2.8	6.7
Vanadium	MG/KG	10.1	6.4	3.6	8.2	13.4
Zinc	MG/KG	74.5 J	17.0	19.1	26.9	34.0

**APPENDIX M.14**  
**EAST AND WEST TRIBUTARIES, DRAINAGE DITCH,**  
**AND MARSH AREA SEDIMENT ORGANICS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL	
	<u>UNITS</u>						
	<u>VOLATILES</u>						
	Chloromethane	UG/KG	ND	NA	NA	NA	
	Bromomethane	UG/KG	ND	NA	NA	NA	
	Vinyl Chloride	UG/KG	ND	NA	NA	NA	
	Chloroethane	UG/KG	ND	NA	NA	NA	
	Methylene Chloride	UG/KG	ND	NA	NA	NA	
	Acetone	UG/KG	ND	NA	NA	NA	
	Carbon Disulfide	UG/KG	ND	NA	NA	NA	
	1,1-Dichloroethene	UG/KG	ND	NA	NA	NA	
	1,1-Dichloroethane	UG/KG	ND	NA	NA	NA	
	1,2-Dichloroethene (total)	UG/KG	ND	NA	NA	NA	
	Chloroform	UG/KG	ND	NA	NA	NA	
	1,2-Dichloroethane	UG/KG	ND	NA	NA	NA	
	2-Butanone	UG/KG	250 J	84.5	81.9	121.8	452.2
	1,1,1-Trichloroethane	UG/KG	ND	NA	NA	NA	
	Carbon Tetrachloride	UG/KG	ND	NA	NA	NA	
	Bromodichloromethane	UG/KG	ND	NA	NA	NA	
	1,2-Dichloropropane	UG/KG	ND	NA	NA	NA	
	cis-1,3-Dichloropropene	UG/KG	ND	NA	NA	NA	
	Trichloroethene	UG/KG	ND	NA	NA	NA	
	Dibromochloromethane	UG/KG	ND	NA	NA	NA	
	1,1,2-Trichloroethane	UG/KG	ND	NA	NA	NA	
	Benzene	UG/KG	ND	NA	NA	NA	
	trans-1,3-Dichloropropene	UG/KG	ND	NA	NA	NA	
	Bromoform	UG/KG	ND	NA	NA	NA	
	4-Methyl-2-Pentanone	UG/KG	ND	NA	NA	NA	
	2-Hexanone	UG/KG	ND	NA	NA	NA	
	Tetrachloroethene	UG/KG	ND	NA	NA	NA	
	1,1,2,2-Tetrachloroethane	UG/KG	ND	NA	NA	NA	
	Toluene	UG/KG	39 J	19.5	12.6	25.2	32.6
	Chlorobenzene	UG/KG	ND	NA	NA	NA	
	Ethylbenzene	UG/KG	ND	NA	NA	NA	
	Styrene	UG/KG	28 J	24.9	14.7	31.6	47.7
	Xylene (total)	UG/KG	ND	NA	NA	NA	

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>				
<u>SEMIVOLATILES</u>					
Phenol	UG/KG	ND	NA	NA	NA
bis(2-Chloroethyl)ether	UG/KG	ND	NA	NA	NA
2-Chlorophenol	UG/KG	ND	NA	NA	NA
1,3-Dichlorobenzene	UG/KG	ND	NA	NA	NA
1,4-Dichlorobenzene	UG/KG	ND	NA	NA	NA
1,2-Dichlorobenzene	UG/KG	ND	NA	NA	NA
2-Methylphenol	UG/KG	ND	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	UG/KG	ND	NA	NA	NA
4-Methylphenol	UG/KG	ND	NA	NA	NA
N-Nitroso-di-n-propylamine	UG/KG	ND	NA	NA	NA
Hexachloroethane	UG/KG	ND	NA	NA	NA
Nitrobenzene	UG/KG	ND	NA	NA	NA
Isophorone	UG/KG	ND	NA	NA	NA
2-Nitrophenol	UG/KG	ND	NA	NA	NA
2,4-Dimethylphenol	UG/KG	ND	NA	NA	NA
bis(2-Chloroethoxy)methane	UG/KG	ND	NA	NA	NA
2,4-Dichlorophenol	UG/KG	ND	NA	NA	NA
1,2,4-Trichlorobenzene	UG/KG	ND	NA	NA	NA
Naphthalene	UG/KG	ND	NA	NA	NA
4-Chloroaniline	UG/KG	ND	NA	NA	NA
Hexachlorobutadiene	UG/KG	ND	NA	NA	NA
4-Chloro-3-methylphenol	UG/KG	ND	NA	NA	NA
2-Methylnaphthalene	UG/KG	ND	NA	NA	NA
Hexachlorocyclopentadiene	UG/KG	ND	NA	NA	NA
2,4,6-Trichlorophenol	UG/KG	ND	NA	NA	NA
2,4,5-Trichlorophenol	UG/KG	ND	NA	NA	NA
2-Chloronaphthalene	UG/KG	ND	NA	NA	NA
2-Nitroaniline	UG/KG	ND	NA	NA	NA
Dimethylphthalate	UG/KG	ND	NA	NA	NA
Acenaphthylene	UG/KG	250 J	752.0	485.6	972.8
2,6-Dinitrotoluene	UG/KG	ND	NA	NA	NA
3-Nitroaniline	UG/KG	ND	NA	NA	NA
Acenaphthene	UG/KG	ND	NA	NA	NA

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL ORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>SEMIVOLATILES Cont.</u>					
	2,4-Dinitrophenol	UG/KG	ND	NA	NA	NA
	Dibenzofuran	UG/KG	130 J	1923.3	1179.5	2459.6
	4-Nitrophenol	UG/KG	ND	NA	NA	NA
	2,4-Dinitrotoluene	UG/KG	ND	NA	NA	NA
	Diethylphthalate	UG/KG	ND	NA	NA	NA
	Fluorene	UG/KG	ND	NA	NA	NA
	4-Chlorophenyl-phenylether	UG/KG	ND	NA	NA	NA
	4-Nitroaniline	UG/KG	ND	NA	NA	NA
	4,6-Dinitro-2-methylphenol	UG/KG	ND	NA	NA	NA
	N-Nitrosodiphenylamine	UG/KG	ND	NA	NA	NA
	4-Bromophenyl-phenylether	UG/KG	ND	NA	NA	NA
	Hexachlorobenzene	UG/KG	ND	NA	NA	NA
	Pentachlorophenol	UG/KG	ND	NA	NA	NA
	Phenanthrene	UG/KG	210 J	740.0	500.3	967.5
	Anthracene	UG/KG	350 J	758.7	478.9	976.4
	Carbazole	UG/KG	ND	NA	NA	NA
	Di-n-butylphthalate	UG/KG	1300 J	637.7	491.1	861.0
	Fluoranthene	UG/KG	450 J	750.8	492.6	974.8
	Pyrene	UG/KG	430 J	747.8	495.5	973.1
	Butylbenzylphthalate	UG/KG	47 J	787.1	484.4	1007.4
	Benzo(a)anthracene	UG/KG	ND	NA	NA	NA
	3,3'-Dichlorobenzidine	UG/KG	110 J	790.0	479.4	1008.0
	Chrysene	UG/KG	320 J	748.0	491.8	971.6
	bis(2-Ethylhexyl)phthalate	UG/KG	810	856.0	417.8	1046.0
	Di-n-octylphthalate	UG/KG	ND	NA	NA	NA
	Benzo(b)fluoranthene	UG/KG	270 NJ	743.0	497.4	969.2
	Benzo(k)fluoranthene	UG/KG	230 NJ	742.0	497.9	968.4
	Benzo(a)pyrene	UG/KG	110 J	790.0	479.4	1008.0
	Indeno(1,2,3-cd)pyrene	UG/KG	ND	NA	NA	NA
	Dibenz(a,h)anthracene	UG/KG	ND	NA	NA	NA
	Benzo(g,h,i)perylene	UG/KG	65 J	787.0	484.1	1007.1

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11 (SITE 7)**  
**WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>PESTICIDE/PCBs</u>					
	alpha-BHC	UG/KG	ND	NA	NA	NA
	beta-BHC	UG/KG	ND	NA	NA	NA
	delta-BHC	UG/KG	ND	NA	NA	NA
	Lindane (gamma-BHC)	UG/KG	ND	NA	NA	NA
	Heptachlor	UG/KG	ND	NA	NA	NA
	Aldrin	UG/KG	3.1 J	4.2	2.3	5.3
	Heptachlor epoxide	UG/KG	ND	NA	NA	NA
	Endosulfan I	UG/KG	ND	NA	NA	NA
	Dieldrin	UG/KG	71	19.2	18.1	27.5
	4,4'-DDE	UG/KG	180 J	44.7	51.9	68.3
	Endrin	UG/KG	ND	NA	NA	NA
	Endosulfan II	UG/KG	ND	NA	NA	NA
	4,4'-DDD	UG/KG	120 J	27.2	30.8	41.2
	Endosulfan sulfate	UG/KG	ND	NA	NA	NA
	4,4'-DDT	UG/KG	110 J	24.8	35.9	41.1
	Methoxychlor	UG/KG	ND	NA	NA	NA
	Endrin ketone	UG/KG	6.5 J	8.2	4.4	10.2
	Endrin aldehyde	UG/KG	ND	NA	NA	NA
	alpha-Chlordane	UG/KG	42 J	12.4	13.2	18.5
	gamma-Chlordane	UG/KG	29 J	6.4	6.6	9.4
	Toxaphene	UG/KG	ND	NA	NA	NA
	Aroclor 1016	UG/KG	ND	NA	NA	NA
	Aroclor 1221	UG/KG	ND	NA	NA	NA
	Aroclor 1232	UG/KG	ND	NA	NA	NA
	Aroclor 1242	UG/KG	ND	NA	NA	NA
	Aroclor 1248	UG/KG	ND	NA	NA	NA
	Aroclor 1254	UG/KG	ND	NA	NA	NA
	Aroclor 1260	UG/KG	450 J	103.1	106.4	151.5
						216.9

**APPENDIX M.15**  
**EAST AND WEST TRIBUTARIES, DRAINAGE DITCH,**  
**AND MARSH AREA SEDIMENT METALS**

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STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11 (SITE 7)  
 WEST AND EAST TRIBUTARIES; DRAINAGE DITCH; MARSH AREA SEDIMENTS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>				
Aluminum	MG/KG 10500	4292.7	2999.2	5656.4	7067.0
Antimony	MG/KG ND	NA	NA	NA	NA
Arsenic	MG/KG 3	1.1	0.8	1.4	2.1
Barium	MG/KG 279	101.0	97.7	145.4	548.6
Beryllium	MG/KG 8	1.0	2.0	1.9	2.4
Cadmium	MG/KG ND	NA	NA	NA	NA
Calcium	MG/KG 13400	4655.3	3915.7	6435.7	21460.8
Chromium	MG/KG 19.4	6.9	3.9	8.7	9.6
Cobalt	MG/KG ND	NA	NA	NA	NA
Copper	MG/KG 95.8	13.7	25.3	25.2	32.7
Iron	MG/KG 6060	2016.7	1735.2	2805.6	3368.7
Lead	MG/KG 90.8	32.1	24.5	43.3	61.1
Magnesium	MG/KG 6180	2521.3	2094.6	3473.6	14977.4
Manganese	MG/KG 30.6	10.7	8.3	14.4	17.2
Mercury	MG/KG 2.6	0.5	0.7	0.8	1.2
Nickel	MG/KG ND	NA	NA	NA	NA
Potassium	MG/KG 1780	794.8	585.1	1060.9	1492.2
Selenium	MG/KG 23.4	2.4	5.8	5.1	5.0
Silver	MG/KG ND	NA	NA	NA	NA
Sodium	MG/KG 20700	3248.7	5286.8	5652.6	75861.7
Thallium	MG/KG 0.66 J	1.0	0.5	1.2	1.7
Vanadium	MG/KG 37.5	10.3	9.1	14.4	15.2
Zinc	MG/KG 536	81.5	150.7	150.0	263.5

**APPENDIX N**  
**CDI CALCULATIONS AND SPREADSHEETS**

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**EXAMPLE SOIL INGESTION CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose:** Estimate intake/risk from ingestion of soil

$$Intake (mg/kg\cdot day) = \frac{C \times CF \times EF \times ED \times IR}{BW \times AT}$$

Where:

C	=	Contaminant concentration in soil (mg/kg)
CF	=	Conversion factor (kg/mg)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
IR	=	Ingestion rate (mg/day)
BW	=	Body weight (kg)
AT <sub>c</sub>	=	Averaging time carcinogen (days)
AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

$$\begin{aligned} \text{Carcinogens} &= \text{Intake (mg/kg}\cdot\text{day)} \times \text{CSF (mg/kg}\cdot\text{day)}^{-1} \\ \text{Noncarcinogens} &= \text{Intake (mg/kg}\cdot\text{day)}/\text{RfD (mg/kg}\cdot\text{day)} \end{aligned}$$

**Example Carcinogen: Arsenic**

$$\begin{aligned} Intake (mg/kg\cdot day) &= \frac{2.2 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/yr} \times 24 \text{ yrs} \times 1.0E-6 \text{ kg/mg}}{70 \text{ kg} \times 25,550 \text{ days}} \\ &= 1.03E-06 \end{aligned}$$

$$Risk = 1.03E-06 \text{ mg/kg}\cdot\text{day} \times 1.75E+00 \text{ mg/kg}\cdot\text{day}^{-1} = 1.81E-06$$

**Example Noncarcinogen: Arsenic**

$$\begin{aligned} Intake (mg/kg\cdot day) &= \frac{2.2 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/yr} \times 24 \text{ yrs} \times 1.0E-6 \text{ kg/mg}}{70 \text{ kg} \times 8,760 \text{ days}} \\ &= 3.01E-06 \end{aligned}$$

$$Risk = \frac{3.01E-06 \text{ mg/kg}\cdot\text{day}}{3.00E-04 \text{ mg/kg}\cdot\text{day}} = 1.00E-02$$

Re: Site 7 Future Residential Adult



SURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

Intake from ingestion of soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * EF * ED * IR/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * \text{CSF or RfD}$$

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	350
ED = exposure duration (yr)	24
IR = soil ingestion rate (mg/day)	100
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	24
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benzo(a)pyrene	0.34	350	24	1E-06	100	70	70	365	1.60E-07	7.30E+00	1.17E-06	32.54
Dieldrin	0.0078	350	24	1E-06	100	70	70	365	3.66E-09	1.60E+01	5.86E-08	1.64
Arsenic	2.2	350	24	1E-06	100	70	70	365	1.03E-06	1.50E+00	1.55E-06	43.27
Beryllium	0.4	350	24	1E-06	100	70	70	365	1.88E-07	4.30E+00	8.08E-07	22.55
TOTAL											3.58E-06	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Dieldrin	0.0078	350	24	1E-06	100	70	24	365	1.07E-08	5.00E-05	0.00021	1.06
Aluminum	7191.9	350	24	1E-06	100	70	24	365	9.85E-03	1.00E+00	0.00985	48.72
Arsenic	2.2	350	24	1E-06	100	70	24	365	3.01E-06	3.00E-04	0.01005	49.68
Beryllium	0.4	350	24	1E-06	100	70	24	365	5.48E-07	5.00E-03	0.00011	0.54
Manganese	15.7	350	24	1E-06	100	70	24	365	2.15E-05	2.40E-02	0.00090	4.43
TOTAL											0.02022	100.00

SURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Intake from ingestion of soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * EF * ED * IR/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * \text{CSF or RfD}$$

Where:

	<b>INPUTS</b>
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	350
ED = exposure duration (yr)	6
IR = soil ingestion rate (mg/day)	200
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk
Benzo(a)pyrene	0.34	350	6	1E-06	200	15	70	365	3.73E-07	7.30E+00	2.72E-06	32.54
Dieldrin	0.0078	350	6	1E-06	200	15	70	365	8.55E-09	1.60E+01	1.37E-07	1.64
Arsenic	2.2	350	6	1E-06	200	15	70	365	2.41E-06	1.50E+00	3.62E-06	43.27
Beryllium	0.4	350	6	1E-06	200	15	70	365	4.38E-07	4.30E+00	1.88E-06	22.55
<b>TOTAL</b>											<b>8.36E-06</b>	<b>100.00</b>

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Dieldrin	0.0078	350	6	1E-06	200	15	6	365	9.97E-08	5.00E-05	0.00199	1.06
Aluminum	7191.9	350	6	1E-06	200	15	6	365	9.20E-02	1.00E+00	0.09195	48.72
Arsenic	2.2	350	6	1E-06	200	15	6	365	2.81E-05	3.00E-04	0.09376	49.68
Beryllium	0.4	350	6	1E-06	200	15	6	365	5.11E-06	5.00E-03	0.00102	0.54
Manganese	15.7	350	6	1E-06	200	15	6	365	2.01E-04	2.40E-02	0.00836	4.43
<b>TOTAL</b>											<b>0.18873</b>	<b>100.00</b>

SURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT RESIDENTIAL ADULT

Intake from ingestion of soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * EF * ED * IR/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * \text{CSF} \text{ or } / \text{RfD}$$

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	350
ED = exposure duration (yr)	4
IR = soil ingestion rate (mg/day)	100
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benzo(a)pyrene	0.34	350	4	1E-06	100	70	70	365	2.66E-08	7.30E+00	1.94E-07	32.54
Dieldrin	0.0078	350	4	1E-06	100	70	70	365	6.11E-10	1.60E+01	9.77E-09	1.64
Arsenic	2.2	350	4	1E-06	100	70	70	365	1.72E-07	1.50E+00	2.58E-07	43.27
Beryllium	0.4	350	4	1E-06	100	70	70	365	3.13E-08	4.30E+00	1.35E-07	22.55
TOTAL											5.97E-07	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Dieldrin	0.0078	350	4	1E-06	100	70	4	365	1.07E-08	5.00E-05	0.00021	1.06
Aluminum	7191.9	350	4	1E-06	100	70	4	365	9.85E-03	1.00E+00	0.00985	48.72
Arsenic	2.2	350	4	1E-06	100	70	4	365	3.01E-06	3.00E-04	0.01005	49.68
Beryllium	0.4	350	4	1E-06	100	70	4	365	5.48E-07	5.00E-03	0.00011	0.54
Manganese	15.7	350	4	1E-06	100	70	4	365	2.15E-05	2.40E-02	0.00090	4.43
TOTAL											0.02022	100.00

SURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT RESIDENTIAL CHILD

Intake from ingestion of soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * EF * ED * IR/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * \text{CSF} \text{ or } /\text{RfD}$$

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	350
ED = exposure duration (yr)	4
IR = soil ingestion rate (mg/day)	200
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk
Benzo(a)pyrene	0.34	350	4	1E-06	200	15	70	365	2.48E-07	7.30E+00	1.81E-06	30.35
Dieldrin	0.0078	350	4	1E-06	200	15	70	365	5.70E-09	1.60E+01	9.12E-08	1.53
Arsenic	2.2	350	4	1E-06	200	15	70	365	1.61E-06	1.75E+00	2.81E-06	47.08
Beryllium	0.4	350	4	1E-06	200	15	70	365	2.92E-07	4.30E+00	1.26E-06	21.04
TOTAL											5.97E-06	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Dieldrin	0.0078	350	4	1E-06	200	15	4	365	9.97E-08	5.00E-05	0.00199	1.06
Aluminum	7191.9	350	4	1E-06	200	15	4	365	9.20E-02	1.00E+00	0.09195	48.72
Arsenic	2.2	350	4	1E-06	200	15	4	365	2.81E-05	3.00E-04	0.09376	49.68
Beryllium	0.4	350	4	1E-06	200	15	4	365	5.11E-06	5.00E-03	0.00102	0.54
Manganese	15.7	350	4	1E-06	200	15	4	365	2.01E-04	2.40E-02	0.00836	4.43
TOTAL											0.18873	100.00

SUBSURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT CONSTRUCTION WORKER

Intake from ingestion of soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * EF * ED * IR/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * \text{CSF or RfD}$$

Where:

	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	90
ED = exposure duration (yr)	1
IR = soil ingestion rate (mg/day)	480
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	1
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Dieldrin	0.0081	90	1	1E-06	480	70	70	365	1.96E-10	1.60E+01	3.13E-09	4.41
Arsenic	1.3	90	1	1E-06	480	70	70	365	3.14E-08	1.50E+00	4.71E-08	66.34
Beryllium	0.2	90	1	1E-06	480	70	70	365	4.83E-09	4.30E+00	2.08E-08	29.26
TOTAL											7.10E-08	100.00

Contaminant	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Conversion Factor (kg/mg)	Ingestion Rate (mg/day)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Dieldrin	0.0081	90	1	1E-06	480	70	1	365	1.37E-08	5.00E-05	0.0003	1.84
Aluminum	4258.9	90	1	1E-06	480	70	1	365	7.20E-03	1.00E+00	0.0072	48.43
Arsenic	1.3	90	1	1E-06	480	70	1	365	2.20E-06	3.00E-04	0.0073	49.27
Beryllium	0.2	90	1	1E-06	480	70	1	365	3.38E-07	5.00E-03	0.0001	0.45
TOTAL											0.0149	100.00

**EXAMPLE DERMAL CONTACT WITH SOIL CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose:** Estimate intake/risk from dermal contact with soil

$$\text{Intake (mg/kg-day)} = \frac{C \times CF \times SA \times AF \times Abs \times EF \times ED}{BW \times AT}$$

Where:	C	=	Contaminant concentration in soil (mg/kg)
	CF	=	Conversion factor (kg/mg)
	SA	=	Surface available for contact (cm <sup>2</sup> /event)
	AF	=	Soil to skin adherence factor (mg/cm <sup>2</sup> )
	Abs	=	Fraction absorbed (percent)
	EF	=	Exposure frequency (days/year)
	ED	=	Exposure duration (years)
	IR	=	Ingestion rate (mg/day)
	BW	=	Body weight (kg)
	AT <sub>c</sub>	=	Averaging time carcinogen (days)
	AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

$$\text{Carcinogens} = \text{Intake (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1}$$

$$\text{Noncarcinogens} = \text{Intake (mg/kg-day)} / \text{RfD (mg/kg-day)}$$

**Example Carcinogen: Benzo(a)pyrene**

$$\text{Intake (mg/kg-day)} = \frac{0.34 \text{ mg/kg} \times 1.0\text{E-}06 \text{ kg/mg} \times 5,800 \text{ cm}^2/\text{event} \times 1\% \times 1 \text{ mg/cm}^2 \times 350 \text{ event/yr} \times 24 \text{ yrs}}{70 \text{ kg} \times 25,550 \text{ days}}$$

$$= 9.26\text{E-}08$$

$$\text{Risk} = 9.26\text{E-}08 \text{ mg/kg-day} \times 7.3\text{E+}00 \text{ mg/kg-day}^{-1} = 6.76\text{E-}07$$

**Example Noncarcinogen: Dieldrin**

$$\text{Intake (mg/kg-day)} = \frac{7.8 \text{ mg/kg} \times 1.0\text{E-}06 \text{ kg/mg} \times 5,800 \text{ cm}^2/\text{event} \times 1 \text{ mg/cm}^2 \times 1\% \times 350 \text{ event/yr} \times 24 \text{ yrs}}{70 \text{ kg} \times 8,760 \text{ days}}$$

$$= 6.20\text{E-}06$$

$$\text{Risk} = \frac{6.20\text{E-}06 \text{ mg/kg-day}}{5.0\text{E-}05 \text{ mg/kg-day}} = 1.24\text{E-}01 = 0.12$$

SURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT

OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

Dermal contact with soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:

C = contaminant concentration in soil (mg/kg)	INPUTS
CF = conversion factor (kg/mg)	Specific
SA = exposed skin surface area (cm <sup>2</sup> )	1E-06
AF = soil to skin adherence factor (mg/cm <sup>2</sup> )	5800
Abs = fraction absorbed (unitless)	1
EF = exposure frequency (events/yr)	Specific
ED = exposure duration (years)	350
BW = body weight (kg)	24
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	70
DY = day per year (day/yr)	24
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	365
RfD = reference dose (mg/kg-day)	Specific
	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult
Benzo(a)pyrene	0.34	1E-06	5800	1	0.01	350	24	70	70	365	9.26E-08	7.30E+00	6.76E-07
Dieldrin	0.0078	1E-06	5800	1	0.01	350	24	70	70	365	2.12E-09	1.60E+01	3.40E-08
Arsenic	2.2	1E-06	5800	1	0.001	350	24	70	70	365	5.99E-08	1.50E+00	8.99E-08
Beryllium	0.4	1E-06	5800	1	0.001	350	24	70	70	365	1.09E-08	4.30E+00	4.69E-08
TOTAL													8.47E-07

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult
Dieldrin	0.0078	1E-06	5800	1	0.01	350	24	70	24	365	6.20E-09	5.00E-05	0.000124
Aluminum	7191.9	1E-06	5800	1	0.001	350	24	70	24	365	5.71E-04	1.00E+00	0.000571
Arsenic	2.2	1E-06	5800	1	0.001	350	24	70	24	365	1.75E-07	3.00E-04	0.000583
Beryllium	0.4	1E-06	5800	1	0.001	350	24	70	24	365	3.18E-08	5.00E-03	0.000006
Manganese	15.7	1E-06	5800	1	0.001	350	24	70	24	365	1.25E-08	2.40E-02	0.000052
TOTAL													0.001284

SURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Dermal contact with soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED / BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion factor (kg/mg)	1E-08
SA = exposed skin surface area (cm <sup>2</sup> )	2300
AF = soil to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless)	Specific
EF = exposure frequency (events/yr)	350
ED = exposure duration (years)	6
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk
Benzo(a)pyrene	0.34	1E-08	2300	1	0.01	350	6	15	70	365	4.28E-08	7.30E+00	3.13E-07
Dieldrin	0.0078	1E-08	2300	1	0.01	350	6	15	70	365	9.83E-10	1.60E+01	1.57E-08
Arsenic	2.2	1E-08	2300	1	0.001	350	6	15	70	365	2.77E-08	1.50E+00	4.18E-08
Beryllium	0.4	1E-08	2300	1	0.001	350	6	15	70	365	5.04E-09	4.30E+00	2.17E-08
TOTAL													3.92E-07

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk
Dieldrin	0.0078	1E-08	2300	1	0.01	350	6	15	6	365	1.15E-08	5.00E-05	0.000229
Aluminum	7191.9	1E-08	2300	1	0.001	350	6	15	6	365	1.06E-03	1.00E+00	0.001057
Arsenic	2.2	1E-08	2300	1	0.001	350	6	15	6	365	3.23E-07	3.00E-04	0.001078
Beryllium	0.4	1E-08	2300	1	0.001	350	6	15	6	365	5.88E-08	5.00E-03	0.000012
Manganese	15.7	1E-08	2300	1	0.001	350	6	15	6	365	2.31E-08	2.40E-02	0.000096
TOTAL													0.002377



SURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT RESIDENTIAL ADULT

Dermal contact with soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED / BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } /RfD$$

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion factor (kg/mg)	1E-06
SA = exposed skin surface area (cm <sup>2</sup> )	5800
AF = soil to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless)	Specific
EF = exposure frequency (events/yr)	350
ED = exposure duration (years)	4
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult
Benzo(a)pyrene	0.34	1E-06	5800	1	0.01	350	4	70	70	365	1.54E-08	7.30E+00	1.13E-07
Dieldrin	0.0078	1E-06	5800	1	0.01	350	4	70	70	365	3.54E-10	1.60E+01	5.67E-09
Arsenic	2.2	1E-06	5800	1	0.001	350	4	70	70	365	9.99E-09	1.50E+00	1.50E-08
Beryllium	0.4	1E-06	5800	1	0.001	350	4	70	70	365	1.82E-09	4.30E+00	7.81E-09
TOTAL													1.41E-07

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult
Dieldrin	0.0078	1E-06	5800	1	0.01	350	4	70	4	365	6.20E-09	5.00E-05	0.000124
Aluminum	7191.9	1E-06	5800	1	0.001	350	4	70	4	365	5.71E-04	1.00E+00	0.000571
Arsenic	2.2	1E-06	5800	1	0.001	350	4	70	4	365	1.75E-07	3.00E-04	0.000583
Beryllium	0.4	1E-06	5800	1	0.001	350	4	70	4	365	3.18E-08	5.00E-03	0.000008
Manganese	15.7	1E-06	5800	1	0.001	350	4	70	4	365	1.25E-08	2.40E-02	0.000052
TOTAL													0.001284

SURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT RESIDENTIAL CHILD

Dermal contact with soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * \text{CSF} \text{ or } \text{RfD}$$

Where:

C = contaminant concentration in soil (mg/kg)	INPUTS
CF = conversion factor (kg/mg)	Specific
SA = exposed skin surface area (cm <sup>2</sup> )	1E-06
AF = soil to skin adherence factor (mg/cm <sup>2</sup> )	2300
Abs = fraction absorbed (unitless)	1
EF = exposure frequency (events/yr)	Specific
ED = exposure duration (years)	350
BW = body weight (kg)	4
ATc = averaging time for carcinogen (yr)	15
ATnc = averaging time for noncarcinogen (yr)	70
DY = day per year (day/yr)	4
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	365
RfD = reference dose (mg/kg-day)	Specific
	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk
Benzo(a)pyrene	0.34	1E-06	2300	1	0.01	350	4	15	70	365	2.86E-08	7.30E+00	2.09E-07
Dieldrin	0.0078	1E-06	2300	1	0.01	350	4	15	70	365	6.55E-10	1.60E+01	1.05E-08
Arsenic	2.2	1E-06	2300	1	0.001	350	4	15	70	365	1.85E-08	1.50E+00	2.77E-08
Beryllium	0.4	1E-06	2300	1	0.001	350	4	15	70	365	3.36E-09	4.30E+00	1.45E-08
TOTAL													2.61E-07

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk
Dieldrin	0.0078	1E-06	2300	1	0.01	350	4	15	4	365	1.15E-08	5.00E-05	0.000229
Aluminum	7191.9	1E-06	2300	1	0.001	350	4	15	4	365	1.06E-03	1.00E+00	0.001057
Arsenic	2.2	1E-06	2300	1	0.001	350	4	15	4	365	3.23E-07	3.00E-04	0.001078
Beryllium	0.4	1E-06	2300	1	0.001	350	4	15	4	365	5.88E-08	5.00E-03	0.000012
Manganese	15.7	1E-06	2300	1	0.001	350	4	15	4	365	2.31E-08	2.40E-02	0.000098
TOTAL													0.002377

SUBSURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT CONSTRUCTION WORKER

Dermal contact with soil is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED / BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:

C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion factor (kg/mg)	1E-06
SA = adult exposed skin surface area (cm <sup>2</sup> )	4300
AF = soil to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless)	Specific
EF = adult exposure frequency (events/yr)	90
ED = adult exposure duration (years)	1
BW = adult body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	1
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Dieldrin	0.0081	1E-06	4300	1	0.01	90	1	70	70	365	1.75E-11	1.60E+01	2.80E-10	31.56
Arsenic	1.3	1E-06	4300	1	0.001	90	1	70	70	365	2.81E-10	1.50E+00	4.22E-10	47.49
Beryllium	0.2	1E-06	4300	1	0.001	90	1	70	70	365	4.33E-11	4.30E+00	1.86E-10	20.94
TOTAL													8.88E-10	100.00

Contaminant	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Dieldrin	0.0081	1E-06	4300	1	0.01	90	1	70	1	365	1.23E-09	5.00E-05	0.0000245	15.80
Aluminum	4258.9	1E-06	4300	1	0.001	90	1	70	1	365	6.45E-05	1.00E+00	0.0000645	41.54
Arsenic	1.3	1E-06	4300	1	0.001	90	1	70	1	365	1.97E-08	3.00E-04	0.0000658	42.27
Beryllium	0.2	1E-06	4300	1	0.001	90	1	70	1	365	3.03E-09	5.00E-03	0.0000006	0.39
TOTAL													0.0001553	100.00

**EXAMPLE INHALATION OF PARTICULATES CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose:** Estimate intake/risk from the inhalation of soil particulates

$$\text{Intake (mg/kg-day)} = \frac{C \times IR \times EF \times ED \times 1/PEF}{BW \times AT}$$

Where:

C	=	Contaminant concentration in soil (mg/kg)
IR	=	Inhalation rate (m <sup>3</sup> /day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
PEF	=	Particulate Emission Factor (m <sup>3</sup> /kg)
BW	=	Body weight (kg)
AT <sub>c</sub>	=	Averaging time carcinogen (days)
AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

$$\begin{aligned} \text{Carcinogens} &= \text{Intake (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1} \\ \text{Noncarcinogens} &= \text{Intake (mg/kg-day)} / \text{RfD (mg/kg-day)} \end{aligned}$$

**Example Carcinogen: Arsenic**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{2.2 \text{ mg/kg} \times 20 \text{ m}^3/\text{day} \times 350 \text{ days/yr} \times 24 \text{ yrs} \times 1/4.6\text{E}+09 \text{ m}^3/\text{kg}}{70 \text{ kg} \times 25,550 \text{ days}} \\ &= 4.46\text{E}-11 \end{aligned}$$

$$\text{Risk} = 4.46\text{E}-11 \text{ mg/kg-day} \times 1.51\text{E}+01 \text{ mg/kg-day}^{-1} = 6.74\text{E}-10$$

**Example Noncarcinogen: NA\***

\* Not evaluated due to lack of published toxicity values.

PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

Intake from the inhalation of particulates is calculated as follows:

$$\text{Intake (mg/kg-day)} = (C * EF * ED * IR * 1/PEF)/(BW * ATc \text{ or } ATnc * DY)$$

$$\text{Risk} = \text{Intake} * \text{CSF or RfD}$$

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CSF = carcinogenic slope factor	Specific
RfD = reference dose for noncarcinogen	Specific
IR = inhalation rate (m3)	20
EF = exposure frequency (days)	350
ED = exposure duration (years)	24
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	24
DY = day per year (day/yr)	365
PEF = particulate emission factor (m3/kg)	6.79E+08

Note: Inputs are scenario and site specific

Contaminant(f)	Concentration Carcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Contribution to Risk
Benzo(a)pyrene	0.34	6.8E+08	350	20	24	70	70	365	4.70E-11	6.10E+00	2.87E-10	5.35
Dieldrin	0.0078	6.8E+08	350	20	24	70	70	365	1.08E-12	1.61E+01	1.74E-11	0.32
Arsenic	2.2	6.8E+08	350	20	24	70	70	365	3.04E-10	1.51E+01	4.60E-09	85.66
Beryllium	0.4	6.8E+08	350	20	24	70	70	365	5.53E-11	6.40E+00	4.65E-10	8.66
TOTAL											5.38E-09	100.00

Contaminant(f)	Concentration Noncarcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Dieldrin	0.0078	6.8E+08	350	20	24	70	24	365	3.15E-12	--	0	--
Arsenic	2.2	6.8E+08	350	20	24	70	24	365	8.88E-10	--	0	--
Beryllium	0.4	6.8E+08	350	20	24	70	24	365	1.61E-10	--	0	--
TOTAL											0	0.00

PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Intake from the Inhalation of particulates is calculated as follows:

$$\text{Intake (mg/kg-day)} = (C * EF * ED * IR * 1/PEF)/(BW * ATc \text{ or } ATnc * DY)$$

$$\text{Risk} = \text{Intake} * \text{CSF or /RfD}$$

Where:

C = contaminant concentration in soil (mg/kg)  
 CSF = carcinogenic slope factor  
 RfD = reference dose for noncarcinogen  
 IR = Inhalation rate (m3)  
 EF = exposure frequency (days)  
 ED = exposure duration (years)  
 BW = body weight (kg)  
 ATc = averaging time for carcinogen (yr)  
 ATnc = averaging time for noncarcinogen (yr)  
 DY = day per year (day/yr)  
 PEF = particulate emission factor (m3/kg)

INPUTS  
 Specific  
 Specific  
 Specific  
 12  
 350  
 6  
 15  
 70  
 6  
 365  
 6.78E+08

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day)-1	Carcinogenic Risk Child	Percent Contribution to Risk
Benzo(a)pyrene	0.34	6.8E+08	350	12	6	15	70	365	3.29E-11	6.10E+00	2.01E-10	5.35
Dieldrin	0.0078	6.8E+08	350	12	6	15	70	365	7.55E-13	1.61E+01	1.22E-11	0.32
Arsenic	2.2	6.8E+08	350	12	6	15	70	365	2.13E-10	1.51E+01	3.22E-09	85.68
Beryllium	0.4	6.8E+08	350	12	6	15	70	365	3.87E-11	8.40E+00	3.25E-10	8.68
TOTAL											3.78E-09	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
Dieldrin	0.0078	6.8E+08	350	12	6	15	6	365	8.81E-12	--	0	--
Arsenic	2.2	6.8E+08	350	12	6	15	6	365	2.49E-09	--	0	--
Beryllium	0.4	6.8E+08	350	12	6	15	6	365	4.52E-10	--	0	--
TOTAL											0	0.00

File Name: PI.WQ2

PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT RESIDENTIAL ADULT

Intake from the inhalation of particulates is calculated as follows:

$$\text{Intake (mg/kg-day)} = (C * EF * ED * IR * 1/PEF) / (BW * ATc \text{ or } ATnc * DY)$$

$$\text{Risk} = \text{Intake} * \text{CSF} \text{ or } \text{RfD}$$

Where:

C = contaminant concentration in soil (mg/kg)	INPUTS
CSF = carcinogenic slope factor	Specific
RfD = reference dose for noncarcinogen	Specific
IR = inhalation rate (m3)	20
EF = exposure frequency (days)	350
ED = exposure duration (years)	4
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = day per year (day/yr)	365
PEF = particulate emission factor (m3/kg)	6.78E+08

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day)-1	Carcinogenic Risk Adult	Percent Contribution to Risk
Benzo(a)pyrene	0.34	6.8E+08	350	20	4	70	70	365	7.84E-12	6.10E+00	4.78E-11	5.35
Dieldrin	0.0078	6.8E+08	350	20	4	70	70	365	1.80E-13	1.61E+01	2.90E-12	0.32
Arsenic	2.2	6.8E+08	350	20	4	70	70	365	5.07E-11	1.51E+01	7.68E-10	85.68
Beryllium	0.4	6.8E+08	350	20	4	70	70	365	9.22E-12	8.40E+00	7.75E-11	8.68
TOTAL											8.94E-10	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Dieldrin	0.0078	6.8E+08	350	20	4	70	4	365	3.15E-12	--	0	--
Arsenic	2.2	6.8E+08	350	20	4	70	4	365	8.88E-10	--	0	--
Beryllium	0.4	6.8E+08	350	20	4	70	4	365	1.61E-10	--	0	--
TOTAL											0	0.00

PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT RESIDENTIAL CHILD

Intake from the Inhalation of particulates is calculated as follows:

$$\text{Intake (mg/kg-day)} = (C * EF * ED * IR * 1/PEF)/(BW * ATc \text{ or } ATnc * DY)$$

$$\text{Risk} = \text{Intake} * \text{CSF} \text{ or } /\text{RfD}$$

Where:

- C = contaminant concentration in soil (mg/kg)
- CSF = carcinogenic slope factor
- RfD = reference dose for noncarcinogen
- IR = Inhalation rate (m3)
- EF = exposure frequency (days)
- ED = exposure duration (years)
- BW = body weight (kg)
- ATc = averaging time for carcinogen (yr)
- ATnc = averaging time for noncarcinogen (yr)
- DY = day per year (day/yr)
- PEF = particulate emission factor (m3/kg)

INPUTS

- Specific
- Specific
- Specific
- 12
- 350
- 4
- 15
- 70
- 4
- 365
- 6.79E+08

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Contribution to Risk
Benzo(a)pyrene	0.34	6.8E+08	350	12	4	15	70	365	2.20E-11	6.10E+00	1.34E-10	5.35
Dieldrin	0.0078	6.8E+08	350	12	4	15	70	365	5.04E-13	1.61E+01	6.11E-12	0.32
Arsenic	2.2	6.8E+08	350	12	4	15	70	365	1.42E-10	1.51E+01	2.14E-09	85.66
Beryllium	0.4	6.8E+08	350	12	4	15	70	365	2.58E-11	6.40E+00	2.17E-10	8.66
TOTAL											2.50E-09	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
Dieldrin	0.0078	6.8E+08	350	12	4	15	4	365	8.81E-12	--	0	--
Arsenic	2.2	6.8E+08	350	12	4	15	4	365	2.49E-09	--	0	--
Beryllium	0.4	6.8E+08	350	12	4	15	4	365	4.52E-10	--	0	--
TOTAL											0	0.00



**EXAMPLE GROUNDWATER INGESTION CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose: Estimate intake/risk from ingestion of groundwater**

$$\text{Intake (mg/kg-day)} = \frac{C \times IR \times EF \times ED}{BW \times AT}$$

Where:

C	=	Contaminant concentration in groundwater (mg/L)
IR	=	Daily intake ingestion rate (L/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT <sub>c</sub>	=	Averaging time carcinogen (days)
AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

$$\text{Carcinogens} = \text{Intake (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1}$$

$$\text{Noncarcinogens} = \text{Intake (mg/kg-day)} / \text{RfD (mg/kg-day)}$$

**Example Carcinogen: Beryllium**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.0023 \text{ mg/L} \times 2 \text{ L/day} \times 350 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 25,550 \text{ days}} \\ &= 2.7\text{E-}05 \end{aligned}$$

$$\text{Risk} = 2.7\text{E-}05 \text{ mg/kg-day} \times 4.3\text{E+}00 \text{ mg/kg-day}^{-1} = 1.16\text{E-}04$$

**Example Noncarcinogen: Manganese**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.4450 \text{ mg/L} \times 2 \text{ L/day} \times 350 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 10,950 \text{ days}} \\ &= 1.22\text{E-}02 \end{aligned}$$

$$\text{Risk} = \frac{1.22\text{E-}02 \text{ mg/kg-day}}{5.00\text{E-}03 \text{ mg/kg-day}} = 2.44\text{E+}00$$

Re: Site 7 Future Residential Adult

GROUNDWATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

Intake from drinking water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * IRw * EF * ED/BW * AT \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } /RfD$$

Where:

	INPUTS
C = contaminant concentration in water (mg/l)	Specific
IRw = daily water ingestion rate (L/Day)	2
EF = exposure frequency (days/yr)	350
ED = exposure duration (yr)	30
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (day/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Ingestion Rate (L/day)	Exposure Frequency (day/year)	Exposure Duration (year)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/yr)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Dieldrin	0.0002	2	350	30	70	70	365	2.35E-06	1.60E+01	3.76E-05	24.45
Beryllium	0.0023	2	350	30	70	70	365	2.70E-05	4.30E+00	1.16E-04	75.55
										1.54E-04	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Ingestion Rate (L/day)	Exposure Frequency (day/year)	Exposure Duration (year)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/yr)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Dieldrin	0.0002	2	350	30	70	30	365	5.48E-06	5.00E-05	0.11	2.90
Aluminum	88.8	2	350	30	70	30	365	2.43E+00	1.00E+00	2.43	64.40
Barium	0.37	2	350	30	70	30	365	1.01E-02	7.00E-02	0.14	3.83
Beryllium	0.0023	2	350	30	70	30	365	6.30E-05	5.00E-03	0.01	0.33
Chromium	0.104	2	350	30	70	30	365	2.85E-03	5.00E-03	0.57	15.08
Manganese	0.4450	2	350	30	70	30	365	1.22E-02	2.40E-02	0.51	13.45
Vanadium	0.167	2	350	30	70	30	365	4.58E-03	7.00E-03	0.65	17.30
TOTAL										3.78	100.00

(1) Lead not evaluated due to the lack of a published toxicity value.

GROUNDWATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Intake from drinking water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * IRw * EF * ED/BW * AT \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * \text{CSF or /RfD}$$

Where:	INPUTS
C = contaminant concentration in water (mg/l)	Specific
IRw = daily water ingestion rate (L/Day)	1
EF = exposure frequency (days/yr)	350
ED = exposure duration (yr)	6
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = days per year (day/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Ingestion Rate (L/day)	Exposure Frequency (day/year)	Exposure Duration (year)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/yr)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk
Dieldrin	0.0002	1	350	6	15	70	365	1.10E-06	1.60E+01	1.75E-05	24.45
Beryllium	0.0023	1	350	6	15	70	365	1.26E-05	4.30E+00	5.42E-05	75.55
										7.17E-05	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Ingestion Rate (L/day)	Exposure Frequency (day/year)	Exposure Duration (year)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/yr)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Dieldrin	0.0002	1	350	6	15	6	365	1.28E-05	5.00E-05	0.26	2.90
Aluminum	88.8	1	350	6	15	6	365	5.68E+00	1.00E+00	5.68	64.40
Barium	0.37	1	350	6	15	6	365	2.37E-02	7.00E-02	0.34	3.83
Beryllium	0.0023	1	350	6	15	6	365	1.47E-04	5.00E-03	0.03	0.33
Chromium	0.104	1	350	6	15	6	365	6.65E-03	5.00E-03	1.33	15.08
Manganese	0.4450	1	350	6	15	6	365	2.84E-02	2.40E-02	1.19	13.45
Vanadium	0.167	1	350	6	15	6	365	1.07E-02	7.00E-03	1.53	17.30
TOTAL										8.81	100.00

(1) Lead not evaluated due to the lack of a published toxicity value.

File Name: GWI.WQ2

**EXAMPLE DERMAL CONTACT WITH GROUNDWATER CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose: Estimate intake/risk from dermal contact with groundwater**

$$\text{Intake (mg/kg-day)} = \frac{C \times SA \times PC \times ET \times EF \times ED \times CF}{BW \times AT}$$

Where:	C	=	Contaminant concentration in groundwater (mg/L)
	SA	=	Exposed skin surface available for contact (cm <sup>2</sup> )
	PC	=	Permeability constant (cm/hr)
	ET	=	Exposure time (hr/day)
	EF	=	Exposure frequency (days/year)
	ED	=	Exposure duration (years)
	CF	=	Conversion factor (1 L/1,000 cm <sup>3</sup> )
	BW	=	Body weight (kg)
	AT <sub>c</sub>	=	Averaging time carcinogen (days)
	AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

$$\begin{aligned} \text{Carcinogens} &= \text{Intake (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1} \\ \text{Noncarcinogens} &= \text{Intake (mg/kg-day)} / \text{RfD (mg/kg-day)} \end{aligned}$$

**Example Carcinogen: Dieldrin**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.0002 \text{ mg/L} \times 23,000 \text{ cm}^2 \times 1.6\text{E-}02 \text{ cm/hr} \times 0.25 \text{ hr/day} \times 350 \text{ days/yr} \times 30 \text{ yrs} \times 1 \text{ L/1,000 cm}^3}{70 \text{ kg} \times 25,550 \text{ days}} \\ &= 1.08\text{E-}07 \end{aligned}$$

$$\text{Risk} = 1.08\text{E-}07 \text{ mg/kg-day} \times 1.6\text{E+}01 \text{ mg/kg-day}^{-1} = 1.73\text{E-}06$$

**Example Noncarcinogen: Manganese**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.445 \text{ mg/L} \times 23,000 \text{ cm}^2/\text{hr} \times 1.00\text{E-}03 \text{ cm/hr} \times 0.25 \text{ hr/day} \times 350 \text{ days/yr} \times 30 \text{ yrs} \times 1 \text{ L/1,000 cm}^3}{70 \text{ kg} \times 10,950 \text{ days}} \\ &= 3.51\text{E-}05 \end{aligned}$$

$$\text{Risk} = \frac{3.51\text{E-}05 \text{ mg/kg-day}}{5.00\text{E-}03 \text{ mg/kg-day}} = 7.01\text{E-}03$$

GROUNDWATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

Dermal Contact from groundwater is calculated as follows:

$$\text{Intake (mg/kg-day)} = \text{CW} * \text{SA} * \text{PC} * \text{ET} * \text{EF} * \text{ED} * \text{CF}/\text{BW} * \text{ATc or ATnc} * \text{DY}$$

$$\text{Risk} = \text{Intake} * \text{CSF or RfD}$$

Where:

CW = contaminant concentration in water (mg/l)  
 SA = skin surface available for contact (cm<sup>2</sup>)  
 PC = contaminant specific dermal permeability (cm/hr)  
 ET = exposure time (hours/day)  
 EF = exposure frequency (days/yr)  
 ED = exposure duration (years)  
 CF = volumetric conversion factor for water (1 liter/1000 cm<sup>3</sup>)  
 BW = body weight (kg)  
 ATc = averaging time for carcinogen (yr)  
 ATnc = averaging time for noncarcinogen (yr)  
 DY = days per year (days)

INPUTS

Specific  
 23000  
 Specific  
 0.25  
 350  
 30  
 0.001  
 70  
 70  
 30  
 365

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Dieldrin	0.0002	23000	1.80E-02	0.25	350	30	0.001	70	70	365	1.08E-07	1.80E+01	1.73E-08	83.81
Beryllium	0.0023	23000	1.00E-03	0.25	350	30	0.001	70	70	365	7.76E-08	4.30E+00	3.34E-07	16.19
TOTAL													2.08E-06	100.00

Contaminant(1)	Concentration Noncarcinoge (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk Adult	Percent Noncarcinogen Risk
Dieldrin	0.0002	23000	1.80E-02	0.25	350	30	0.001	70	30	365	2.52E-07	5.00E-05	0.00504	32.34
Aluminum	88.8	23000	1.00E-03	0.25	350	30	0.001	70	30	365	6.99E-03	1.00E+00	0.00699	44.87
Barium	0.37	23000	1.00E-03	0.25	350	30	0.001	70	30	365	2.91E-05	7.00E-02	0.00042	2.67
Beryllium	0.0023	23000	1.00E-03	0.25	350	30	0.001	70	30	365	1.81E-07	5.00E-03	0.00004	0.23
Chromium	0.104	23000	1.00E-03	0.25	350	30	0.001	70	30	365	8.19E-08	5.00E-03	0.00164	10.51
Manganese	0.445	23000	1.00E-03	0.25	350	30	0.001	70	30	365	3.51E-05	2.40E-02	0.00146	9.37
Vanadium	0.187	23000	1.00E-03	0.25	350	30	0.001	70	30	365	1.32E-05	7.00E-03	0.00188	12.06
TOTAL													0.01559	100.00

(1) Lead not evaluated due to the lack of a published toxicity value.

File Name: 2GWDC.WQ1

GROUNDWATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Dermal Contact from groundwater is calculated as follows:

$$\text{Intake (mg/kg-day)} = \text{CW} * \text{SA} * \text{PC} * \text{ET} * \text{EF} * \text{ED} * \text{CF/BW} * \text{ATc or ATnc} * \text{DY}$$

$$\text{Risk} = \text{Intake} * \text{CSF or /RID}$$

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = skin surface available for contact (cm <sup>2</sup> )	10000
PC = contaminant specific dermal permability (cm/hr)	Specific
ET = exposure time (hours/day)	0.25
EF = exposure frequency (days/yr)	350
ED = exposure duration (years)	6
CF = volumetric conversion factor for water (1liter/1000 cm <sup>3</sup> )	0.001
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = days per year (days)	365

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk
Diethan	0.0002	10000	1.80E-02	0.25	350	6	0.001	15	70	365	4.38E-08	1.80E+01	7.01E-07	83.81
Beryllium	0.0023	10000	1.00E-03	0.25	350	6	0.001	15	70	365	3.15E-08	4.30E+00	1.35E-07	16.19
<b>TOTAL</b>													<b>8.37E-07</b>	<b>100.00</b>

Contaminant(1)	Concentration Noncarcinoge (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk	Percent Noncarcinogen Risk
Diethan	0.0002	10000	1.80E-02	0.25	350	6	0.001	15	6	365	5.11E-07	5.00E-05	0.01023	32.34
Aluminum	88.8	10000	1.00E-03	0.25	350	6	0.001	15	6	365	1.42E-02	1.00E+00	0.01419	44.87
Barium	0.37	10000	1.00E-03	0.25	350	6	0.001	15	6	365	5.91E-05	7.00E-02	0.00084	2.67
Beryllium	0.0023	10000	1.00E-03	0.25	350	6	0.001	15	6	365	3.68E-07	5.00E-03	0.00007	0.23
Chromium	0.104	10000	1.00E-03	0.25	350	6	0.001	15	6	365	1.68E-05	5.00E-03	0.00332	10.51
Manganese	0.445	10000	1.00E-03	0.25	350	6	0.001	15	6	365	7.11E-05	2.40E-02	0.00298	9.37
Vanadium	0.167	10000	1.00E-03	0.25	350	6	0.001	15	6	365	2.67E-05	7.00E-03	0.00381	12.06
<b>TOTAL</b>													<b>0.03183</b>	<b>100.00</b>

(1) Lead not evaluated due to the lack of a published toxicity value.

File Name: 2GWDC.WQ2

**EXAMPLE INGESTION OF NORTHEAST CREEK  
SURFACE WATER CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose:** Estimate intake/risk from ingestion of surface water

$$\text{Intake (mg/kg-day)} = \frac{C \times IR \times ET \times EF \times ED}{BW \times AT \times DY}$$

**Where:**

C	=	Contaminant concentration in surface water (mg/L)
CR	=	Contact rate (L/hr)
ET	=	Exposure time (hrs/event)
EF	=	Exposure frequency (events/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (years)
DY	=	Days per year (days)

**Risks:**

$$\text{Carcinogens} = \text{Intake (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1}$$

$$\text{Noncarcinogens} = \text{Intake (mg/kg-day)} / \text{RfD (mg/kg-day)}$$

**Example Carcinogen:** No carcinogenic COPCs in surface water

**Example Noncarcinogen:** Manganese

$$\text{Intake (mg/kg-day)} = \frac{0.0689 \text{ mg/L} \times 0.05 \text{ L/hr} \times 2.6 \text{ hrs/event} \times 48 \text{ events/yr} \times 30 \text{ years}}{70 \text{ kg} \times 30 \text{ years} \times 365 \text{ days/yr}}$$

$$= 1.67E-05$$

$$\text{Risk} = \frac{1.68E-05 \text{ mg/kg-day}}{5.0E-03 \text{ mg/kg-day}} = 3.37E-03$$

NORTHEAST CREEK SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

The intake from the ingestion of surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w * CR * ET * EF * ED / BW * AT_c \text{ or } AT_{nc} * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUT
C <sub>w</sub> = contaminant concentration in surface water (mg/l)	Specific
IR = ingestion rate (Liter/hour)	0.05
ET = exposure time (hours/event)	2.8
EF = exposure frequency (events/yr)	48
ED = exposure duration (yrs)	6
BW = body weight (kg)	15
AT <sub>c</sub> = averaging time for carcinogen (yr)	70
AT <sub>nc</sub> = averaging time for noncarcinogen (yr)	6
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
No Carcinogenic COPCs												
TOTAL												

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Noncarc (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
2-Butanone	0.002	0.05	2.8	48	6	15	6	365	2.28E-06	6.00E-01	0.000004	0.02
Barium	0.0314	0.05	2.8	48	6	15	6	365	3.58E-05	7.00E-02	0.000511	3.13
Manganese	0.0689	0.05	2.8	48	6	15	6	365	7.85E-05	5.00E-03	0.015705	96.08
Zinc	0.0329	0.05	2.8	48	6	15	6	365	3.75E-05	3.00E-01	0.000125	0.78
TOTAL											0.018345	100.00

(1) 2-Hexanone and lead not evaluated due to a lack of published toxicity values.

FILE NAME: SWINC.WQ2



NORTHEAST CREEK SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

The intake from the ingestion of surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w * CR * ET * EF * ED / BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUT
C <sub>w</sub> = contaminant concentration in surface water (mg/l)	Specific
IR = Ingestion rate (Liter/hour)	0.05
ET = exposure time (hours/event)	2.6
EF = exposure frequency (events/yr)	48
ED = exposure duration (yrs)	30
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
No Carcinogenic COPCs												
TOTAL												

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Noncarc (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
2-Butanone	0.002	0.05	2.6	48	30	70	30	365	4.88E-07	8.00E-01	0.0000008	0.02
Barium	0.0314	0.05	2.6	48	30	70	30	365	7.67E-08	7.00E-02	0.0001098	3.13
Manganese	0.0689	0.05	2.6	48	30	70	30	365	1.68E-05	5.00E-03	0.0033654	96.11
Zinc	0.0329	0.05	2.6	48	30	70	30	365	8.04E-08	3.00E-01	0.0000268	0.76
TOTAL											0.0035018	100.02

(1) 2-Hexanone and lead not evaluated due to a lack of published toxicity values.

FILE NAME: SWINC.WQ1

NORTHEAST CREEK SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD RESIDENT

The intake from the ingestion of surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w * CR * ET * EF * ED/BW * AT_c \text{ or } AT_{nc} * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUT
C <sub>w</sub> = contaminant concentration in surface water (mg/l)	Specific
IR = Ingestion rate (Liter/hour)	0.05
ET = exposure time (hours/event)	2.6
EF = exposure frequency (events/yr)	48
ED = exposure duration (yrs)	4
BW = body weight (kg)	15
AT <sub>c</sub> = averaging time for carcinogen (yr)	70
AT <sub>nc</sub> = averaging time for noncarcinogen (yr)	4
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
No Carcinogenic COPCs												
TOTAL												

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Noncarc (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
2-Butanone	0.002	0.05	2.6	48	4	15	4	365	2.28E-06	6.00E-01	0.000004	0.02
Barium	0.0314	0.05	2.6	48	4	15	4	365	3.58E-05	7.00E-02	0.000511	3.13
Manganese	0.0689	0.05	2.6	48	4	15	4	365	7.85E-05	5.00E-03	0.015705	96.08
Zinc	0.0329	0.05	2.6	48	4	15	4	365	3.75E-05	3.00E-01	0.000125	0.76
TOTAL											0.016345	100.00

(1) 2-Hexanone and lead not evaluated due to a lack of published toxicity values.

FILE NAME: SWINC.WQ4

NORTHEAST CREEK SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT RESIDENT

The intake from the ingestion of surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w \cdot C_R \cdot E_T \cdot E_F \cdot E_D / B_W \cdot A_{Tc} \text{ or } A_{Tnc} \cdot D_Y$$

$$\text{Risk} = \text{Intake} \cdot C_{SF} \text{ or } R_{FD}$$

Where:	INPUT
C <sub>w</sub> = contaminant concentration in surface water (mg/l)	Specific
I <sub>R</sub> = ingestion rate (Liter/hour)	0.05
E <sub>T</sub> = exposure time (hours/event)	2.8
E <sub>F</sub> = exposure frequency (events/yr)	48
E <sub>D</sub> = exposure duration (yrs)	4
B <sub>W</sub> = body weight (kg)	70
A <sub>Tc</sub> = averaging time for carcinogen (yr)	70
A <sub>Tnc</sub> = averaging time for noncarcinogen (yr)	4
D <sub>Y</sub> = days per year (days)	365
C <sub>SF</sub> = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
R <sub>FD</sub> = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
No Carcinogenic COPCs												
TOTAL												

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Noncarc (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
2-Butanone	0.002	0.05	2.8	48	4	70	4	365	4.88E-07	6.00E-01	0.0000008	0.02
Barium	0.0314	0.05	2.8	48	4	70	4	365	7.67E-08	7.00E-02	0.0001098	3.13
Manganese	0.0689	0.05	2.8	48	4	70	4	365	1.68E-05	5.00E-03	0.0033654	96.08
Zinc	0.0329	0.05	2.8	48	4	70	4	365	8.04E-08	3.00E-01	0.0000268	0.76
TOTAL											0.0035026	100.00

(1) 2-Hexanone and lead not evaluated due to a lack of published toxicity values.

FILE NAME: SWINC.WQ3

**EXAMPLE DERMAL CONTACT WITH NORTHEAST CREEK  
SURFACE WATER CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose:** Estimate intake/risk from dermal contact with surface water

$$\text{Intake (mg/kg}\cdot\text{day)} = \frac{C \times SA \times PC \times ET \times EF \times ED \times CF}{BW \times AT}$$

Where:	C	=	Contaminant concentration in surface water (mg/L)
	SA	=	Exposed skin surface available for contact (cm <sup>2</sup> )
	PC	=	Permeability constant (cm/hr)
	ET	=	Exposure time (hr/day)
	EF	=	Exposure frequency (days/year)
	ED	=	Exposure duration (years)
	CF	=	Conversion factor (1 L/1,000 cm <sup>3</sup> )
	BW	=	Body weight (kg)
	AT <sub>c</sub>	=	Averaging time carcinogen (days)
	AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

$$\begin{aligned} \text{Carcinogens} &= \text{Intake (mg/kg}\cdot\text{day)} \times \text{CSF (mg/kg}\cdot\text{day)}^{-1} \\ \text{Noncarcinogens} &= \text{Intake (mg/kg}\cdot\text{day)}/\text{RfD (mg/kg}\cdot\text{day)} \end{aligned}$$

**Example Carcinogen: No Carcinogenic COPCs in Surface Water**

**Example Noncarcinogen: Manganese**

$$\text{Intake (mg/kg}\cdot\text{day)} = \frac{0.0689 \text{ mg/L} \times 8300 \text{ cm}^2 \times 1.0\text{E}-03 \text{ cm/hr} \times 2.6 \text{ hr/day} \times 48 \text{ days/yr} \times 30 \text{ yrs} \times 1 \text{ L/1,000 cm}^3}{70 \text{ kg} \times 30 \text{ yrs} \times 365 \text{ days/yr}}$$

$$= 2.79\text{E}-06$$

$$\text{Risk} = \frac{2.79\text{E}-06 \text{ mg/kg}\cdot\text{day}}{5.0\text{E}-03 \text{ mg/kg}\cdot\text{day}} = 5.58\text{E}-04$$

NORTHEAST CREEK SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION - CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

The intake from dermal contact with surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = Cw * SA * PC * ET * EF * ED * CF/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = skin surface available for contact (cm <sup>2</sup> )	2100
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = exposure time (hours/day)	2.6
EF = exposure frequency (days/yr)	48
ED = exposure duration (years)	6
CF = volumetric conversion factor for water (1 liter/1000 c)	0.001
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
No Carcinogenic COPCs														
<b>TOTAL</b>														

Contaminant(1)	Concentration Noncarcinoge (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk Child	Percent Noncarcinogenic Risk
2-Butanone	0.002	2100	5.0E-03	2.6	48	6	0.001	15	6	365	4.79E-07	6.00E-01	0.0000008	0.12
Barium	0.0314	2100	1.0E-03	2.6	48	6	0.001	15	6	365	1.50E-06	7.00E-02	0.0000215	3.13
Manganese	0.0689	2100	1.0E-03	2.6	48	6	0.001	15	6	365	3.30E-06	5.00E-03	0.0006596	98.29
Zinc	0.0329	2100	6.0E-04	2.6	48	6	0.001	15	6	365	8.45E-07	3.00E-01	0.0000031	0.46
<b>TOTAL</b>													<b>0.0006850</b>	<b>100.00</b>

(1) 2-Hexanone and lead not evaluated due to a lack of published toxicity values.

File Name: SWDCNC.WQ2

NORTHEAST CREEK SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION - CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

The intake from dermal contact with surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w * SA * PC * ET * EF * ED * CF / BW * AT_c \text{ or } AT_{nc} * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = skin surface available for contact (cm <sup>2</sup> )	8300
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = exposure time (hours/day)	2.8
EF = exposure frequency (days/yr)	48
ED = exposure duration (years)	30
CF = volumetric conversion factor for water (1liter/1000 c)	0.001
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
No Carcinogenic COPCs														
TOTAL														

Contaminant(1)	Concentration Noncarcinoge (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk Adult	Percent Noncarcinogenic Risk
2-Butanone	0.002	8300	5.0E-03	2.8	48	30	0.001	70	30	365	4.05E-07	8.00E-01	0.0000007	0.12
Barium	0.0314	8300	1.0E-03	2.8	48	30	0.001	70	30	365	1.27E-08	7.00E-02	0.0000182	3.13
Manganese	0.0689	8300	1.0E-03	2.8	48	30	0.001	70	30	365	2.78E-08	5.00E-03	0.0005587	98.29
Zinc	0.0329	8300	6.0E-04	2.8	48	30	0.001	70	30	365	8.00E-07	3.00E-01	0.0000027	0.48
TOTAL													0.0005802	100.00

(1) 2-Hexanone and lead not evaluated due to a lack of published toxicity values.

File Name: SWDCNG.WQ1

NORTHEAST CREEK SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION - CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD RESIDENT

The Intake from dermal contact with surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = Cw * SA * PC * ET * EF * ED * CF/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = skin surface available for contact (cm <sup>2</sup> )	2100
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = exposure time (hours/day)	2.6
EF = exposure frequency (days/yr)	48
ED = exposure duration (years)	4
CF = volumetric conversion factor for water (1liter/1000 c)	0.001
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
No Carcinogenic COPCs														
<b>TOTAL</b>														

Contaminant(1)	Concentration Noncarcinoge (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk Child	Percent Noncarcinogenic Risk
2-Butanone	0.002	2100	5.0E-03	2.6	48	4	0.001	15	4	365	4.79E-07	6.00E-01	0.0000008	0.12
Barium	0.0314	2100	1.0E-03	2.6	48	4	0.001	15	4	365	1.50E-06	7.00E-02	0.0000215	3.13
Manganese	0.0689	2100	1.0E-03	2.6	48	4	0.001	15	4	365	3.30E-06	5.00E-03	0.0006596	96.29
Zinc	0.0329	2100	6.0E-04	2.6	48	4	0.001	15	4	365	8.45E-07	3.00E-01	0.0000031	0.46
<b>TOTAL</b>													0.0006850	100.00

(1) 2-Hexanone and lead not evaluated due to a lack of published toxicity values.

File Name: SWDCNC.WQ4

NORTHEAST CREEK SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION - CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT RESIDENT

The intake from dermal contact with surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = Cw * SA * PC * ET * EF * ED * CF/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = skin surface available for contact (cm <sup>2</sup> )	8300
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = exposure time (hours/day)	2.6
EF = exposure frequency (days/yr)	48
ED = exposure duration (years)	4
CF = volumetric conversion factor for water (1 liter/1000 c)	0.001
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
No Carcinogenic COPCs														
TOTAL														

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk Adult	Percent Noncarcinogenic Risk
2-Butanone	0.002	8300	5.0E-03	2.6	48	4	0.001	70	4	365	4.05E-07	6.00E-01	0.000007	0.12
Bartum	0.0314	8300	1.0E-03	2.6	48	4	0.001	70	4	365	1.27E-06	7.00E-02	0.000182	3.13
Manganese	0.0689	8300	1.0E-03	2.6	48	4	0.001	70	4	365	2.79E-06	5.00E-03	0.0005587	96.29
Zinc	0.0328	8300	6.0E-04	2.6	48	4	0.001	70	4	365	8.00E-07	3.00E-01	0.0000027	0.48
TOTAL													0.0005802	100.00

(1) 2-Hexanone and lead not evaluated due to a lack of published toxicity values.

File Name: SWDCNC.WQ3



**EXAMPLE INGESTION OF NORTHEAST CREEK  
SEDIMENT CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose: Estimate intake/risk from ingestion of sediment**

$$\text{Intake (mg/kg-day)} = \frac{C \times IR \times CF \times EF \times ED}{BW \times AT}$$

Where:

C	=	Contaminant concentration in sediment (mg/kg)
IR	=	Ingestion rate (mg/day)
CF	=	Conversion factor for kg to mg (mg/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (years)

**Risks:**

$$\text{Carcinogens} = \text{Intake (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1}$$

$$\text{Noncarcinogens} = \text{Intake (mg/kg-day)} / \text{RfD (mg/kg-day)}$$

**Example Carcinogen: 4,4'-DDT**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.0088 \text{ mg/kg} \times 100 \text{ mg/day} \times 1.0E-06 \times 48 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 70 \text{ yrs} \times 365 \text{ days/yr}} \\ &= 7.09E-10 \end{aligned}$$

$$\text{Risk} = 7.09E-10 \text{ mg/kg-day} \times 3.00E-01 \text{ mg/kg-day}^{-1} = 2.13E-10$$

**Example Noncarcinogen: 4,4'-DDT**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.0088 \text{ mg/kg} \times 100 \text{ mg/day} \times 1.0E-06 \times 48 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 30 \text{ yrs} \times 365 \text{ days/yr}} \\ &= 1.65E-09 \end{aligned}$$

$$\text{Risk} = \frac{1.65E-09 \text{ mg/kg-day}}{5.0E-04 \text{ mg/kg-day}} = 3.3E-06$$

Re: Site 7 Future Residential Adult

NORTHEAST CREEK SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

Intake from ingestion of sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * IR * CF * EF * ED / BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } /RfD$$

Where:	INPUTS
C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	48
ED = exposure duration (yr)	6
IR = soil ingestion rate (mg/day)	200
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Benzo(a)anthracene	0.074	48	6	200	1E-06	15	70	365	1.11E-08	7.30E-01	8.12E-09	1.43
Benzo(b)fluoranthene	0.048	48	6	200	1E-06	15	70	365	6.91E-09	7.30E-01	5.05E-09	0.89
Benzo(k)fluoranthene	0.067	48	6	200	1E-06	15	70	365	8.67E-09	7.30E-02	6.25E-10	0.11
Chrysene	0.07	48	6	200	1E-06	15	70	365	1.06E-08	7.30E-03	7.88E-11	0.01
Indeno(1,2,3-cd)pyrene	0.063	48	6	200	1E-06	15	70	365	7.97E-09	7.30E-01	5.81E-09	1.02
alpha-Chlordane	0.014	48	6	200	1E-06	15	70	365	2.10E-09	1.30E+00	2.74E-09	0.48
gamma-Chlordane	0.011	48	6	200	1E-06	15	70	365	1.66E-09	1.30E+00	2.15E-09	0.38
1,4'-DDD	0.0394	48	6	200	1E-06	15	70	365	5.92E-09	2.40E-01	1.42E-09	0.25
1,4'-DDE	0.02	48	6	200	1E-06	15	70	365	3.01E-09	3.40E-01	1.02E-09	0.18
1,4'-DDT	0.0088	48	6	200	1E-06	15	70	365	1.32E-09	3.00E-01	3.97E-10	0.07
Dieldrin	0.0079	48	6	200	1E-06	15	70	365	1.19E-09	1.60E+01	1.90E-08	3.34
Arsenic	1.3	48	6	200	1E-06	15	70	365	1.95E-07	1.75E+00	3.42E-07	60.06
Beryllium	0.28	48	6	200	1E-06	15	70	365	4.21E-08	4.30E+00	1.81E-07	31.79
<b>TOTAL</b>											<b>5.69E-07</b>	<b>100.00</b>

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
2-Butanone	0.053	48	6	200	1E-06	15	6	365	9.29E-08	6.00E-01	0.0000002	0.00
Butyl benzyl phthalate	0.047	48	6	200	1E-06	15	6	365	8.24E-08	2.00E-01	0.0000004	0.00
Di-n-octylphthalate	0.6	48	6	200	1E-06	15	6	365	8.77E-07	2.00E-02	0.0000438	0.04
Fluoranthene	0.12	48	6	200	1E-06	15	6	365	2.10E-07	4.00E-02	0.0000063	0.00
Pyrene	0.17	48	6	200	1E-06	15	6	365	2.98E-07	3.00E-02	0.0000099	0.01
alpha-Chlordane	0.014	48	6	200	1E-06	15	6	365	2.48E-08	6.00E-05	0.0004091	0.35
gamma-Chlordane	0.011	48	6	200	1E-06	15	6	365	1.93E-08	6.00E-05	0.0003216	0.27
1,4'-DDT	0.0088	48	6	200	1E-06	15	6	365	1.64E-08	5.00E-04	0.0000309	0.03
Dieldrin	0.0079	48	6	200	1E-06	15	6	365	1.39E-08	5.00E-05	0.0002770	0.24
Arsenic	1.3	48	6	200	1E-06	15	6	365	2.28E-08	3.00E-04	0.0075982	6.49
Barium	13.3	48	6	200	1E-06	15	6	365	2.33E-05	7.00E-02	0.0003332	0.28
Beryllium	0.28	48	6	200	1E-06	15	6	365	4.91E-07	5.00E-03	0.0000982	0.08
Copper	0.3	48	6	200	1E-06	15	6	365	1.63E-05	3.71E-02	0.0004395	0.38
Thallium	4.9	48	6	200	1E-06	15	6	365	8.59E-06	8.00E-05	0.1073973	91.66
Zinc	34	48	6	200	1E-06	15	6	365	5.96E-05	3.00E-01	0.0001987	0.17
<b>TOTAL</b>											<b>0.1171631</b>	<b>100.00</b>

(1) Phenanthrene and lead not evaluated due to the lack of published toxicity values.

NORTHEAST CREEK SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

Intake from ingestion of sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C \cdot IR \cdot CF \cdot EF \cdot ED / BW \cdot ATC \text{ or } ATnc \cdot DY$$

$$\text{Risk} = \text{Intake} \cdot CSF \text{ or } /RID$$

Where:

- C = contaminant concentration in sediment (mg/kg)
- CF = conversion for kg to mg
- EF = exposure frequency (days/yr)
- ED = exposure duration (yr)
- IR = soil ingestion rate (mg/day)
- BW = body weight (kg)
- ATc = averaging time for carcinogen (yr)
- ATnc = averaging time for noncarcinogen (yr)
- DY = days per year (days/year)
- CSF = cancer slope factor (mg/kg-day)<sup>-1</sup>
- RID = reference dose (mg/kg-day)

INPUTS

- Specific
- 1E-08
- 48
- 30
- 100
- 70
- 70
- 30
- 365
- Specific
- Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benzo(a)anthracene	0.074	48	30	100	1E-06	70	70	365	5.96E-09	7.30E-01	4.35E-09	1.43
Benzo(b)fluoranthene	0.048	48	30	100	1E-06	70	70	365	3.70E-09	7.30E-01	2.70E-09	0.89
Benzo(k)fluoranthene	0.057	48	30	100	1E-06	70	70	365	4.89E-09	7.30E-02	3.35E-10	0.11
Chrysene	0.07	48	30	100	1E-06	70	70	365	5.84E-09	7.30E-03	4.11E-11	0.01
Indeno(1,2,3-cd)pyrene	0.053	48	30	100	1E-06	70	70	365	4.27E-09	7.30E-01	3.12E-09	1.02
alpha-Chlordane	0.014	48	30	100	1E-06	70	70	365	1.13E-09	1.30E+00	1.47E-09	0.48
gamma-Chlordane	0.011	48	30	100	1E-06	70	70	365	8.88E-10	1.30E+00	1.15E-09	0.38
1,4'-DDD	0.0394	48	30	100	1E-06	70	70	365	3.17E-09	2.40E-01	7.61E-10	0.25
1,4'-DDE	0.02	48	30	100	1E-06	70	70	365	1.61E-09	3.40E-01	5.47E-10	0.18
1,4'-DDT	0.0088	48	30	100	1E-06	70	70	365	7.09E-10	3.00E-01	2.19E-10	0.07
Dieldrin	0.0079	48	30	100	1E-06	70	70	365	6.36E-10	1.60E+01	1.02E-08	3.34
Arsenic	1.3	48	30	100	1E-06	70	70	365	1.05E-07	1.75E+00	1.83E-07	60.06
Beryllium	0.28	48	30	100	1E-06	70	70	365	2.25E-08	4.30E+00	9.69E-08	31.79
TOTAL											3.05E-07	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
n-Butanone	0.083	48	30	100	1E-06	70	30	365	9.86E-09	8.00E-01	0.00000002	0.00
Butyl benzyl phthalate	0.047	48	30	100	1E-06	70	30	365	8.83E-09	2.00E-01	0.00000004	0.00
Di-n-octylphthalate	0.5	48	30	100	1E-06	70	30	365	9.39E-08	2.00E-02	0.00000470	0.04
Fluoranthene	0.12	48	30	100	1E-06	70	30	365	2.25E-08	4.00E-02	0.00000056	0.00
Pyrene	0.17	48	30	100	1E-06	70	30	365	3.19E-08	3.00E-02	0.00000106	0.01
alpha-Chlordane	0.014	48	30	100	1E-06	70	30	365	2.83E-09	6.00E-05	0.00004384	0.35
gamma-Chlordane	0.011	48	30	100	1E-06	70	30	365	2.07E-09	6.00E-05	0.00003444	0.27
1,4'-DDT	0.0088	48	30	100	1E-06	70	30	365	1.85E-09	5.00E-04	0.00003331	0.03
Dieldrin	0.0079	48	30	100	1E-06	70	30	365	1.48E-09	5.00E-05	0.00002968	0.24
Arsenic	1.3	48	30	100	1E-06	70	30	365	2.44E-07	3.00E-04	0.00081409	6.49
Barium	13.3	48	30	100	1E-06	70	30	365	2.50E-06	7.00E-02	0.00003569	0.28
Beryllium	0.28	48	30	100	1E-06	70	30	365	5.26E-08	5.00E-03	0.00001052	0.08
Copper	9.3	48	30	100	1E-06	70	30	365	1.75E-08	3.71E-02	0.00004709	0.38
Thallium	4.9	48	30	100	1E-06	70	30	365	9.21E-07	8.00E-05	0.01150685	91.66
Zinc	34	48	30	100	1E-06	70	30	365	6.39E-06	3.00E-01	0.00002129	0.17
TOTAL											0.01255319	100.00

(1) Phenanthrene and lead not evaluated due to the lack of published toxicity values.

NORTHEAST CREEK SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD RESIDENT

Intake from ingestion of sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C \cdot IR \cdot CF \cdot EF \cdot ED / BW \cdot ATC \text{ or } ATnc \cdot DY$$

$$\text{Risk} = \text{Intake} \cdot CBF \text{ or } /RID$$

Where:	INPUTS
C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	48
ED = exposure duration (yr)	4
IR = soil ingestion rate (mg/day)	200
BW = body weight (kg)	15
ATC = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days/year)	365
CBF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RID = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Benzo(a)anthracene	0.074	48	4	200	1E-06	15	70	365	7.41E-09	7.30E-01	5.41E-09	1.43
Benzo(b)fluoranthene	0.048	48	4	200	1E-06	15	70	365	4.81E-09	7.30E-01	3.36E-09	0.89
Benzo(k)fluoranthene	0.057	48	4	200	1E-06	15	70	365	5.71E-09	7.30E-02	4.17E-10	0.11
Chrysene	0.07	48	4	200	1E-06	15	70	365	7.01E-09	7.30E-03	5.12E-11	0.01
Indeno(1,2,3-cd)pyrene	0.063	48	4	200	1E-06	15	70	365	5.31E-09	7.30E-01	3.88E-09	1.02
alpha-Chlordane	0.014	48	4	200	1E-06	15	70	365	1.40E-09	1.30E+00	1.82E-09	0.48
gamma-Chlordane	0.011	48	4	200	1E-06	15	70	365	1.10E-09	1.30E+00	1.43E-09	0.38
4,4'-DDD	0.0394	48	4	200	1E-06	15	70	365	3.96E-09	2.40E-01	9.47E-10	0.25
4,4'-DDE	0.02	48	4	200	1E-06	15	70	365	2.00E-09	3.40E-01	8.81E-10	0.18
4,4'-DDT	0.0068	48	4	200	1E-06	15	70	365	8.82E-10	3.00E-01	2.65E-10	0.07
Dieldrin	0.0079	48	4	200	1E-06	15	70	365	7.92E-10	1.60E+01	1.27E-08	3.34
Arsenic	1.3	48	4	200	1E-06	15	70	365	1.30E-07	1.75E+00	2.28E-07	60.06
Beryllium	0.28	48	4	200	1E-06	15	70	365	2.81E-06	4.30E+00	1.21E-07	31.78
TOTAL											3.80E-07	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
2-Butanone	0.053	48	4	200	1E-06	15	4	365	9.29E-08	6.00E-01	1.55E-07	0.00
Butyl benzyl phthalate	0.047	48	4	200	1E-06	15	4	365	8.24E-08	2.00E-01	4.12E-07	0.00
Din-octylphthalate	0.6	48	4	200	1E-06	15	4	365	8.77E-07	2.00E-02	4.38E-06	0.04
Fluoranthene	0.12	48	4	200	1E-06	15	4	365	2.10E-07	4.00E-02	5.26E-06	0.00
Pyrene	0.17	48	4	200	1E-06	15	4	365	2.96E-07	3.00E-02	9.94E-06	0.01
alpha-Chlordane	0.014	48	4	200	1E-06	15	4	365	2.45E-08	6.00E-05	4.09E-04	0.35
gamma-Chlordane	0.011	48	4	200	1E-06	15	4	365	1.93E-08	6.00E-05	3.21E-04	0.27
4,4'-DDT	0.0068	48	4	200	1E-06	15	4	365	1.54E-08	5.00E-04	3.09E-05	0.03
Dieldrin	0.0079	48	4	200	1E-06	15	4	365	1.39E-08	5.00E-05	2.77E-04	0.24
Arsenic	1.3	48	4	200	1E-06	15	4	365	2.28E-06	3.00E-04	7.60E-03	6.49
Barium	13.3	48	4	200	1E-06	15	4	365	2.33E-05	7.00E-02	3.33E-04	0.28
Beryllium	0.28	48	4	200	1E-06	15	4	365	4.91E-07	5.00E-03	9.82E-05	0.08
Copper	9.3	48	4	200	1E-06	15	4	365	1.63E-05	3.71E-02	4.40E-04	0.38
Thallium	4.9	48	4	200	1E-06	15	4	365	8.59E-06	8.00E-05	1.07E-01	91.66
Zinc	34	48	4	200	1E-06	15	4	365	5.98E-05	3.00E-01	1.99E-04	0.17
TOTAL											0.1172	100.00

(1) Phenanthrene and lead not evaluated due to the lack of published toxicity values.

NORTHEAST CREEK SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT RESIDENT

Intake from ingestion of sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C \cdot IR \cdot CF \cdot EF \cdot ED / BW \cdot ATc \text{ or } ATnc \cdot DY$$

$$\text{Risk} = \text{Intake} \cdot CSF \text{ or } RfD$$

Where:

- C = contaminant concentration in sediment (mg/kg)
- CF = conversion for kg to mg
- EF = exposure frequency (days/yr)
- ED = exposure duration (yr)
- IR = soil ingestion rate (mg/day)
- BW = body weight (kg)
- ATc = averaging time for carcinogen (yr)
- ATnc = averaging time for noncarcinogen (yr)
- DY = days per year (days/year)
- CSF = cancer slope factor (mg/kg-day)<sup>-1</sup>
- RfD = reference dose (mg/kg-day)

INPUTS

- Specific
- 1E-08
- 48
- 4
- 100
- 70
- 70
- 365
- Specific
- Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benzo(a)anthracene	0.074	48	4	100	1E-08	70	70	365	7.94E-10	7.30E-01	5.80E-10	1.43
Benzo(b)fluoranthene	0.046	48	4	100	1E-08	70	70	365	4.94E-10	7.30E-01	3.60E-10	0.89
Benzo(k)fluoranthene	0.067	48	4	100	1E-08	70	70	365	6.12E-10	7.30E-02	4.47E-11	0.11
Chrysene	0.07	48	4	100	1E-08	70	70	365	7.51E-10	7.30E-03	5.49E-12	0.01
Indeno(1,2,3-cd)pyrene	0.053	48	4	100	1E-08	70	70	365	5.69E-10	7.30E-01	4.15E-10	1.02
alpha-Chlordane	0.014	48	4	100	1E-08	70	70	365	1.60E-10	1.30E+00	1.95E-10	0.48
gamma-Chlordane	0.011	48	4	100	1E-08	70	70	365	1.19E-10	1.30E+00	1.54E-10	0.38
1,4'-DDD	0.0394	48	4	100	1E-08	70	70	365	4.23E-10	2.40E-01	1.02E-10	0.25
1,4'-DDE	0.02	48	4	100	1E-08	70	70	365	2.16E-10	3.40E-01	7.30E-11	0.18
1,4'-DDT	0.0088	48	4	100	1E-08	70	70	365	9.45E-11	3.00E-01	2.83E-11	0.07
Dieldrin	0.0079	48	4	100	1E-08	70	70	365	8.48E-11	1.60E+01	1.36E-09	3.34
Arsenic	1.3	48	4	100	1E-08	70	70	365	1.40E-08	1.75E+00	2.44E-08	60.06
Beryllium	0.28	48	4	100	1E-08	70	70	365	3.01E-09	4.30E+00	1.29E-08	31.79
<b>TOTAL</b>											<b>4.07E-08</b>	<b>100.00</b>

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
2-Butanone	0.053	48	4	100	1E-08	70	4	365	8.96E-09	8.00E-01	0.00000002	0.00
Butyl benzyl phthalate	0.047	48	4	100	1E-08	70	4	365	8.83E-09	2.00E-01	0.00000004	0.00
Di-n-octylphthalate	0.5	48	4	100	1E-08	70	4	365	9.30E-08	2.00E-02	0.00000470	0.04
Fluoranthene	0.12	48	4	100	1E-08	70	4	365	2.25E-08	4.00E-02	0.00000056	0.00
Pyrene	0.17	48	4	100	1E-08	70	4	365	3.19E-08	3.00E-02	0.00000106	0.01
alpha-Chlordane	0.014	48	4	100	1E-08	70	4	365	2.83E-09	6.00E-05	0.00004384	0.35
gamma-Chlordane	0.011	48	4	100	1E-08	70	4	365	2.07E-09	6.00E-05	0.00003444	0.27
1,4'-DDT	0.0088	48	4	100	1E-08	70	4	365	1.65E-09	5.00E-04	0.00000331	0.03
Dieldrin	0.0079	48	4	100	1E-08	70	4	365	1.48E-09	5.00E-05	0.00002968	0.24
Arsenic	1.3	48	4	100	1E-08	70	4	365	2.44E-07	3.00E-04	0.00081409	8.49
Barium	13.3	48	4	100	1E-08	70	4	365	2.60E-08	7.00E-02	0.00003569	0.28
Beryllium	0.28	48	4	100	1E-08	70	4	365	5.26E-08	5.00E-03	0.00001052	0.08
Copper	9.3	48	4	100	1E-08	70	4	365	1.75E-08	3.71E-02	0.00004709	0.38
Thallium	4.9	48	4	100	1E-08	70	4	365	9.21E-07	8.00E-05	0.01160685	91.66
Zinc	34	48	4	100	1E-08	70	4	365	6.39E-06	3.00E-01	0.00002129	0.17
<b>TOTAL</b>											<b>0.01255319</b>	<b>100.00</b>

(1) Phenanthrene and lead not evaluated due to the lack of published toxicity values.

**EXAMPLE DERMAL CONTACT WITH NORTHEAST CREEK  
SEDIMENT CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose: Estimate intake/risk from dermal contact with sediment**

$$\text{Intake (mg/kg-day)} = \frac{C \times CF \times SA \times AF \times Abs \times EF \times ED}{BW \times AT \times DY}$$

Where:

C	=	Concentration of contaminant in sediment (mg/kg)
CF	=	Conversion factor for kg to mg
SA	=	Exposed skin surface area (cm <sup>2</sup> )
AF	=	Sediment to skin adherence factor (mg/cm <sup>2</sup> )
Abs	=	Fraction absorbed (unitless)
EF	=	Exposure frequency (events/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (years)
DY	=	Days per year (days)

**Risks:**

$$\begin{aligned} \text{Carcinogens} &= \text{Intake (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1} \\ \text{Noncarcinogens} &= \text{Intake (mg/kg-day)} / \text{RfD (mg/kg-day)} \end{aligned}$$

**Example Carcinogen: 4,4'-DDT**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.0088 \text{ mg/kg} \times 1.0\text{E-}06 \times 8300 \text{ cm}^2 \times 1 \times 0.01 \times 48 \text{ events/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 70 \text{ years} \times 365 \text{ days/yr}} \\ &= 5.88\text{E-}10 \end{aligned}$$

$$\text{Risk} = 5.88\text{E-}10 \text{ mg/kg-day} \times 3.00\text{E-}01 \text{ mg/kg-day}^{-1} = 1.76\text{E-}10$$

**Example Noncarcinogen: 4,4'-DDT**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.0088 \text{ mg/kg} \times 1.0\text{E-}06 \times 8300 \text{ cm}^2 \times 1 \times 0.01 \times 48 \text{ events/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 30 \text{ years} \times 365 \text{ days/yr}} \\ &= 1.37\text{E-}09 \end{aligned}$$

$$\text{Risk} = \frac{1.37\text{E-}09 \text{ mg/kg-day}}{5.0\text{E-}04 \text{ mg/kg-day}} = 2.74\text{E-}06$$

NORTHEAST CREEK SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

The intake from dermal contact to sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED / BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:  
 C = contaminant concentration in sediment (mg/kg)  
 CF = conversion factor for kg to mg  
 SA = exposed skin surface area (cm<sup>2</sup>)  
 AF = sediment to skin adherence factor (mg/cm<sup>2</sup>)  
 Abs = fraction absorbed (unitless)  
 EF = exposure frequency (events/yr)  
 ED = exposure duration (year)  
 BW = body weight (kg)  
 ATc = averaging time for carcinogen (yr)  
 ATnc = averaging time for noncarcinogen (yr)  
 DY = day per year (day/yr)  
 CSF = cancer slope factor (mg/kg-day)<sup>-1</sup>  
 RfD = reference dose (mg/kg-day)

INPUTS  
 Specific  
 1.00E-08  
 8300  
 1  
 Specific  
 48  
 30  
 70  
 70  
 30  
 365  
 Specific  
 Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benzo(a)anthracene	0.074	1E-06	8300	1	0.01	48	30	70	70	365	4.95E-09	7.30E-01	3.61E-09	8.23
Benzo(b)fluoranthene	0.048	1E-06	8300	1	0.01	48	30	70	70	365	3.07E-09	7.30E-01	2.24E-09	5.11
Benzo(k)fluoranthene	0.067	1E-06	8300	1	0.01	48	30	70	70	365	3.81E-09	7.30E-02	2.78E-10	0.63
Chrysene	0.07	1E-06	8300	1	0.01	48	30	70	70	365	4.68E-09	7.30E-03	3.41E-11	0.08
Indeno(1,2,3-cd)pyrene	0.063	1E-06	8300	1	0.01	48	30	70	70	365	3.64E-09	7.30E-01	2.69E-09	5.89
Alpha-Chlordane	0.014	1E-06	8300	1	0.01	48	30	70	70	365	9.36E-10	1.30E+00	1.22E-09	2.77
Gamma-Chlordane	0.011	1E-06	8300	1	0.01	48	30	70	70	365	7.35E-10	1.30E+00	9.66E-10	2.18
1,4'-DDD	0.0394	1E-06	8300	1	0.01	48	30	70	70	365	2.63E-09	2.40E-01	6.32E-10	1.44
1,4'-DDE	0.02	1E-06	8300	1	0.01	48	30	70	70	365	1.34E-09	3.40E-01	4.54E-10	1.04
1,4'-DDT	0.0068	1E-06	8300	1	0.01	48	30	70	70	365	5.89E-10	3.00E-01	1.78E-10	0.40
Dieldrin	0.0079	1E-06	8300	1	0.01	48	30	70	70	365	5.28E-10	1.60E+01	8.45E-09	19.25
Arsenic	1.3	1E-06	8300	1	0.001	48	30	70	70	365	8.69E-09	1.75E+00	1.52E-08	34.65
Beryllium	0.28	1E-06	8300	1	0.001	48	30	70	70	365	1.87E-09	4.30E+00	8.05E-09	18.34
TOTAL													4.39E-08	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
2-Butoxyethanol	0.053	1E-06	8300	1	0.01	48	30	70	30	365	8.26E-09	6.00E-01	0.00000001	0.00
Butyl benzyl phthalate	0.047	1E-06	8300	1	0.01	48	30	70	30	365	7.33E-09	2.00E-01	0.00000004	0.00
Di-n-octyl phthalate	0.5	1E-06	8300	1	0.01	48	30	70	30	365	7.90E-08	2.00E-02	0.00000390	0.35
Fluoranthene	0.12	1E-06	8300	1	0.01	48	30	70	30	365	1.87E-08	4.00E-02	0.00000047	0.04
Pyrene	0.17	1E-06	8300	1	0.01	48	30	70	30	365	2.66E-08	3.00E-02	0.00000088	0.08
Alpha-Chlordane	0.014	1E-06	8300	1	0.01	48	30	70	30	365	2.18E-09	6.00E-05	0.00003638	3.22
Gamma-Chlordane	0.011	1E-06	8300	1	0.01	48	30	70	30	365	1.72E-09	6.00E-05	0.00002859	2.53
1,4'-DDT	0.0068	1E-06	8300	1	0.01	48	30	70	30	365	1.37E-09	5.00E-04	0.00000274	0.24
Dieldrin	0.0079	1E-06	8300	1	0.01	48	30	70	30	365	1.23E-09	5.00E-05	0.00002484	2.18
Arsenic	1.3	1E-06	8300	1	0.001	48	30	70	30	365	2.03E-08	3.00E-04	0.00006767	6.98
Berium	13.3	1E-06	8300	1	0.001	48	30	70	30	365	2.07E-07	7.00E-02	0.00000296	0.26
Beryllium	0.28	1E-06	8300	1	0.001	48	30	70	30	365	4.37E-09	5.00E-03	0.00000087	0.08
Copper	9.3	1E-06	8300	1	0.001	48	30	70	30	365	1.45E-07	3.71E-02	0.00000391	0.35
Thallium	4.9	1E-06	8300	1	0.001	48	30	70	30	365	7.64E-08	8.00E-05	0.00095507	84.53
Zinc	34	1E-06	8300	1	0.001	48	30	70	30	365	5.30E-07	3.00E-01	0.00000177	0.16
TOTAL													0.0012880	100.00

(1) Phenanthrene and lead not evaluated due to the lack of a published toxicity value.

NORTHEAST CREEK SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

The intake from dermal contact to sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED / BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } /RfD$$

Where:

C = contaminant concentration in sediment (mg/kg)  
 CF = conversion factor for kg to mg  
 SA = exposed skin surface area (cm<sup>2</sup>)  
 AF = sediment to skin adherence factor (mg/cm<sup>2</sup>)  
 Abs = fraction absorbed (unitless)  
 EF = exposure frequency (events/yr)  
 ED = exposure duration (year)  
 BW = body weight (kg)  
 ATc = averaging time for carcinogen (yr)  
 ATnc = averaging time for noncarcinogen (yr)  
 DY = day per year (day/yr)  
 CSF = cancer slope factor (mg/kg-day)<sup>-1</sup>  
 RfD = reference dose (mg/kg-day)

INPUTS  
 Specific  
 1.00E-06  
 2100  
 1  
 Specific  
 48  
 6  
 15  
 70  
 6  
 365  
 Specific  
 Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Benzo(a)anthracene	0.074	1E-06	2100	1	0.01	48	6	15	70	365	1.17E-09	7.30E-01	8.62E-10	8.23
Benzo(b)fluoranthene	0.046	1E-06	2100	1	0.01	48	6	15	70	365	7.26E-10	7.30E-01	5.30E-10	5.11
Benzo(k)fluoranthene	0.057	1E-06	2100	1	0.01	48	6	15	70	365	9.00E-10	7.30E-02	6.57E-11	0.63
Chrysene	0.07	1E-06	2100	1	0.01	48	6	15	70	365	1.10E-09	7.30E-03	8.06E-12	0.08
Indeno(1,2,3-cd)pyrene	0.053	1E-06	2100	1	0.01	48	6	15	70	365	8.96E-10	7.30E-01	6.11E-10	5.89
Alpha-Chlordane	0.014	1E-06	2100	1	0.01	48	6	15	70	365	2.21E-10	1.30E+00	2.87E-10	2.77
Gamma-Chlordane	0.011	1E-06	2100	1	0.01	48	6	15	70	365	1.74E-10	1.30E+00	2.26E-10	2.18
1,4'-DDD	0.0394	1E-06	2100	1	0.01	48	6	15	70	365	6.22E-10	2.40E-01	1.49E-10	1.44
1,4'-DDE	0.02	1E-06	2100	1	0.01	48	6	15	70	365	3.16E-10	3.40E-01	1.07E-10	1.04
1,4'-DDT	0.0068	1E-06	2100	1	0.01	48	6	15	70	365	1.39E-10	3.00E-01	4.17E-11	0.40
Dieldrin	0.0079	1E-06	2100	1	0.01	48	6	15	70	365	1.25E-10	1.60E+01	1.99E-09	19.25
Arsenic	1.3	1E-06	2100	1	0.001	48	6	15	70	365	2.05E-09	1.76E+00	3.59E-09	34.65
Beryllium	0.28	1E-06	2100	1	0.001	48	6	15	70	365	4.42E-10	4.30E+00	1.90E-09	18.34
TOTAL													1.08E-08	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
2-BUTANONE	0.053	1E-06	2100	1	0.01	48	6	15	6	365	9.76E-09	6.00E-01	0.00000002	0.00
Butyl benzyl phthalate	0.047	1E-06	2100	1	0.01	48	6	15	6	365	6.65E-09	2.00E-01	0.00000004	0.00
Dih-n-octyl phthalate	0.6	1E-06	2100	1	0.01	48	6	15	6	365	9.21E-08	2.00E-02	0.00000460	0.35
Fluoranthene	0.12	1E-06	2100	1	0.01	48	6	15	6	365	2.21E-08	4.00E-02	0.00000055	0.04
Pyrene	0.17	1E-06	2100	1	0.01	48	6	15	6	365	3.13E-08	3.00E-02	0.00000104	0.08
Alpha-Chlordane	0.014	1E-06	2100	1	0.01	48	6	15	6	365	2.58E-08	6.00E-05	0.00004296	3.22
Gamma-Chlordane	0.011	1E-06	2100	1	0.01	48	6	15	6	365	2.03E-08	6.00E-05	0.00003375	2.53
1,4'-DDT	0.0068	1E-06	2100	1	0.01	48	6	15	6	365	1.62E-08	5.00E-04	0.00000324	0.24
Dieldrin	0.0079	1E-06	2100	1	0.01	48	6	15	6	365	1.45E-08	5.00E-05	0.00002909	2.18
Arsenic	1.3	1E-06	2100	1	0.001	48	6	15	6	365	2.39E-08	3.00E-04	0.00007978	5.99
Barium	13.3	1E-06	2100	1	0.001	48	6	15	6	365	2.45E-07	7.00E-02	0.00000350	0.26
Beryllium	0.28	1E-06	2100	1	0.001	48	6	15	6	365	5.16E-09	6.00E-03	0.00000103	0.08
Copper	9.3	1E-06	2100	1	0.001	48	6	15	6	365	1.71E-07	3.71E-02	0.00000462	0.35
Thallium	4.9	1E-06	2100	1	0.001	48	6	15	6	365	9.02E-08	8.00E-05	0.00112767	84.53
Zinc	34	1E-06	2100	1	0.001	48	6	15	6	365	6.26E-07	3.00E-01	0.00000209	0.16
TOTAL													0.00133398	100.00

(1) Phenanthrene and lead not evaluated due to the lack of a published toxicity value.



NORTHEAST CREEK SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT RESIDENT

The intake from dermal contact to sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED / BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion factor for kg to mg	1.00E-08
SA = exposed skin surface area (cm <sup>2</sup> )	8300
AF = sediment to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless)	Specific
EF = exposure frequency (events/yr)	48
ED = exposure duration (year)	4
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benz(a)anthracene	0.074	1E-08	8300	1	0.01	48	4	70	70	365	6.69E-10	7.30E-01	4.91E-10	8.23
Benz(b)fluoranthene	0.048	1E-08	8300	1	0.01	48	4	70	70	365	4.10E-10	7.30E-01	2.99E-10	5.11
Benz(k)fluoranthene	0.057	1E-08	8300	1	0.01	48	4	70	70	365	5.08E-10	7.30E-02	3.71E-11	0.63
Chrysene	0.07	1E-08	8300	1	0.01	48	4	70	70	365	6.24E-10	7.30E-03	4.55E-12	0.08
Indeno(1,2,3-cd)pyrene	0.053	1E-08	8300	1	0.01	48	4	70	70	365	4.72E-10	7.30E-01	3.45E-10	5.89
Alpha-Chlordane	0.014	1E-08	8300	1	0.01	48	4	70	70	365	1.25E-10	1.30E+00	1.62E-10	2.77
Gamma-Chlordane	0.011	1E-08	8300	1	0.01	48	4	70	70	365	9.80E-11	1.30E+00	1.27E-10	2.18
1,4'-DDD	0.0394	1E-08	8300	1	0.01	48	4	70	70	365	3.61E-10	2.40E-01	8.43E-11	1.44
1,4'-DDE	0.02	1E-08	8300	1	0.01	48	4	70	70	365	1.78E-10	3.40E-01	6.06E-11	1.04
1,4'-DDT	0.0088	1E-08	8300	1	0.01	48	4	70	70	365	7.84E-11	3.00E-01	2.35E-11	0.40
Dieldrin	0.0079	1E-08	8300	1	0.01	48	4	70	70	365	7.04E-11	1.60E+01	1.13E-09	19.25
Arsenic	1.3	1E-08	8300	1	0.001	48	4	70	70	365	1.16E-09	1.75E+00	2.03E-09	34.65
Beryllium	0.28	1E-08	8300	1	0.001	48	4	70	70	365	2.49E-10	4.30E+00	1.07E-09	18.34
TOTAL													5.85E-09	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
2-Butanone	0.053	1E-08	8300	1	0.01	48	4	70	4	365	8.26E-09	8.00E-01	0.00000001	0.00
Butyl benzyl phthalate	0.047	1E-08	8300	1	0.01	48	4	70	4	365	7.33E-09	2.00E-01	0.00000004	0.00
Di-n-octyl phthalate	0.6	1E-08	8300	1	0.01	48	4	70	4	365	7.90E-08	2.00E-02	0.00000390	0.35
Fluoranthene	0.12	1E-08	8300	1	0.01	48	4	70	4	365	1.87E-08	4.00E-02	0.00000047	0.04
Pyrene	0.17	1E-08	8300	1	0.01	48	4	70	4	365	2.65E-08	3.00E-02	0.00000088	0.08
Alpha-Chlordane	0.014	1E-08	8300	1	0.01	48	4	70	4	365	2.18E-09	6.00E-05	0.00003638	3.22
Gamma-Chlordane	0.011	1E-08	8300	1	0.01	48	4	70	4	365	1.72E-09	6.00E-05	0.00002859	2.63
1,4'-DDT	0.0088	1E-08	8300	1	0.01	48	4	70	4	365	1.37E-09	5.00E-04	0.00000274	0.24
Dieldrin	0.0079	1E-08	8300	1	0.01	48	4	70	4	365	1.23E-09	6.00E-05	0.00002464	2.18
Arsenic	1.3	1E-08	8300	1	0.001	48	4	70	4	365	2.03E-08	3.00E-04	0.00006757	5.88
Barium	13.3	1E-08	8300	1	0.001	48	4	70	4	365	2.07E-07	7.00E-02	0.00000296	0.26
Beryllium	0.28	1E-08	8300	1	0.001	48	4	70	4	365	4.37E-09	5.00E-03	0.00000087	0.08
Copper	9.3	1E-08	8300	1	0.001	48	4	70	4	365	1.45E-07	3.71E-02	0.00000391	0.35
Thallium	4.9	1E-08	8300	1	0.001	48	4	70	4	365	7.64E-08	8.00E-05	0.00095507	84.53
Zinc	34	1E-08	8300	1	0.001	48	4	70	4	365	5.30E-07	3.00E-01	0.00000177	0.16
TOTAL													0.0012360	100.00

(1) Phenanthrene and lead not evaluated due to the lack of a published toxicity value.

NORTHEAST CREEK SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD RESIDENT

The intake from dermal contact to sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED / BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion factor for kg to mg	1.00E-06
SA = exposed skin surface area (cm <sup>2</sup> )	2100
AF = sediment to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless)	Specific
EF = exposure frequency (events/yr)	48
ED = exposure duration (year)	4
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Benz(a)anthracene	0.074	1E-06	2100	1	0.01	48	4	15	70	365	7.78E-10	7.30E-01	5.68E-10	9.23
Benz(b)fluoranthene	0.046	1E-06	2100	1	0.01	48	4	15	70	365	4.84E-10	7.30E-01	3.53E-10	5.11
Benz(k)fluoranthene	0.067	1E-06	2100	1	0.01	48	4	15	70	365	6.00E-10	7.30E-02	4.38E-11	0.63
Chrysene	0.07	1E-06	2100	1	0.01	48	4	15	70	365	7.35E-10	7.30E-03	5.39E-12	0.08
Indeno(1,2,3-cd)pyrene	0.053	1E-06	2100	1	0.01	48	4	15	70	365	5.58E-10	7.30E-01	4.07E-10	5.89
Alpha-Chlordane	0.014	1E-06	2100	1	0.01	48	4	15	70	365	1.47E-10	1.30E+00	1.91E-10	2.77
Gamma-Chlordane	0.011	1E-06	2100	1	0.01	48	4	15	70	365	1.16E-10	1.30E+00	1.50E-10	2.18
1,4'-DDD	0.0394	1E-06	2100	1	0.01	48	4	15	70	365	4.15E-10	2.40E-01	9.95E-11	1.44
1,4'-DDE	0.02	1E-06	2100	1	0.01	48	4	15	70	365	2.10E-10	3.40E-01	7.15E-11	1.04
1,4'-DDT	0.0088	1E-06	2100	1	0.01	48	4	15	70	365	9.26E-11	3.00E-01	2.78E-11	0.40
Dieldrin	0.0079	1E-06	2100	1	0.01	48	4	15	70	365	8.31E-11	1.60E+01	1.33E-09	19.25
Arsenic	1.3	1E-06	2100	1	0.001	48	4	15	70	365	1.37E-09	1.75E+00	2.39E-09	34.65
Beryllium	0.28	1E-06	2100	1	0.001	48	4	15	70	365	2.95E-10	4.30E+00	1.27E-09	18.34
<b>TOTAL</b>													<b>6.91E-09</b>	<b>100.00</b>

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
2-Butanone	0.053	1E-06	2100	1	0.01	48	4	15	4	365	3.76E-09	6.00E-01	0.00000002	0.00
Butyl benzyl phthalate	0.047	1E-06	2100	1	0.01	48	4	15	4	365	8.65E-09	2.00E-01	0.00000004	0.00
Din-octyl phthalate	0.5	1E-06	2100	1	0.01	48	4	15	4	365	9.21E-08	2.00E-02	0.00000460	0.35
Fluoranthene	0.12	1E-06	2100	1	0.01	48	4	15	4	365	2.21E-08	4.00E-02	0.00000055	0.04
Pyrene	0.17	1E-06	2100	1	0.01	48	4	15	4	365	3.13E-08	3.00E-02	0.00000104	0.08
Alpha-Chlordane	0.014	1E-06	2100	1	0.01	48	4	15	4	365	2.68E-09	6.00E-05	0.00004296	3.22
Gamma-Chlordane	0.011	1E-06	2100	1	0.01	48	4	15	4	365	2.03E-09	6.00E-05	0.00003375	2.53
1,4'-DDT	0.0088	1E-06	2100	1	0.01	48	4	15	4	365	1.62E-09	5.00E-04	0.00000324	0.24
Dieldrin	0.0079	1E-06	2100	1	0.01	48	4	15	4	365	1.45E-09	5.00E-05	0.00002909	2.18
Arsenic	1.3	1E-06	2100	1	0.001	48	4	15	4	365	2.39E-08	3.00E-04	0.00007978	5.88
Barium	13.3	1E-06	2100	1	0.001	48	4	15	4	365	2.45E-07	7.00E-02	0.00000350	0.28
Beryllium	0.28	1E-06	2100	1	0.001	48	4	15	4	365	5.16E-09	5.00E-03	0.00000103	0.08
Copper	9.3	1E-06	2100	1	0.001	48	4	15	4	365	1.71E-07	3.71E-02	0.00000462	0.35
Thallium	4.9	1E-06	2100	1	0.001	48	4	15	4	365	9.02E-08	8.00E-05	0.00112787	84.63
Zinc	34	1E-06	2100	1	0.001	48	4	15	4	365	8.26E-07	3.00E-01	0.00000209	0.16
<b>TOTAL</b>													<b>0.00133396</b>	<b>100.00</b>

(1) Phenanthrene and lead not evaluated due to the lack of a published toxicity value.

**EXAMPLE INGESTION OF TRIBUTARY SURFACE WATER CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose:** Estimate intake/risk from ingestion of surface water

$$\text{Intake (mg/kg-day)} = \frac{C \times IR \times ET \times EF \times ED}{BW \times AT \times DY}$$

Where:

C	=	Contaminant concentration in surface water (mg/L)
CR	=	Contact rate (L/hr)
ET	=	Exposure time (hrs/event)
EF	=	Exposure frequency (events/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (years)
DY	=	Days per year (days)

**Risks:**

$$\text{Carcinogens} = \text{Intake (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1}$$

$$\text{Noncarcinogens} = \text{Intake (mg/kg-day)} / \text{RfD (mg/kg-day)}$$

**Example Carcinogen: Dieldrin**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.0005 \text{ mg/L} \times 0.05 \text{ L/hr} \times 2.6 \text{ hrs/event} \times 48 \text{ events/yr} \times 30 \text{ years}}{70 \text{ kg} \times 70 \text{ years} \times 365 \text{ days/yr}} \\ &= 5.23\text{E-}08 \end{aligned}$$

$$\text{Risk} = 5.23\text{E-}08 \text{ mg/kg-day} \times 1.6\text{E-}01 \text{ mg/kg-day}^{-1} = 8.37\text{E-}07$$

**Example Noncarcinogen: Dieldrin**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.0005 \text{ mg/L} \times 0.05 \text{ L/hr} \times 2.6 \text{ hrs/event} \times 48 \text{ events/yr} \times 30 \text{ years}}{70 \text{ kg} \times 30 \text{ years} \times 365 \text{ days/yr}} \\ &= 1.227\text{E-}07 \end{aligned}$$

$$\text{Risk} = \frac{1.227\text{E-}07 \text{ mg/kg-day}}{5.0\text{E-}05 \text{ mg/kg-day}} = 2.44\text{E-}03$$

Re: Site 7 Future Residential Adult

TRIBUTARY SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

The Intake from the Ingestion of surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w \cdot C_R \cdot E_T \cdot E_F \cdot E_D / B_W \cdot A_{Tc} \text{ or } A_{Tnc} \cdot D_Y$$

$$\text{Risk} = \text{Intake} \cdot C_{SF} \text{ or } R_{fD}$$

Where:	INPUT
C <sub>w</sub> = contaminant concentration in surface water (mg/l)	Specific
IR = ingestion rate (Liter/hour)	0.05
E <sub>T</sub> = exposure time (hours/event)	2.6
E <sub>F</sub> = exposure frequency (events/yr)	48
E <sub>D</sub> = exposure duration (yrs)	6
B <sub>W</sub> = body weight (kg)	15
A <sub>Tc</sub> = averaging time for carcinogen (yr)	70
A <sub>Tnc</sub> = averaging time for noncarcinogen (yr)	6
D <sub>Y</sub> = days per year (days)	365
C <sub>SF</sub> = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
R <sub>fD</sub> = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Dieldrin	0.0005	0.05	2.6	48	6	15	70	365	4.88E-08	1.60E+01	7.82E-07	100.00
<b>TOTAL</b>											7.82E-07	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Noncarc (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
Xylenes	0.001	0.05	2.6	48	6	15	6	365	1.14E-08	2.00E+00	0.0000008	0.00
Dieldrin	0.0005	0.05	2.6	48	6	15	6	365	5.70E-07	5.00E-05	0.0113973	84.82
Barium	0.0274	0.05	2.6	48	6	15	6	365	3.12E-05	7.00E-02	0.0004461	2.53
Copper	0.0083	0.05	2.6	48	6	15	6	365	9.46E-08	3.71E-02	0.0002550	1.45
Manganese	0.0172	0.05	2.6	48	6	15	6	365	1.86E-05	5.00E-03	0.0039207	22.23
Silver	0.0043	0.05	2.6	48	6	15	6	365	4.80E-08	5.00E-03	0.0009802	5.56
Zinc	0.168	0.05	2.6	48	6	15	6	365	1.91E-04	3.00E-01	0.0006382	3.62
<b>TOTAL</b>											0.0176380	100.00

(1) Endrin ketone and lead not evaluated due to the lack of published toxicity values.

FILE NAME: SWITB.WQ2

TRIBUTARY SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

The intake from the ingestion of surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w \cdot CR \cdot ET \cdot EF \cdot ED / BW \cdot AT_c \text{ or } AT_{nc} \cdot DY$$

$$\text{Risk} = \text{Intake} \cdot CSF \text{ or } RfD$$

Where:	INPUT
C <sub>w</sub> = contaminant concentration in surface water (mg/l)	Specific
IR = Ingestion rate (L/hr)	0.05
ET = exposure time (hours/event)	2.6
EF = exposure frequency (events/yr)	48
ED = exposure duration (yrs)	30
BW = body weight (kg)	70
AT <sub>c</sub> = averaging time for carcinogen (yr)	70
AT <sub>nc</sub> = averaging time for noncarcinogen (yr)	30
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Dieldrin	0.0005	0.05	2.6	48	30	70	70	365	5.23E-08	1.60E+01	8.37E-07	100.00
<b>TOTAL</b>											8.37E-07	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Noncarc (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Xylenes	0.001	0.05	2.6	48	30	70	30	365	2.44E-07	2.00E+00	0.0000001	0.00
Dieldrin	0.0005	0.05	2.6	48	30	70	30	365	1.22E-07	5.00E-05	0.0024423	64.62
Barium	0.0274	0.05	2.6	48	30	70	30	365	6.69E-06	7.00E-02	0.0000956	2.53
Copper	0.0083	0.05	2.6	48	30	70	30	365	2.03E-06	3.71E-02	0.0000546	1.45
Manganese	0.0172	0.05	2.6	48	30	70	30	365	4.20E-06	5.00E-03	0.0008401	22.23
Silver	0.0043	0.05	2.6	48	30	70	30	365	1.05E-06	5.00E-03	0.0002100	5.56
Zinc	0.168	0.05	2.6	48	30	70	30	365	4.10E-05	3.00E-01	0.0001368	3.62
<b>TOTAL</b>											0.0037796	100.00

(1) Endrin ketone and lead not evaluated due to the lack of published toxicity values.

FILE NAME: SWITB.WQ1

TRIBUTARY SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD RESIDENT

The intake from the ingestion of surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w * CR * ET * EF * ED/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUT
C <sub>w</sub> = contaminant concentration in surface water (mg/l)	Specific
IR = Ingestion rate (Liter/hour)	0.05
ET = exposure time (hours/event)	2.6
EF = exposure frequency (events/yr)	48
ED = exposure duration (yrs)	4
BW = body weight (kg)	15
AT <sub>c</sub> = averaging time for carcinogen (yr)	70
AT <sub>nc</sub> = averaging time for noncarcinogen (yr)	4
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Dieldrin	0.0005	0.05	2.6	48	4	15	70	365	3.28E-08	1.60E+01	5.21E-07	100.00
<b>TOTAL</b>											5.21E-07	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Noncarc (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
Xylenes	0.001	0.05	2.6	48	4	15	4	365	1.14E-06	2.00E+00	0.0000006	0.00
Dieldrin	0.0005	0.05	2.6	48	4	15	4	365	5.70E-07	5.00E-05	0.0113973	64.62
Barium	0.0274	0.05	2.6	48	4	15	4	365	3.12E-05	7.00E-02	0.0004461	2.53
Copper	0.0083	0.05	2.6	48	4	15	4	365	9.46E-06	3.71E-02	0.0002550	1.45
Manganese	0.0172	0.05	2.6	48	4	15	4	365	1.98E-05	5.00E-03	0.0039207	22.23
Silver	0.0043	0.05	2.6	48	4	15	4	365	4.90E-06	5.00E-03	0.0009802	5.56
Zinc	0.188	0.05	2.6	48	4	15	4	365	1.91E-04	3.00E-01	0.0006382	3.62
<b>TOTAL</b>											0.0176380	100.00

(1) Endrin ketone and lead not evaluated due to the lack of published toxicity values.

FILE NAME: SWTB.WQ4

TRIBUTARY SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT RESIDENT

The intake from the ingestion of surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = Cw \cdot CR \cdot ET \cdot EF \cdot ED/BW \cdot ATc \text{ or } ATnc \cdot DY$$

$$\text{Risk} = \text{Intake} \cdot CSF \text{ or } RfD$$

Where:	INPUT
Cw = contaminant concentration in surface water (mg/l)	Specific
IR = ingestion rate (Liter/hour)	0.05
ET = exposure time (hours/event)	2.8
EF = exposure frequency (events/yr)	48
ED = exposure duration (yrs)	4
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Dieldrin	0.0005	0.05	2.8	48	4	70	70	365	6.98E-09	1.80E+01	1.12E-07	100.00
<b>TOTAL</b>											<b>1.12E-07</b>	<b>100.00</b>

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Noncarc (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Xylenes	0.001	0.05	2.8	48	4	70	4	365	2.44E-07	2.00E+00	0.0000001	0.00
Dieldrin	0.0005	0.05	2.8	48	4	70	4	365	1.22E-07	5.00E-05	0.0024423	64.62
Barium	0.0274	0.05	2.8	48	4	70	4	365	6.69E-06	7.00E-02	0.0000956	2.53
Copper	0.0083	0.05	2.8	48	4	70	4	365	2.03E-06	3.71E-02	0.0000548	1.45
Manganese	0.0172	0.05	2.8	48	4	70	4	365	4.20E-06	5.00E-03	0.0008401	22.23
Silver	0.0043	0.05	2.8	48	4	70	4	365	1.05E-06	5.00E-03	0.0002100	5.56
Zinc	0.168	0.05	2.8	48	4	70	4	365	4.10E-05	3.00E-01	0.0001368	3.62
<b>TOTAL</b>											<b>0.0037798</b>	<b>100.00</b>

(1) Endrin ketone and lead not evaluated due to the lack of published toxicity values.

FILE NAME: SWITB.WG3

**EXAMPLE DERMAL CONTACT WITH TRIBUTARY SURFACE WATER CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose: Estimate intake/risk from dermal contact with surface water**

$$Intake (mg/kg\cdot day) = \frac{C \times SA \times PC \times ET \times EF \times ED \times CF}{BW \times AT}$$

Where:

C	=	Contaminant concentration in surface water (mg/L)
SA	=	Exposed skin surface available for contact (cm <sup>2</sup> )
PC	=	Permeability constant (cm/hr)
ET	=	Exposure time (hr/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
CF	=	Conversion factor (1 L/1,000 cm <sup>3</sup> )
BW	=	Body weight (kg)
AT <sub>c</sub>	=	Averaging time carcinogen (days)
AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

$$Carcinogens = Intake (mg/kg\cdot day) \times CSF (mg/kg\cdot day)^{-1}$$

$$Noncarcinogens = Intake (mg/kg\cdot day) / RfD (mg/kg\cdot day)$$

**Example Carcinogen: Dieldrin**

$$Intake (mg/kg\cdot day) = \frac{0.0005 \text{ mg/L} \times 8300 \text{ cm}^2 \times 1.6E-02 \text{ cm/hr} \times 2.6 \text{ hr/day} \times 48 \text{ days/yr} \times 70 \text{ yrs} \times 1 \text{ L/1,000 cm}^3}{70 \text{ kg} \times 70 \text{ yrs} \times 365 \text{ days}}$$

$$= 1.39E-07$$

$$Risk = 1.39E-07 \text{ mg/kg}\cdot\text{day} \times 16 \text{ mg/kg}\cdot\text{day}^{-1} = 2.2E-06$$

**Example Noncarcinogen: Dieldrin**

$$Intake (mg/kg\cdot day) = \frac{0.0005 \text{ mg/L} \times 8300 \text{ cm}^2 \times 1.6E-02 \text{ cm/hr} \times 2.6 \text{ hr/day} \times 48 \text{ days/yr} \times 30 \text{ yrs} \times 1 \text{ L/1,000 cm}^3}{70 \text{ kg} \times 30 \text{ yrs} \times 365 \text{ days/yr}}$$

$$= 3.24E-07$$

$$Risk = \frac{3.24E-07 \text{ mg/kg}\cdot\text{day}}{5.0E-05 \text{ mg/kg}\cdot\text{day}} = 6.49E-03$$



TRIBUTARY SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION - CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

The intake from dermal contact with surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w * SA * PC * ET * EF * ED * CF/BW * AT_c \text{ or } AT_{nc} * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } /RfD$$

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = skin surface available for contact (cm <sup>2</sup> )	2100
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = exposure time (hours/day)	2.6
EF = exposure frequency (days/yr)	48
ED = exposure duration (years)	6
CF = volumetric conversion factor for water (1 liter/1000 c)	0.001
BW = body weight (kg)	15
AT <sub>c</sub> = averaging time for carcinogen (yr)	70
AT <sub>nc</sub> = averaging time for noncarcinogen (yr)	6
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Dieldrin	0.0005	2100	1.60E-02	2.6	48	6	0.001	15	70	365	3.26E-08	1.60E+01	5.25E-07	100.00
<b>TOTAL</b>													<b>5.25E-07</b>	<b>100.00</b>

Contaminant(1)	Concentration Noncarcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk Child	Percent Noncarcinogenic Risk
Xylenes	0.001	2100	8.0E-02	2.6	48	6	0.001	15	6	365	3.83E-06	2.00E+00	0.0000019	0.02
Dieldrin	0.0005	2100	1.6E-02	2.6	48	6	0.001	15	6	365	3.83E-07	5.00E-05	0.0076590	97.00
Bartum	0.0274	2100	1.0E-03	2.6	48	6	0.001	15	6	365	1.31E-06	7.00E-02	0.0000187	0.24
Copper	0.0083	2100	1.0E-03	2.6	48	6	0.001	15	6	365	3.97E-07	3.71E-02	0.0000107	0.14
Manganese	0.0172	2100	1.0E-03	2.6	48	6	0.001	15	6	365	8.23E-07	5.00E-03	0.0001647	2.09
Silver	0.0043	2100	6.0E-04	2.6	48	6	0.001	15	6	365	1.24E-07	5.00E-03	0.0000247	0.31
Zinc	0.168	2100	6.0E-04	2.6	48	6	0.001	15	6	365	4.83E-06	3.00E-01	0.0000181	0.20
<b>TOTAL</b>													<b>0.0078958</b>	<b>100.00</b>

(1) Endrin ketone and lead not evaluated due to the lack of published toxicity values.

TRIBUTARY SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION - CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

The intake from dermal contact with surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w * SA * PC * ET * EF * ED * CF/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = skin surface available for contact (cm <sup>2</sup> )	8300
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = exposure time (hours/day)	2.8
EF = exposure frequency (days/yr)	48
ED = exposure duration (years)	30
CF = volumetric conversion factor for water (1liter/1000 c)	0.001
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Dieldrin	0.0005	8300	1.80E-02	2.8	48	30	0.001	70	70	365	1.39E-07	1.80E+01	2.22E-08	100.00
<b>TOTAL</b>													2.22E-08	100.00

Contaminant(1)	Concentration Noncarcinoge (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk Adult	Percent Noncarcinogenic Risk
Xylenes	0.001	8300	8.0E-02	2.8	48	30	0.001	70	30	365	3.24E-08	2.00E+00	0.0000018	0.02
Dieldrin	0.0005	8300	1.8E-02	2.8	48	30	0.001	70	30	365	3.24E-07	5.00E-05	0.0084867	97.00
Barium	0.0274	8300	1.0E-03	2.8	48	30	0.001	70	30	365	1.11E-06	7.00E-02	0.0000159	0.24
Copper	0.0083	8300	1.0E-03	2.8	48	30	0.001	70	30	365	3.36E-07	3.71E-02	0.0000091	0.14
Manganese	0.0172	8300	1.0E-03	2.8	48	30	0.001	70	30	365	6.87E-07	5.00E-03	0.0001395	2.09
Silver	0.0043	8300	6.0E-04	2.8	48	30	0.001	70	30	365	1.05E-07	5.00E-03	0.0000209	0.31
Zinc	0.168	8300	6.0E-04	2.8	48	30	0.001	70	30	365	4.09E-06	3.00E-01	0.0000136	0.20
<b>TOTAL</b>													0.0066872	100.00

(1) Endrin ketone and lead not evaluated due to the lack of published toxicity values.

File Name: SWDCTB.WQ1

TRIBUTARY SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION - CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD RESIDENT

The intake from dermal contact with surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = C_w * SA * PC * ET * EF * ED * CF / BW * AT_c \text{ or } AT_{nc} * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = skin surface available for contact (cm <sup>2</sup> )	2100
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = exposure time (hours/day)	2.6
EF = exposure frequency (days/yr)	48
ED = exposure duration (years)	4
CF = volumetric conversion factor for water (1liter/1000 c)	0.001
BW = body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Dieldrin	0.0005	2100	1.60E-02	2.6	48	4	0.001	15	70	365	2.19E-08	1.60E+01	3.50E-07	100.00
<b>TOTAL</b>													<b>3.50E-07</b>	<b>100.00</b>

Contaminant(1)	Concentration Noncarcinoge (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk Child	Percent Noncarcinogenic Risk
Xylenes	0.001	2100	8.0E-02	2.6	48	4	0.001	15	4	365	3.83E-08	2.00E+00	0.0000019	0.02
Dieldrin	0.0005	2100	1.6E-02	2.6	48	4	0.001	15	4	365	3.83E-07	5.00E-05	0.0078590	97.00
Barium	0.0274	2100	1.0E-03	2.6	48	4	0.001	15	4	365	1.31E-08	7.00E-02	0.0000187	0.24
Copper	0.0083	2100	1.0E-03	2.6	48	4	0.001	15	4	365	3.97E-07	3.71E-02	0.0000107	0.14
Manganese	0.0172	2100	1.0E-03	2.6	48	4	0.001	15	4	365	8.23E-07	5.00E-03	0.0001647	2.09
Silver	0.0043	2100	8.0E-04	2.6	48	4	0.001	15	4	365	1.24E-07	5.00E-03	0.0000247	0.31
Zinc	0.188	2100	8.0E-04	2.6	48	4	0.001	15	4	365	4.83E-08	3.00E-01	0.0000161	0.20
<b>TOTAL</b>													<b>0.0078958</b>	<b>100.00</b>

(1) Endrin ketone and lead not evaluated due to the lack of published toxicity values.

File Name: SWDCTB.WQ4

TRIBUTARY SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION - CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT RESIDENT

The intake from dermal contact with surface water is calculated as follows:

$$\text{Intake (mg/kg-day)} = Cw * SA * PC * ET * EF * ED * CF/BW * ATc \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = skin surface available for contact (cm <sup>2</sup> )	8300
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = exposure time (hours/day)	2.8
EF = exposure frequency (days/yr)	48
ED = exposure duration (years)	4
CF = volumetric conversion factor for water (1liter/1000 c)	0.001
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are site and scenario specific

Contaminant(1)	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (years)	Days per Year (days)	Carc Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Dieldrin	0.0005	8300	1.80E-02	2.8	48	4	0.001	70	70	365	1.85E-08	1.60E+01	2.97E-07	100.00
TOTAL													2.97E-07	100.00

Contaminant(1)	Concentration Noncarcinoge (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Average Noncarc Time (years)	Days per Year (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarc Risk Adult	Percent Noncarcinogenic Risk
Kylenes	0.001	8300	8.0E-02	2.8	48	4	0.001	70	4	365	3.24E-06	2.00E+00	0.000016	0.02
Dieldrin	0.0005	8300	1.8E-02	2.8	48	4	0.001	70	4	365	3.24E-07	8.00E-05	0.0064867	97.00
Barium	0.0274	8300	1.0E-03	2.8	48	4	0.001	70	4	365	1.11E-06	7.00E-02	0.0000159	0.24
Copper	0.0083	8300	1.0E-03	2.8	48	4	0.001	70	4	365	3.36E-07	3.71E-02	0.0000091	0.14
Manganese	0.0172	8300	1.0E-03	2.8	48	4	0.001	70	4	365	6.97E-07	5.00E-03	0.0001395	2.09
Silver	0.0043	8300	8.0E-04	2.8	48	4	0.001	70	4	365	1.05E-07	5.00E-03	0.0000209	0.31
Zinc	0.168	8300	8.0E-04	2.8	48	4	0.001	70	4	365	4.09E-06	3.00E-01	0.0000136	0.20
TOTAL													0.0068672	100.00

(1) Endrin ketone and lead not evaluated due to the lack of published toxicity values.

File Name: SWDCTB.WQ3

**EXAMPLE INGESTION OF TRIBUTARY SEDIMENT CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose: Estimate intake/risk from ingestion of sediment**

$$Intake (mg/kg\cdot day) = \frac{C \times IR \times CF \times EF \times ED}{BW \times AT}$$

Where:

C	=	Contaminant concentration in sediment (mg/kg)
IR	=	Ingestion rate (mg/day)
CF	=	Conversion factor for kg to mg (mg/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (years)

**Risks:**

$$\begin{aligned} \text{Carcinogens} &= \text{Intake (mg/kg}\cdot\text{day)} \times \text{CSF (mg/kg}\cdot\text{day)}^{-1} \\ \text{Noncarcinogens} &= \text{Intake (mg/kg}\cdot\text{day)} / \text{RfD (mg/kg}\cdot\text{day)} \end{aligned}$$

**Example Carcinogen: dieldrin**

$$\begin{aligned} Intake (mg/kg\cdot day) &= \frac{0.0275 \text{ mg/kg} \times 100 \text{ mg/day} \times 1.0E-06 \times 48 \text{ days/yr} \times 70 \text{ yrs}}{70 \text{ kg} \times 30 \text{ yrs} \times 365 \text{ days/yr}} \\ &= 2.21E-09 \end{aligned}$$

$$Risk = 2.21E-09 \text{ mg/kg}\cdot\text{day} \times 16 \text{ mg/kg}\cdot\text{day}^{-1} = 3.54E-08$$

**Example Noncarcinogen: Dieldrin**

$$\begin{aligned} Intake (mg/kg\cdot day) &= \frac{0.0275 \text{ mg/kg} \times 100 \text{ mg/day} \times 1.0E-06 \times 48 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 30 \text{ yrs} \times 365 \text{ days/yr}} \\ &= 5.17E-09 \end{aligned}$$

$$Risk = \frac{5.17E-09 \text{ mg/kg}\cdot\text{day}}{5.0E-05 \text{ mg/kg}\cdot\text{day}} = 1.03E-04$$

TRIUTARY SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTD-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

Intake from ingestion of sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C \cdot R \cdot CF \cdot EF \cdot ED / BW \cdot ATC \text{ or } ATnc \cdot DY$$

$$\text{Risk} = \text{Intake} \cdot CSF \text{ or } RFD$$

Where:	INPUTS
C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	48
ED = exposure duration (yr)	8
R = sediment ingestion rate (mg/day)	200
BW = body weight (kg)	15
ATC = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RFD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carb. Time (years)	Days per year (days/yr)	Carc. Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
benzo(b)fluoranthene	0.27	48	8	200	1E-06	15	70	365	4.03E-08	7.30E-01	2.93E-09	1.13
benzo(g)fluoranthene	0.23	48	8	200	1E-06	15	70	365	3.46E-08	7.30E-02	2.52E-09	0.10
benzo(a)pyrene	0.11	48	8	200	1E-06	15	70	365	1.66E-08	7.30E+00	1.21E-07	4.61
2-(2-ethylhexyl)phthalate	0.81	48	8	200	1E-06	15	70	365	1.22E-07	1.40E-02	1.70E-09	0.07
Chrysene	0.32	48	8	200	1E-06	15	70	365	4.81E-08	7.30E-00	3.61E-10	0.01
1,3-Dichlorobenzene	0.11	48	8	200	1E-06	15	70	365	1.66E-08	4.60E-01	7.44E-09	0.28
Naph	0.0031	48	8	200	1E-06	15	70	365	4.86E-10	1.70E+01	7.92E-09	0.30
Dieldrin	0.0275	48	8	200	1E-06	15	70	365	4.13E-09	1.80E+01	8.81E-08	2.53
4,4'-DDE	0.18	48	8	200	1E-06	15	70	365	2.71E-08	3.40E-01	8.20E-09	0.35
4,4'-DDD	0.08	48	8	200	1E-06	15	70	365	1.20E-08	2.40E-01	2.88E-09	0.11
4,4'-DDT	0.0322	48	8	200	1E-06	15	70	365	1.40E-08	3.40E-01	4.78E-09	0.18
alpha-Chlordane	0.035	48	8	200	1E-06	15	70	365	8.28E-09	1.30E+00	8.84E-09	0.28
gamma-Chlordane	0.0121	48	8	200	1E-06	15	70	365	1.82E-09	1.30E+00	2.36E-09	0.09
Endosulfan	0.2189	48	8	200	1E-06	15	70	365	3.28E-08	7.70E+00	2.61E-07	9.69
Arsenic	2.1	48	8	200	1E-06	15	70	365	3.18E-07	1.75E+00	5.62E-07	21.11
Beryllium	2.4	48	8	200	1E-06	15	70	365	3.61E-07	4.30E+00	1.62E-06	59.27
TOTAL											2.62E-08	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Noncarb. Time (years)	Days per year (days/yr)	Noncarb. Dose (mg/kg/day)	Reference Dose (mg/kg/day)	NonCarcinogenic Risk Child	Percent Noncarcinogenic Risk
Acetaminophen	0.25	48	8	200	1E-06	15	6	365	4.38E-07	8.00E-01	0.0000007	0.00
Styrene	0.028	48	8	200	1E-06	15	6	365	4.91E-08	2.00E-01	0.0000002	0.00
Toluene	0.0228	48	8	200	1E-06	15	6	365	6.72E-08	2.00E-01	0.0000003	0.00
Acenaphthylene	0.25	48	8	200	1E-06	15	6	365	4.38E-07	8.00E-02	0.0000073	0.01
Anthracene	0.36	48	8	200	1E-06	15	6	365	6.14E-07	3.00E-01	0.0000020	0.00
2-(2-ethylhexyl)phthalate	0.81	48	8	200	1E-06	15	6	365	1.42E-06	2.00E-02	0.0000710	0.11
Butyl benzyl phthalate	0.047	48	8	200	1E-06	15	6	365	8.24E-08	2.00E-01	0.0000004	0.00
Dibenzofuran	0.13	48	8	200	1E-06	15	6	365	2.28E-07	4.00E-03	0.0000070	0.09
2-n-butyl phthalate	1.2699	48	8	200	1E-06	15	6	365	2.22E-06	1.00E-01	0.0000222	0.04
Fluoranthene	0.45	48	8	200	1E-06	15	6	365	7.66E-07	4.00E-02	0.0000197	0.03
Threne	0.43	48	8	200	1E-06	15	6	365	7.64E-07	3.00E-02	0.0000251	0.04
Naph	0.0031	48	8	200	1E-06	15	6	365	6.44E-09	3.00E-05	0.0001812	0.29
Dieldrin	0.0275	48	8	200	1E-06	15	6	365	4.82E-08	5.00E-05	0.0008844	1.54
4,4'-DDT	0.0322	48	8	200	1E-06	15	6	365	1.60E-07	5.00E-04	0.0003288	0.62
alpha-Chlordane	0.035	48	8	200	1E-06	15	6	365	8.14E-08	8.00E-05	0.0010228	1.63
gamma-Chlordane	0.0121	48	8	200	1E-06	15	6	365	2.12E-08	8.00E-05	0.0003536	0.56
Arsenic	2.1	48	8	200	1E-06	15	6	365	3.66E-06	3.00E-04	0.0122740	19.68
Berium	279	48	8	200	1E-06	15	6	365	4.66E-04	7.00E-02	0.0098899	11.15
Beryllium	2.4	48	8	200	1E-06	15	6	365	4.21E-08	5.00E-03	0.0008416	1.34
Chromium	8.8	48	8	200	1E-06	15	6	365	1.66E-05	5.00E-03	0.0033886	5.37
Copper	32.7	48	8	200	1E-06	15	6	365	6.73E-05	3.71E-02	0.0015455	2.47
Manganese	17.2	48	8	200	1E-06	15	6	365	3.02E-05	5.00E-03	0.0060316	9.62
Mercury	1.2	48	8	200	1E-06	15	6	365	2.10E-06	3.00E-04	0.0070137	11.19
Selenium	6	48	8	200	1E-06	15	6	365	8.77E-06	5.00E-03	0.0017334	2.60
Thallium	0.08	48	8	200	1E-06	15	6	365	1.16E-06	8.00E-05	0.0144659	23.08
Vanadium	15.2	48	8	200	1E-06	15	6	365	2.87E-05	7.00E-03	0.0038074	6.07
Zinc	203.5	48	8	200	1E-06	15	6	365	4.62E-04	3.00E-01	0.0015401	2.46
TOTAL											0.0826935	100.00

(1) Phenanthrene, benzo(a)h)pyrene, and lead not evaluated due to the lack of published toxicity values.

TRIBUTARY SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTD-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

Intake from ingestion of sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * IR * CF * EF * ED / BW * ATC \text{ or } ATnc * DY$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } /RD$$

Where:

C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	48
ED = exposure duration (yr)	30
IR = sediment ingestion rate (mg/day)	100
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	CSFs Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benzo(a)anthracene	0.27	48	30	100	1E-06	70	30	365	2.17E-08	7.00E-01	1.52E-09	1.13
Benzo(a)fluoranthene	0.23	48	30	100	1E-06	70	70	365	1.85E-08	7.30E-02	1.35E-09	0.10
Benzo(b)fluoranthene	0.11	48	30	100	1E-06	70	70	365	9.25E-09	7.30E+00	6.47E-09	4.81
Benzo(k)fluoranthene	0.09	48	30	100	1E-06	70	70	365	8.52E-09	1.40E-02	9.13E-10	0.07
Benzo(e)pyrene	0.32	48	30	100	1E-06	70	70	365	2.58E-08	7.30E-03	1.88E-10	0.01
Chrysene	0.11	48	30	100	1E-06	70	70	365	8.89E-09	4.62E-01	3.98E-09	0.29
1,2-Dichlorobenzene	0.001	48	30	100	1E-06	70	70	365	2.62E-10	1.70E+01	4.24E-09	0.30
Naphthalene	0.0275	48	30	100	1E-06	70	70	365	2.21E-09	1.62E+01	3.54E-09	2.63
4,4'-DDE	0.18	48	30	100	1E-06	70	70	365	1.48E-08	3.40E-01	4.93E-09	0.36
4,4'-DDD	0.08	48	30	100	1E-06	70	70	365	6.44E-09	2.40E-01	1.65E-09	0.11
4,4'-DDT	0.002	48	30	100	1E-06	70	70	365	7.62E-09	3.40E-01	2.65E-09	0.19
Alpha-Chlordane	0.036	48	30	100	1E-06	70	70	365	2.82E-09	1.30E+00	3.86E-09	0.28
Gamma-Chlordane	0.0121	48	30	100	1E-06	70	70	365	9.74E-10	1.30E+00	1.27E-09	0.09
Heptachlor Epoxide	0.2169	48	30	100	1E-06	70	70	365	1.70E-08	7.70E+00	1.34E-07	8.08
Heptachlor Chloride	2.1	48	30	100	1E-06	70	70	365	1.85E-07	1.75E+00	2.94E-07	21.11
Beryllium	2.4	48	30	100	1E-06	70	70	365	1.90E-07	4.30E+00	8.31E-07	62.27
TOTAL											1.40E-08	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Nonc Time (years)	Days per year (days/yr)	Nonc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Nonc Carcinogenic Risk Adult	Percent Noncarcinogenic Risk
Benzo(a)anthracene	0.25	48	30	100	1E-06	70	30	365	4.70E-08	6.00E-01	0.00000008	0.00
Benzo(a)fluoranthene	0.028	48	30	100	1E-06	70	30	365	6.29E-09	2.00E-01	0.00000003	0.00
Benzo(b)fluoranthene	0.0025	48	30	100	1E-06	70	30	365	6.18E-09	2.00E-01	0.00000003	0.00
Benzo(k)fluoranthene	0.25	48	30	100	1E-06	70	30	365	4.70E-08	6.00E-02	0.00000078	0.01
Benzo(e)pyrene	0.35	48	30	100	1E-06	70	30	365	6.68E-08	3.00E-01	0.00000022	0.00
Benzo(a)pyrene	0.81	48	30	100	1E-06	70	30	365	1.62E-07	2.00E-02	0.00000781	0.11
Benzo(b)pyrene	0.047	48	30	100	1E-06	70	30	365	6.93E-09	2.00E-01	0.00000004	0.00
Benzo(k)pyrene	0.13	48	30	100	1E-06	70	30	365	2.44E-08	4.00E-03	0.00000311	0.00
Benzo(a)anthracene	1.2699	48	30	100	1E-06	70	30	365	2.39E-07	1.00E-01	0.00000239	0.04
Benzo(a)fluoranthene	0.45	48	30	100	1E-06	70	30	365	8.45E-08	4.00E-02	0.00000211	0.03
Benzo(b)fluoranthene	0.43	48	30	100	1E-06	70	30	365	8.08E-08	3.00E-02	0.00000289	0.04
Benzo(k)fluoranthene	0.001	48	30	100	1E-06	70	30	365	8.92E-10	3.00E-05	0.00001941	0.29
Chrysene	0.0275	48	30	100	1E-06	70	30	365	8.17E-09	5.00E-05	0.00010333	1.64
4,4'-DDT	0.002	48	30	100	1E-06	70	30	365	1.75E-08	6.00E-04	0.00003502	0.52
Alpha-Chlordane	0.036	48	30	100	1E-06	70	30	365	6.69E-09	6.00E-05	0.00010959	1.63
Gamma-Chlordane	0.0121	48	30	100	1E-06	70	30	365	2.87E-09	6.00E-05	0.00003789	0.56
Heptachlor Epoxide	2.1	48	30	100	1E-06	70	30	365	3.95E-07	3.00E-04	0.00131507	19.58
Heptachlor Chloride	279	48	30	100	1E-06	70	30	365	5.24E-05	7.00E-02	0.00074878	11.15
Beryllium	2.4	48	30	100	1E-06	70	30	365	4.51E-07	5.00E-03	0.00006018	1.34
Chromium	9.8	48	30	100	1E-06	70	30	365	1.80E-08	5.00E-03	0.00038070	5.37
Copper	32.7	48	30	100	1E-06	70	30	365	6.14E-08	3.71E-02	0.00016599	2.47
Dibenz(a,h)anthracene	17.2	48	30	100	1E-06	70	30	365	3.23E-08	5.00E-03	0.00094828	9.62
Mercury	1.2	48	30	100	1E-06	70	30	365	2.25E-07	3.00E-04	0.00075147	11.19
Selenium	5	48	30	100	1E-06	70	30	365	9.35E-07	5.00E-03	0.00018787	2.80
Thallium	0.65	48	30	100	1E-06	70	30	365	1.24E-07	8.00E-05	0.00154990	23.08
Vanadium	15.2	48	30	100	1E-06	70	30	365	2.98E-08	7.00E-03	0.00040794	6.07
Zinc	253.9	48	30	100	1E-06	70	30	365	4.95E-05	3.00E-01	0.00016501	2.46
TOTAL											0.00671609	100.00

(1) Fluoranthene, benzo(a,h)pyrene, and triphenylene, and lead not evaluated due to the lack of published toxicity values.

TRIBUTARY SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTD-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD RESIDENT

Intake from ingestion of sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C \cdot R \cdot CF \cdot EF \cdot ED / BW \cdot ATC \text{ or } ATnc \cdot DY$$

$$\text{Risk} = \text{Intake} \cdot CSF \text{ or } RfD$$

Where:

C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	48
ED = exposure duration (yr)	4
R = sediment ingestion rate (mg/day)	200
BW = body weight (kg)	16
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(1)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Benzo(b)fluoranthene	0.27	48	4	200	1E-06	16	70	365	2.71E-08	7.30E-01	1.97E-08	1.13
Benzo(k)fluoranthene	0.23	48	4	200	1E-06	16	70	365	2.30E-08	7.30E-02	1.68E-08	0.10
Benzo(a)pyrene	0.11	48	4	200	1E-06	16	70	365	1.10E-08	7.30E+00	8.05E-08	4.81
Ba(2-ethylhexyl)phthalate	0.81	48	4	200	1E-06	16	70	365	8.12E-08	1.40E-02	1.14E-09	0.07
Chrysene	0.32	48	4	200	1E-06	16	70	365	3.21E-08	7.30E-03	2.34E-10	0.01
1,3-Dichlorobenzene	0.11	48	4	200	1E-06	16	70	365	1.10E-08	4.80E-01	4.86E-09	0.28
Naphthalene	0.0331	48	4	200	1E-06	16	70	365	3.11E-10	1.70E+01	5.28E-09	0.30
Dieldrin	0.0278	48	4	200	1E-06	16	70	365	2.78E-09	1.80E+01	4.41E-08	2.53
4,4'-DDE	0.18	48	4	200	1E-06	16	70	365	1.80E-08	3.40E-01	6.13E-09	0.36
4,4'-DDD	0.08	48	4	200	1E-06	16	70	365	8.02E-09	2.40E-01	1.82E-09	0.11
4,4'-DDT	0.0332	48	4	200	1E-06	16	70	365	3.34E-09	3.40E-01	3.18E-09	0.18
Alpha-Chlordane	0.035	48	4	200	1E-06	16	70	365	3.51E-09	1.30E+00	4.56E-09	0.26
Gamma-Chlordane	0.0121	48	4	200	1E-06	16	70	365	1.21E-09	1.30E+00	1.58E-09	0.09
Toxaph-1200	0.2189	48	4	200	1E-06	16	70	365	2.17E-08	7.70E+00	1.67E-07	9.89
Ysentic	2.1	48	4	200	1E-06	16	70	365	2.10E-07	1.78E+00	3.85E-07	21.11
Beryllium	2.4	48	4	200	1E-06	16	70	365	2.40E-07	4.30E+00	1.03E-06	68.27
TOTAL											1.74E-06	100.00

Contaminant(1)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (ppm)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk
EBU/EBz	0.25	48	4	200	1E-06	16	4	365	4.38E-07	8.00E-01	0.0000007	0.00
Styrene	0.028	48	4	200	1E-06	16	4	365	4.91E-08	2.00E-01	0.0000002	0.00
Toluene	0.0320	48	4	200	1E-06	16	4	365	6.72E-08	2.00E-01	0.0000003	0.00
Acenaphthylene	0.25	48	4	200	1E-06	16	4	365	4.38E-07	8.00E-02	0.0000073	0.01
Nitrobenzene	0.35	48	4	200	1E-06	16	4	365	6.14E-07	3.00E-01	0.0000020	0.00
Ba(2-ethylhexyl)phthalate	0.81	48	4	200	1E-06	16	4	365	1.48E-06	2.00E-02	0.0000710	0.11
Ba(2-ethylhexyl)phthalate	0.047	48	4	200	1E-06	16	4	365	8.24E-08	2.00E-01	0.0000004	0.00
Di-n-butyl phthalate	0.13	48	4	200	1E-06	16	4	365	2.28E-07	4.00E-03	0.0000570	0.08
Di-n-butyl phthalate	1.2000	48	4	200	1E-06	16	4	365	2.22E-06	1.00E-01	0.0000222	0.04
Fluoranthene	0.45	48	4	200	1E-06	16	4	365	7.85E-07	4.00E-02	0.0000197	0.03
Pyrene	0.43	48	4	200	1E-06	16	4	365	7.84E-07	3.00E-02	0.0000251	0.04
Naphthalene	0.0331	48	4	200	1E-06	16	4	365	6.44E-08	3.00E-06	0.0001812	0.29
Dieldrin	0.0278	48	4	200	1E-06	16	4	365	4.82E-08	8.00E-05	0.0000844	1.54
4,4'-DDT	0.0332	48	4	200	1E-06	16	4	365	1.83E-07	5.00E-04	0.0003285	0.62
Alpha-Chlordane	0.035	48	4	200	1E-06	16	4	365	6.14E-08	8.00E-06	0.0010228	1.83
Gamma-Chlordane	0.0121	48	4	200	1E-06	16	4	365	2.13E-08	8.00E-05	0.0003536	0.58
Ysentic	2.1	48	4	200	1E-06	16	4	365	3.68E-06	3.00E-04	0.0122740	19.56
Beryllium	2.4	48	4	200	1E-06	16	4	365	4.80E-04	7.00E-02	0.0068988	11.15
Beryllium	2.4	48	4	200	1E-06	16	4	365	4.21E-05	8.00E-03	0.0008418	1.34
Zinc	9.6	48	4	200	1E-06	16	4	365	1.88E-05	5.00E-03	0.0033988	5.37
Copper	32.7	48	4	200	1E-06	16	4	365	6.73E-05	3.71E-02	0.0015455	2.47
Antimony	17.2	48	4	200	1E-06	16	4	365	3.02E-05	8.00E-03	0.0000318	0.62
Mercury	1.2	48	4	200	1E-06	16	4	365	2.10E-06	3.00E-04	0.0070137	11.19
Selenium	5	48	4	200	1E-06	16	4	365	8.77E-06	8.00E-03	0.0017534	2.80
Thallium	0.85	48	4	200	1E-06	16	4	365	1.16E-06	8.00E-05	0.0144958	23.08
Vanadium	18.2	48	4	200	1E-06	16	4	365	2.67E-05	7.00E-03	0.0009074	6.07
Chromium	283.6	48	4	200	1E-06	16	4	365	4.82E-04	3.00E-01	0.0015401	2.45
TOTAL											0.0226335	100.00

(1) Fluoranthene, benzo(g,h,i)perylene, and lead not evaluated due to the lack of published toxicity values.



TRIBUTARY SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT RESIDENT

Intake from ingestion of sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C \cdot \text{FI} \cdot \text{CF} \cdot \text{EF} \cdot \text{ED} / \text{BW} \cdot \text{ATC} \text{ or } \text{ATnc} \cdot \text{DY}$$

$$\text{Risk} = \text{Intake} \cdot \text{CSF} \text{ or } \text{RfD}$$

Where:	INPUTS
C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	48
ED = exposure duration (yr)	4
FI = sediment ingestion rate (mg/day)	100
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant(s)	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carc Time (years)	Days per year (days/yr)	Carc Dose (mg/kg/day)	CSF Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benz(a)anthracene	0.27	48	4	100	1E-06	70	70	365	2.0E-09	7.3E-01	2.1E-09	1.13
Benz(a)fluoranthene	0.23	48	4	100	1E-06	70	70	365	2.47E-09	7.3E-02	1.8E-10	0.10
Benz(a)pyrene	0.11	48	4	100	1E-06	70	70	365	1.18E-09	7.3E+00	8.6E-09	4.61
Benzo(b)fluoranthene	0.01	48	4	100	1E-06	70	70	365	8.70E-09	1.4E-02	1.2E-10	0.07
Chrysene	0.32	48	4	100	1E-06	70	70	365	3.44E-09	7.3E-03	2.6E-11	0.01
3,3'-Dichlorobenzidine	0.11	48	4	100	1E-06	70	70	365	1.18E-09	4.6E-01	5.3E-10	0.28
Indin	0.0201	48	4	100	1E-06	70	70	365	3.33E-11	1.7E+01	5.6E+00	0.30
Naphth	0.0275	48	4	100	1E-06	70	70	365	2.9E-10	1.6E+01	4.7E-09	2.53
4,4'-DDD	0.18	48	4	100	1E-06	70	70	365	1.8E-09	3.4E-01	6.67E+00	0.35
4,4'-DDD	0.08	48	4	100	1E-06	70	70	365	8.6E-10	2.4E-01	2.0E+00	0.11
4,4'-DDT	0.032	48	4	100	1E-06	70	70	365	1.0E-09	3.4E-01	3.4E+00	0.18
Alpha-Chlordane	0.035	48	4	100	1E-06	70	70	365	2.7E-10	1.3E+00	4.8E+00	0.26
Gamma-Chlordane	0.0121	48	4	100	1E-06	70	70	365	1.3E-10	1.3E+00	1.6E+00	0.08
Toxair-1200	0.2169	48	4	100	1E-06	70	70	365	2.3E-09	7.7E+00	1.7E-08	9.69
Arsenic	2.1	48	4	100	1E-06	70	70	365	2.2E-08	1.7E+00	3.9E-08	21.11
Selenium	2.4	48	4	100	1E-06	70	70	365	2.6E-08	4.3E+00	1.11E-07	69.27
TOTAL											1.87E-07	100.00

Contaminant(s)	Concentration Noncarcinogen (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (days/yr)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
EBUtiona	0.25	48	4	100	1E-06	70	4	365	4.7E-08	6.0E-01	0.00000008	0.00
Styrene	0.028	48	4	100	1E-06	70	4	365	5.2E-09	2.0E-01	0.00000003	0.00
Toluene	0.0229	48	4	100	1E-06	70	4	365	6.1E-09	2.0E-01	0.00000003	0.00
Acenaphthylene	0.25	48	4	100	1E-06	70	4	365	4.70E-08	6.0E-02	0.00000078	0.01
Anthracene	0.35	48	4	100	1E-06	70	4	365	6.5E-08	3.0E-01	0.00000022	0.00
Benzo(a)anthracene	0.01	48	4	100	1E-06	70	4	365	1.6E-07	2.0E-02	0.00000781	0.11
Butyl benzyl phthalate	0.047	48	4	100	1E-06	70	4	365	8.8E-09	2.0E-01	0.00000004	0.00
Dibenzofuran	0.13	48	4	100	1E-06	70	4	365	2.44E-08	4.0E-03	0.00000811	0.09
Di-n-butyl phthalate	1.2660	48	4	100	1E-06	70	4	365	2.3E-07	1.0E-01	0.00000238	0.04
Fluoranthene	0.45	48	4	100	1E-06	70	4	365	8.4E-08	4.0E-02	0.00000211	0.03
Pyrene	0.43	48	4	100	1E-06	70	4	365	8.0E-08	3.0E-02	0.00000289	0.04
Naph	0.0201	48	4	100	1E-06	70	4	365	6.6E-10	3.0E-05	0.00001941	0.29
Naphth	0.0275	48	4	100	1E-06	70	4	365	6.17E-09	5.0E-05	0.00010333	1.54
4,4'-DDT	0.032	48	4	100	1E-06	70	4	365	1.7E-09	5.0E-04	0.00003502	0.62
Alpha-Chlordane	0.035	48	4	100	1E-06	70	4	365	6.6E-09	6.0E-05	0.00010699	1.63
Gamma-Chlordane	0.0121	48	4	100	1E-06	70	4	365	2.27E-09	6.0E-05	0.00003789	0.56
Arsenic	2.1	48	4	100	1E-06	70	4	365	3.6E-07	3.0E-04	0.00131507	18.68
Selenium	2.70	48	4	100	1E-06	70	4	365	5.24E-05	7.0E-02	0.00074878	11.16
Selenium	2.4	48	4	100	1E-06	70	4	365	4.61E-07	5.0E-03	0.00009018	1.34
Chromium	9.8	48	4	100	1E-06	70	4	365	1.8E-08	5.0E-03	0.00009070	5.37
Copper	32.7	48	4	100	1E-06	70	4	365	6.14E-08	3.71E-02	0.00016559	2.47
Manganese	17.2	48	4	100	1E-06	70	4	365	3.2E-08	6.0E-03	0.00084628	9.82
Mercury	1.2	48	4	100	1E-06	70	4	365	2.2E-07	3.0E-04	0.00075147	11.19
Selenium	5	48	4	100	1E-06	70	4	365	9.3E-07	6.0E-03	0.00018787	2.90
Thallium	0.66	48	4	100	1E-06	70	4	365	1.24E-07	8.0E-05	0.00164960	23.08
Vanadium	15.2	48	4	100	1E-06	70	4	365	2.8E-08	7.0E-03	0.00040794	6.07
Zinc	203.6	48	4	100	1E-06	70	4	365	4.9E-05	3.0E-01	0.00016501	2.46
TOTAL											0.00871609	100.00

(1) Fluoranthene, benzo(a,h)pyrene, indin, and lead not evaluated due to the lack of published toxicity values.

**EXAMPLE DERMAL CONTACT WITH TRIBUTARY SEDIMENT CALCULATIONS  
OPERABLE UNIT NO. 11 (SITE 7)  
CONTRACT TASK ORDER 0274**

**Purpose: Estimate intake/risk from dermal contact with sediment**

$$\text{Intake (mg/kg-day)} = \frac{C \times CF \times SA \times AF \times Abs \times EF \times ED}{BW \times AT \times DY}$$

Where:	C	=	Concentration of contaminant in sediment (mg/kg)
	CF	=	Conversion factor for kg to mg
	SA	=	Exposed skin surface area (cm <sup>2</sup> )
	AF	=	Sediment to skin adherence factor (mg/cm <sup>2</sup> )
	Abs	=	Fraction absorbed (unitless)
	EF	=	Exposure frequency (events/year)
	ED	=	Exposure duration (years)
	BW	=	Body weight (kg)
	AT	=	Averaging time (years)
	DY	=	Days per year (days)

**Risks:**

$$\begin{aligned} \text{Carcinogens} &= \text{Intake (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1} \\ \text{Noncarcinogens} &= \text{Intake (mg/kg-day)} / \text{RfD (mg/kg-day)} \end{aligned}$$

**Example Carcinogen: 4,4'-DDT**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.0932 \text{ mg/kg} \times 1.0\text{E}-06 \times 8300 \text{ cm}^2 \times 1 \times 0.01 \times 48 \text{ events/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 70 \text{ years} \times 365 \text{ days/yr}} \\ &= 6.23\text{E}-09 \end{aligned}$$

$$\text{Risk} = 6.23\text{E}-09 \text{ mg/kg-day} \times 3.4\text{E}-01 \text{ mg/kg-day}^{-1} = 2.12\text{E}-09$$

**Example Noncarcinogen: 4,4'-DDT**

$$\begin{aligned} \text{Intake (mg/kg-day)} &= \frac{0.00932 \text{ mg/kg} \times 1.0\text{E}-06 \times 8300 \text{ cm}^2 \times 1 \times 0.01 \times 48 \text{ events/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 30 \text{ years} \times 365 \text{ days/yr}} \\ &= 1.45\text{E}-08 \end{aligned}$$

$$\text{Risk} = \frac{1.45\text{E}-08 \text{ mg/kg-day}}{5.0\text{E}-04 \text{ mg/kg-day}} = 2.91\text{E}-05$$

TERRESTRIAL SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTD-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

The intake from dermal contact to sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C \cdot CF \cdot SA \cdot AF \cdot Abs \cdot EF \cdot ED/BW \cdot ATc \text{ or } ATnc \cdot DY$$

$$\text{Risk} = \text{Intake} \cdot CSF \text{ or } RD$$

Where:

C = contaminant concentration in soil (mg/kg)	INPUTS
CF = conversion factor for kg to mg	Specific
SA = exposed skin surface area (cm <sup>2</sup> )	1.00E-08
AF = sediment to skin adherence factor (mg/cm <sup>2</sup> )	2100
Abs = fraction absorbed (unitless)	1
EF = exposure frequency (events/yr)	Specific
ED = exposure duration (years)	48
BW = body weight (kg)	6
ATc = averaging time for carcinogen (yr)	15
ATnc = averaging time for noncarcinogen (yr)	70
DY = day per year (day/yr)	6
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	365
RD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk
Benzo(a)fluoranthene	0.27	1E-08	2100	1	0.01	48	6	15	70	365	4.26E-08	7.30E-01	3.11E-09	1.50
Benzo(b)fluoranthene	0.29	1E-08	2100	1	0.01	48	6	15	70	365	3.63E-08	7.30E-02	2.65E-10	0.13
Benzo(k)fluoranthene	0.11	1E-08	2100	1	0.01	48	6	15	70	365	1.74E-08	7.30E+00	1.27E-08	6.10
Benzo(a)pyrene	0.61	1E-08	2100	1	0.01	48	6	15	70	365	1.28E-08	1.40E-02	1.70E-10	0.09
Benzo(e)pyrene	0.32	1E-08	2100	1	0.01	48	6	15	70	365	5.05E-09	7.30E-03	3.66E-11	0.02
Chrysene	0.11	1E-08	2100	1	0.01	48	6	15	70	365	1.74E-08	4.90E-01	7.81E-10	0.38
1,2,3,4-Dichlorobenzidine	0.0031	1E-08	2100	1	0.01	48	6	15	70	365	4.66E-11	1.70E+01	8.32E-10	0.40
Aldrin	0.0275	1E-08	2100	1	0.01	48	6	15	70	365	4.34E-10	1.60E+01	6.94E-09	3.34
Dieldrin	0.18	1E-08	2100	1	0.01	48	6	15	70	365	2.84E-09	3.40E-01	9.66E-10	0.48
4,4'-DDE	0.08	1E-08	2100	1	0.01	48	6	15	70	365	1.26E-08	2.40E-01	3.03E-10	0.15
4,4'-DDD	0.0832	1E-08	2100	1	0.01	48	6	15	70	365	1.47E-08	3.40E-01	5.00E-10	0.24
4,4'-DDT	0.035	1E-08	2100	1	0.01	48	6	15	70	365	5.62E-10	1.30E+00	7.18E-10	0.35
Alpha-Chlordane	0.0121	1E-08	2100	1	0.01	48	6	15	70	365	1.91E-10	1.30E+00	2.48E-10	0.12
Gamma-Chlordane	0.2189	1E-08	2100	1	0.08	48	6	15	70	365	2.05E-08	7.70E+00	1.68E-07	78.11
Aroclor-1260	2.1	1E-08	2100	1	0.001	48	6	15	70	365	3.31E-08	1.70E+00	5.80E-08	2.79
Aroclor-1254	2.4	1E-08	2100	1	0.001	48	6	15	70	365	3.76E-08	4.30E+00	1.83E-08	7.84
Beryllium														
<b>TOTAL</b>													<b>2.08E-07</b>	<b>100.00</b>

Contaminant	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarc/Chronic Risk Child	Percent Noncarcinogenic Risk
Benzo(a)anthracene	0.25	1E-08	2100	1	0.01	48	6	15	6	365	4.00E-08	8.00E-01	0.00000008	0.01
Styrene	0.028	1E-08	2100	1	0.01	48	6	15	6	365	5.16E-09	2.00E-01	0.00000003	0.00
Toluene	0.0328	1E-08	2100	1	0.01	48	6	15	6	365	6.00E-09	2.00E-01	0.00000003	0.00
Acenaphthylene	0.25	1E-08	2100	1	0.01	48	6	15	6	365	4.60E-09	6.00E-02	0.00000077	0.08
Anthracene	0.35	1E-08	2100	1	0.01	48	6	15	6	365	6.44E-09	3.00E-01	0.00000021	0.02
Benzo(a)anthracene	0.61	1E-08	2100	1	0.01	48	6	15	6	365	1.46E-07	2.00E-02	0.00000746	0.79
Benzo(b)anthracene	0.047	1E-08	2100	1	0.01	48	6	15	6	365	8.65E-09	2.00E-01	0.00000004	0.00
Benzo(k)anthracene	0.13	1E-08	2100	1	0.01	48	6	15	6	365	2.35E-09	4.00E-03	0.00000288	0.33
Benzo(e)anthracene	1.2899	1E-08	2100	1	0.01	48	6	15	6	365	2.34E-07	1.00E-01	0.00000234	0.25
Fluoranthene	0.45	1E-08	2100	1	0.01	48	6	15	6	365	8.25E-09	4.00E-02	0.00000207	0.22
Pyrene	0.43	1E-08	2100	1	0.01	48	6	15	6	365	7.62E-09	3.00E-02	0.00000264	0.28
Aldrin	0.0031	1E-08	2100	1	0.01	48	6	15	6	365	6.71E-10	3.00E-05	0.00001602	2.01
Dieldrin	0.0275	1E-08	2100	1	0.01	48	6	15	6	365	5.05E-09	5.00E-05	0.00010128	10.69
4,4'-DDT	0.0832	1E-08	2100	1	0.01	48	6	15	6	365	1.72E-08	6.00E-04	0.00003432	3.62
Alpha-Chlordane	0.035	1E-08	2100	1	0.01	48	6	15	6	365	6.44E-09	6.00E-05	0.00010740	11.34
Gamma-Chlordane	0.0121	1E-08	2100	1	0.01	48	6	15	6	365	2.23E-09	6.00E-05	0.00003713	3.92
Aroclor-1260	2.1	1E-08	2100	1	0.001	48	6	15	6	365	3.97E-08	3.00E-04	0.00012688	13.61
Aroclor-1254	2.79	1E-08	2100	1	0.001	48	6	15	6	365	6.14E-08	7.00E-04	0.00007338	7.75
Beryllium	2.4	1E-08	2100	1	0.001	48	6	15	6	365	4.42E-08	5.00E-03	0.00003984	0.60
Chromium	8.6	1E-08	2100	1	0.001	48	6	15	6	365	1.77E-07	5.00E-03	0.00002635	3.79
Copper	22.7	1E-08	2100	1	0.001	48	6	15	6	365	6.02E-07	3.71E-02	0.00001623	1.71
Manganese	17.2	1E-08	2100	1	0.001	48	6	15	6	365	3.17E-07	6.00E-03	0.00003333	6.69
Mercury	1.2	1E-08	2100	1	0.001	48	6	15	6	365	2.21E-08	3.00E-04	0.00007384	7.78
Selenium	6	1E-08	2100	1	0.001	48	6	15	6	365	6.21E-08	5.00E-03	0.00001841	1.94
Thallium	0.69	1E-08	2100	1	0.001	48	6	15	6	365	1.22E-08	8.00E-05	0.00015189	16.04
Vanadium	15.2	1E-08	2100	1	0.001	48	6	15	6	365	2.80E-07	7.00E-03	0.00003668	4.22
Zinc	283.5	1E-08	2100	1	0.001	48	6	15	6	365	4.85E-06	3.00E-01	0.00001617	1.71
<b>TOTAL</b>													<b>0.00094887</b>	<b>100.00</b>

(1) Phenanthrene, benzo(a,h)perylene, and triphenylene, and lead not evaluated due to the lack of published toxicity values.

TRIBUTARY BEDMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION CTD-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

The intake from dermal contact to sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C \cdot CF \cdot SA \cdot AF \cdot Abs \cdot EF \cdot ED/BW \cdot ATc \text{ or } ATnc \cdot DY$$

$$\text{Risk} = \text{Intake} \cdot CSF \text{ or } RFD$$

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion factor for kg to mg	1.00E-06
SA = exposed skin surface area (cm <sup>2</sup> )	8300
AF = sediment to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless)	Specific
EF = exposure frequency (events/yr)	48
ED = exposure duration (years)	30
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RFD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Care Time (years)	Days per year (day/year)	CRC Dose (mg/kg-day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benzo(a)anthracene	0.27	1E-06	8300	1	0.01	48	30	70	70	365	1.80E-08	7.30E-01	1.36E-08	1.50
Benzo(a)fluoranthene	0.23	1E-06	8300	1	0.01	48	30	70	70	365	1.54E-08	7.30E-02	1.12E-09	0.13
Benzo(b)fluoranthene	0.11	1E-06	8300	1	0.01	48	30	70	70	365	7.96E-09	7.30E+00	6.37E-08	6.10
Benzo(e)pyrene	0.81	1E-06	8300	1	0.01	48	30	70	70	365	8.41E-08	1.40E-02	7.68E-10	0.09
Benzo(k)fluoranthene	0.32	1E-06	8300	1	0.01	48	30	70	70	365	2.14E-08	7.30E-03	1.69E-10	0.02
Chrysene	0.11	1E-06	8300	1	0.01	48	30	70	70	365	7.96E-09	4.6E-01	3.31E-09	0.36
1,2,3,4-Dibenzodioxin	0.0391	1E-06	8300	1	0.01	48	30	70	70	365	8.07E-10	1.70E+01	3.62E-09	0.40
Dieldrin	0.0276	1E-06	8300	1	0.01	48	30	70	70	365	1.84E-09	1.60E+01	2.94E-08	3.34
4,4'-DDE	0.18	1E-06	8300	1	0.01	48	30	70	70	365	1.30E-08	3.40E-01	4.08E-09	0.48
4,4'-DDD	0.09	1E-06	8300	1	0.01	48	30	70	70	365	6.96E-09	2.40E-01	1.28E-09	0.15
4,4'-DDT	0.0592	1E-06	8300	1	0.01	48	30	70	70	365	8.93E-09	3.40E-01	2.12E-09	0.24
Alpha-Chlordane	0.035	1E-06	8300	1	0.01	48	30	70	70	365	2.34E-09	1.30E+00	3.04E-09	0.36
Gamma-Chlordane	0.0121	1E-06	8300	1	0.01	48	30	70	70	365	8.09E-10	1.30E+00	1.02E-09	0.12
Endosulfan	0.2169	1E-06	8300	1	0.06	48	30	70	70	365	8.70E-08	7.70E+00	6.70E-07	76.11
Hexachlorocyclopentadiene	2.1	1E-06	8300	1	0.001	48	30	70	70	365	1.40E-08	1.78E+00	2.48E-08	2.79
Beryllium	2.4	1E-06	8300	1	0.001	48	30	70	70	365	1.60E-08	4.30E+00	6.90E-08	7.84
<b>TOTAL</b>													<b>8.80E-07</b>	<b>100.00</b>

Contaminant	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncare Time (years)	Days per year (day/year)	NRCC Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Acetophenone	0.25	1E-06	8300	1	0.01	48	30	70	30	365	3.90E-08	8.00E-01	0.00000008	0.01
Styrene	0.028	1E-06	8300	1	0.01	48	30	70	30	365	4.37E-09	2.00E-01	0.00000002	0.00
Toluene	0.0326	1E-06	8300	1	0.01	48	30	70	30	365	6.08E-09	2.00E-01	0.00000003	0.00
Acenaphthylene	0.25	1E-06	8300	1	0.01	48	30	70	30	365	3.90E-08	8.00E-02	0.00000085	0.08
Acenaphthene	0.25	1E-06	8300	1	0.01	48	30	70	30	365	3.90E-08	3.00E-01	0.00000018	0.02
Benzo(a)anthracene	0.81	1E-06	8300	1	0.01	48	30	70	30	365	1.28E-07	2.00E-02	0.00000632	0.78
Butyl benzyl phthalate	0.047	1E-06	8300	1	0.01	48	30	70	30	365	7.33E-09	2.00E-01	0.00000004	0.00
Dibenzofuran	0.13	1E-06	8300	1	0.01	48	30	70	30	365	2.03E-08	4.00E-03	0.00000907	0.83
Di-n-butyl phthalate	1.2689	1E-06	8300	1	0.01	48	30	70	30	365	1.89E-07	1.00E-01	0.00000198	0.26
Fluoranthene	0.45	1E-06	8300	1	0.01	48	30	70	30	365	7.02E-08	4.00E-02	0.00000176	0.22
Pyrene	0.43	1E-06	8300	1	0.01	48	30	70	30	365	6.70E-08	3.00E-02	0.00000223	0.28
Naphthalene	0.0391	1E-06	8300	1	0.01	48	30	70	30	365	4.80E-10	3.00E-06	0.00001611	2.01
Dieldrin	0.0276	1E-06	8300	1	0.01	48	30	70	30	365	4.29E-09	6.00E-06	0.00009578	10.89
4,4'-DDT	0.0592	1E-06	8300	1	0.01	48	30	70	30	365	1.40E-08	6.00E-04	0.00002907	3.62
Alpha-Chlordane	0.035	1E-06	8300	1	0.01	48	30	70	30	365	6.48E-09	6.00E-05	0.00006098	11.34
Gamma-Chlordane	0.0121	1E-06	8300	1	0.01	48	30	70	30	365	1.89E-09	8.00E-05	0.00003145	3.92
Hexachlorocyclopentadiene	2.1	1E-06	8300	1	0.001	48	30	70	30	365	3.27E-08	3.00E-04	0.00010916	13.61
Beryllium	279	1E-06	8300	1	0.001	48	30	70	30	365	4.36E-06	7.00E-02	0.00008216	7.75
Bismuth	2.4	1E-06	8300	1	0.001	48	30	70	30	365	3.74E-08	6.00E-03	0.00000748	0.93
Chromium	9.8	1E-06	8300	1	0.001	48	30	70	30	365	1.50E-07	6.00E-03	0.00008894	3.70
Copper	32.7	1E-06	8300	1	0.001	48	30	70	30	365	6.10E-07	3.71E-02	0.00001374	1.71
Manganese	17.2	1E-06	8300	1	0.001	48	30	70	30	365	2.89E-07	6.00E-03	0.00006394	8.88
Mercury	1.2	1E-06	8300	1	0.001	48	30	70	30	365	1.87E-08	3.00E-04	0.00006237	7.78
Selenium	5	1E-06	8300	1	0.001	48	30	70	30	365	7.80E-08	6.00E-03	0.00015589	1.84
Thallium	0.89	1E-06	8300	1	0.001	48	30	70	30	365	1.03E-08	8.00E-05	0.00012894	16.04
Vanadium	15.2	1E-06	8300	1	0.001	48	30	70	30	365	2.37E-07	7.00E-03	0.00003386	4.22
Zinc	203.6	1E-06	8300	1	0.001	48	30	70	30	365	4.11E-06	3.00E-01	0.00001370	1.71
<b>TOTAL</b>													<b>0.0080184</b>	<b>100.00</b>

(1) Fluoranthene, benzo(a,h)pyrene, and naphthalene, and lead not evaluated due to the lack of published toxicity values.

TRIBUTARY SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION GTD-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT RESIDENT

The intake from dermal contact to sediment is calculated as follows:

$$\text{Intake (mg/kg-day)} = C * CF * SA * AF * Abs * EF * ED / BW * ATc \text{ or } ATnc * DT$$

$$\text{Risk} = \text{Intake} * CSF \text{ or } RfD$$

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion factor for kg to mg	1.00E-06
SA = exposed skin surface area (cm <sup>2</sup> )	8000
AF = sediment to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless)	Specific
EF = exposure frequency (events/yr)	48
ED = exposure duration (years)	4
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DT = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

Note: Inputs are scenario and site specific

Contaminant	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (years)	Days per year (day/year)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk
Benzo(a)anthracene	0.23	1E-06	8000	1	0.01	48	4	70	70	365	2.05E-09	7.30E+00	1.48E-10	1.00
Benzo(a)fluoranthene	0.23	1E-06	8000	1	0.01	48	4	70	70	365	2.05E-09	7.30E+00	1.68E-10	0.13
Benzo(a)pyrene	0.11	1E-06	8000	1	0.01	48	4	70	70	365	9.80E-10	7.30E+00	7.15E-09	6.10
Ben(b)fluoranthene	0.09	1E-06	8000	1	0.01	48	4	70	70	365	7.25E-09	1.40E-02	1.01E-10	0.06
Ben(e)fluoranthene	0.32	1E-06	8000	1	0.01	48	4	70	70	365	2.66E-09	7.30E-03	2.08E-11	0.02
Phenanthrene	0.11	1E-06	8000	1	0.01	48	4	70	70	365	9.80E-10	4.90E-01	4.41E-10	0.38
Acridene	0.0001	1E-06	8000	1	0.01	48	4	70	70	365	2.78E-11	1.70E+01	4.70E-10	0.40
Dibenz(a,h)anthracene	0.0275	1E-06	8000	1	0.01	48	4	70	70	365	2.49E-10	1.60E+01	3.99E-09	3.34
4,4'-DDE	0.18	1E-06	8000	1	0.01	48	4	70	70	365	1.60E-09	3.40E-01	5.45E-10	0.48
4,4'-DDD	0.08	1E-06	8000	1	0.01	48	4	70	70	365	7.13E-10	2.40E-01	1.71E-10	0.16
4,4'-DDT	0.0632	1E-06	8000	1	0.01	48	4	70	70	365	8.30E-10	3.40E-01	2.88E-10	0.24
Alpha-Chlordane	0.035	1E-06	8000	1	0.01	48	4	70	70	365	3.12E-10	1.30E+00	4.05E-10	0.35
Gamma-Chlordane	0.0121	1E-06	8000	1	0.01	48	4	70	70	365	1.09E-10	1.30E+00	1.40E-10	0.12
Heptachlor Epoxide	0.2189	1E-06	8000	1	0.06	48	4	70	70	365	1.18E-08	7.70E+00	8.80E-08	78.11
Arsenic	2.1	1E-06	8000	1	0.001	48	4	70	70	365	1.87E-09	1.75E+00	3.27E-09	2.79
Beryllium	2.4	1E-06	8000	1	0.001	48	4	70	70	365	2.14E-09	4.30E+00	9.20E-09	7.84
TOTAL													1.17E-07	100.00

Contaminant	Concentration Noncarcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Noncarc Time (years)	Days per year (day/year)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk
Acridene	0.25	1E-06	8000	1	0.01	48	4	70	4	365	3.93E-08	8.00E-01	0.00000008	0.01
Styrene	0.028	1E-06	8000	1	0.01	48	4	70	4	365	4.37E-09	2.00E-01	0.00000002	0.00
Chlorane	0.0328	1E-06	8000	1	0.01	48	4	70	4	365	6.09E-09	2.00E-01	0.00000003	0.00
Acenaphthylene	0.25	1E-06	8000	1	0.01	48	4	70	4	365	3.93E-08	6.00E-02	0.00000006	0.08
Anthracene	0.35	1E-06	8000	1	0.01	48	4	70	4	365	5.45E-08	3.00E-01	0.00000018	0.02
Ben(b)fluoranthene	0.07	1E-06	8000	1	0.01	48	4	70	4	365	1.26E-07	2.00E-02	0.00000032	0.79
Butyl benzyl phthalate	0.047	1E-06	8000	1	0.01	48	4	70	4	365	7.33E-09	2.00E-01	0.00000004	0.00
Chenofuran	0.13	1E-06	8000	1	0.01	48	4	70	4	365	2.92E-08	4.00E-03	0.00000007	0.63
Di-n-butyl phthalate	1.2989	1E-06	8000	1	0.01	48	4	70	4	365	1.99E-07	1.00E-01	0.00000199	0.29
Fluorethene	0.45	1E-06	8000	1	0.01	48	4	70	4	365	7.05E-08	4.00E-02	0.00000175	0.22
Pyrene	0.43	1E-06	8000	1	0.01	48	4	70	4	365	6.70E-08	3.00E-02	0.00000223	0.28
Moln	0.0031	1E-06	8000	1	0.01	48	4	70	4	365	4.63E-10	3.00E-05	0.00001611	2.01
Dibenz(a,h)anthracene	0.0275	1E-06	8000	1	0.01	48	4	70	4	365	4.29E-09	5.00E-05	0.00008578	10.89
4,4'-DDT	0.0632	1E-06	8000	1	0.01	48	4	70	4	365	1.49E-08	6.00E-04	0.00002807	3.82
Alpha-Chlordane	0.035	1E-06	8000	1	0.01	48	4	70	4	365	5.49E-09	6.00E-05	0.00009098	11.34
Gamma-Chlordane	0.0121	1E-06	8000	1	0.01	48	4	70	4	365	1.89E-09	6.00E-05	0.00003145	3.92
Arsenic	2.1	1E-06	8000	1	0.001	48	4	70	4	365	3.27E-08	3.00E-04	0.00010915	13.61
Beryllium	2.4	1E-06	8000	1	0.001	48	4	70	4	365	4.39E-08	7.00E-04	0.00006215	7.75
Beryllium	2.4	1E-06	8000	1	0.001	48	4	70	4	365	3.74E-08	5.00E-03	0.00000748	0.83
Chromium	9.6	1E-06	8000	1	0.001	48	4	70	4	365	1.50E-07	5.00E-03	0.00002994	3.73
Copper	32.7	1E-06	8000	1	0.001	48	4	70	4	365	6.10E-07	3.71E-02	0.00001374	1.71
Manganese	17.2	1E-06	8000	1	0.001	48	4	70	4	365	2.89E-07	5.00E-03	0.00002364	6.69
Mercury	1.2	1E-06	8000	1	0.001	48	4	70	4	365	1.87E-08	3.00E-04	0.00006237	7.70
Selenium	5	1E-06	8000	1	0.001	48	4	70	4	365	7.65E-08	5.00E-03	0.00001569	1.94
Thallium	0.65	1E-06	8000	1	0.001	48	4	70	4	365	1.03E-08	8.00E-05	0.00012994	16.04
Vanadium	15.2	1E-06	8000	1	0.001	48	4	70	4	365	2.37E-07	7.00E-03	0.00003398	4.22
Zinc	263.5	1E-06	8000	1	0.001	48	4	70	4	365	4.11E-06	3.00E-01	0.00001370	1.71
TOTAL													0.00080194	100.00

(1) Phenanthrene, benzo(a,h)pyrene, and lead not evaluated due to the lack of published toxicity values.

**APPENDIX O**  
**FIELD DATA SHEETS**

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**APPENDIX O.1**  
**TERRESTRIAL**

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ECOLOGICAL EVALUATION  
FIELD DATA SHEET - TERRESTRIAL

Project Name: Habitat Evaluation - Tarawa Terrace Dump

Location: MCB Camp Lejeune, Jacksonville, NC

Date: 12/6/94

Sampling Location: Tarawa Terrace

Data Collected By: LSS,

Habitat Type: Deciduous Forest

Vegetation: Diverse - Dec. trees with pines, vines in  
disturbed areas

Trees:

Dominant Species:

- |   |   |
|---|---|
| 1. <u>oaks as a class are</u>                 | 6. <u>Live oak - Q. virginiana</u>      |
| 2. <u>dominant - no single</u>                | 7. <u>White oak - Q. alba</u>           |
| 3. <u>species dominates -</u>                 | 8. <u>Southern red oak - Q. falcata</u> |
| 4. <u>species present:</u>                    | 9. _____                                |
| 5. <u>Water oak - <sup>Quercus</sup>nigra</u> | 10. _____                               |

Secondary Species:

- |  |   |
|--|---|
| 1. <u>Sweetgum - <sup>Liquidambar</sup>styraciflua</u> | 6. <u>Hickory - Carya sp.</u>             |
| 2. <u>Loblolly Pine - Pinus taeda</u>                  | 7. <u>Magnolia - Magnolia grandifolia</u> |
| 3. <u>Sourwood - Oxydendron</u>                        | 8. <u>Sweetbay - Magnolia virginiana</u>  |
| 4. <u>Red Maple - Acer rubrum</u>                      | 9. <u>Holly - Ilex opaca</u>              |
| 5. <u>Black Cherry - Prunus<br/>serotina</u>           | 10. _____                                 |



Saplings/Shrubs:

Dominant Species:

1. Pyracantha - <sup>Cotoneaster</sup> pyracantha 6. \_\_\_\_\_
2. Privet - Ligustrum vulgare 7. \_\_\_\_\_
3. Red Cedar - Juniperus 8. \_\_\_\_\_
4. virginiana 9. \_\_\_\_\_
5. These are dominant in 10. \_\_\_\_\_  
disturbed areas

Secondary Species:

1. Huckleberry - Gaylussacia<sup>sp.</sup> 6. Beautyberry - Callicarpa americana
2. Blueberry - Vaccinium sp. 7. Silverberry - Elaeagnus  
pungens
3. Red Bay - Persea borbonia 8. \_\_\_\_\_
4. Sweet myrtle - <sup>Myrica</sup> caribaea 9. \_\_\_\_\_
5. Dogwood - Cornus 10. \_\_\_\_\_  
florida

Woody Vines:

Dominant Species:

1. none dominant 6. \_\_\_\_\_
2. \_\_\_\_\_ 7. \_\_\_\_\_
3. \_\_\_\_\_ 8. \_\_\_\_\_
4. \_\_\_\_\_ 9. \_\_\_\_\_
5. \_\_\_\_\_ 10. \_\_\_\_\_

Secondary Species:

1. Greenbrier <sup>Smilax</sup> rotundifolia 6. \_\_\_\_\_
2. ~~Pole~~ Bullbrier - Smilax 7. \_\_\_\_\_  
bona-nox
3. \_\_\_\_\_ 8. \_\_\_\_\_
4. \_\_\_\_\_ 9. \_\_\_\_\_
5. \_\_\_\_\_ 10. \_\_\_\_\_

Herbs:

Dominant Species:

- |                         |           |
|-------------------------|-----------|
| 1. _____                | 6. _____  |
| 2. <u>none dominant</u> | 7. _____  |
| 3. _____                | 8. _____  |
| 4. _____                | 9. _____  |
| 5. _____                | 10. _____ |

Secondary Species: little vegetation on forest floor

- |   |           |
|---|-----------|
| 1. <u>Partridgeberry</u> - <u>repens</u> <sup>Mitchella</sup> | 6. _____  |
| 2. <u>Ebony Spleenwort</u> - <u>tan</u> <sup>Asplenium</sup>  | 7. _____  |
| 3. <u>Cane</u> - <u>Arundinaria</u> <sup>Switch</sup>         | 8. _____  |
| 4. _____  | 9. _____  |
| 5. _____  | 10. _____ |

Birds: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

Species	Sex	Feeding	Nesting	Approx. No.
1. <u>Catbird</u> - <u>carolinensis</u>		<u>Dumetella</u>		<u>Flicker</u> - <u>Colaptes auratus</u>
2. <u>Pileated woodpecker</u> - <u>pileatus</u>		<u>Dryocopus</u>		<u>Swamp Sparrow</u> - <u>melospiza georgiana</u>
3. <u>Yellow-bellied Sapsucker</u> - <u>varius</u>		<u>Sphyrapicus</u>		<u>Mourning Dove</u> - <u>zenaida macroura</u>
4. <u>Wood Thrush</u> - <u>mustelina</u>		<u>Hylocichla</u>		<u>Robin</u> - <u>turdus migratorius</u>
5. <u>Carolina Wren</u> - <u>ludoviciana</u>		<u>Thryothorus</u>		<u>Osprey</u> - <u>haliaeetus</u> <sup>Pandion</sup> <u>over creek</u>
6. <u>Phoebe</u> - <u>Sayornis phoebe</u>				<u>Pied-bill Grebe</u> - <u>podilymbus podiceps</u>
7. <u>Common Crow</u> - <u>brachyrhynchos</u>		<u>Corvus</u>		<u>Brown Pelican</u> - <u>pelecanus occidentalis</u>
8. <u>Myrtle Warbler</u> - <u>dendroica coronata</u>				<u>Herring Gull</u> - <u>larus argentatus</u>
9. <u>Mockingbird</u> - <u>polyglottas</u>		<u>Mimus</u>		<u>Laughing Gull</u> - <u>larus atricilla</u>
<u>Blue Jay</u> - <u>cyanostris cristata</u>				<u>Great blue Heron</u> - <u>ardea herodias</u>
<u>Carolina Chickadee</u> - <u>carolinensis</u>		<u>Parus</u>		<u>Kingfisher</u> - <u>megaceryle alcyon</u>
<u>Red-bellied woodpecker</u> - <u>carolinus</u>		<u>melanerpes</u>		

Cedar waxwing - *Bombycilla cedrorum*  
Red-tailed Hawk - *Buteo jamaicensis*  
Buteo hawk - *Buteo sp.*

10. \_\_\_\_\_

Mammals: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
1.	Grey Squirrel	-	<i>Sciurus carolinensis</i>	
2.	Raccoon	-	Procyon lotor	tracks
3.	Opposum	-	<i>Didelphis</i> marsupialis	tracks
4.	Deer	-	<i>Odocoileus</i> virginianus	tracks
5.				
6.				
7.				
8.				
9.				
10.				

Reptiles and Amphibians: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
1.	Box turtle	-	<i>Terrepena carolina</i>	from shell
2.	Anole	-	<i>Anole carolinensis</i>	
3.	Small snake	-		observed tail only, iden. not possible
4.				
5.				
6.				

- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_

**Miscellaneous Notes:**

ECOLOGICAL EVALUATION  
FIELD DATA SHEET - TERRESTRIAL

Project Name: Habitat Evaluation

Location: MCB Camp Levine, Jacksonville, NC

Date: 12/6/94

Sampling Location: Tarawa Terrace

Data Collected By: LSS, CDC

Habitat Type: marsh

Vegetation: no trees present, shrubs and emergent  
vegetation

Trees:

Dominant Species:

- |                |           |
|----------------|-----------|
| 1. _____       | 6. _____  |
| 2. _____       | 7. _____  |
| 3. <u>none</u> | 8. _____  |
| 4. _____       | 9. _____  |
| 5. _____       | 10. _____ |

Secondary Species:

- |                |           |
|----------------|-----------|
| 1. _____       | 6. _____  |
| 2. _____       | 7. _____  |
| 3. <u>none</u> | 8. _____  |
| 4. _____       | 9. _____  |
| 5. _____       | 10. _____ |

Saplings/Shrubs:

Dominant Species:

- |                         |           |
|-------------------------|-----------|
| 1. _____                | 6. _____  |
| 2. _____                | 7. _____  |
| 3. <u>none dominant</u> | 8. _____  |
| 4. _____                | 9. _____  |
| 5. _____                | 10. _____ |

Secondary Species:

- |   |           |
|---|-----------|
| 1. <u>Sweet myrtle - <sup>myrica</sup> Carolina</u>       | 6. _____  |
| 2. <u>groundsel-tree <sup>Baccharis</sup> halimifolia</u> | 7. _____  |
| 3. <u>live oak - <sup>Quercus</sup> virginiana</u>        | 8. _____  |
| 4. <u>red cedar - <sup>Juniperus</sup> virginiana</u>     | 9. _____  |
| 5. _____  | 10. _____ |

Woody Vines:

Dominant Species:

- |                |           |
|----------------|-----------|
| 1. _____       | 6. _____  |
| 2. <u>none</u> | 7. _____  |
| 3. _____       | 8. _____  |
| 4. _____       | 9. _____  |
| 5. _____       | 10. _____ |

Secondary Species:

- |                |           |
|----------------|-----------|
| 1. _____       | 6. _____  |
| 2. _____       | 7. _____  |
| 3. <u>none</u> | 8. _____  |
| 4. _____       | 9. _____  |
| 5. _____       | 10. _____ |

Herbs:

Dominant Species:

1. Saltmarsh cordgrass - 6. \_\_\_\_\_
2. Spartina alterniflora 7. \_\_\_\_\_
3. \_\_\_\_\_ 8. \_\_\_\_\_
4. \_\_\_\_\_ 9. \_\_\_\_\_
5. \_\_\_\_\_ 10. \_\_\_\_\_

Secondary Species: Typha angustifolia

1. narrow leaved cattail - 6. \_\_\_\_\_
2. big cordgrass - <sup>Spartina</sup> Cynosurus 7. \_\_\_\_\_
3. grasses 8. \_\_\_\_\_
4. \_\_\_\_\_ 9. \_\_\_\_\_
5. \_\_\_\_\_ 10. \_\_\_\_\_

Birds: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Sex</u>	<u>Feeding</u>	<u>Nesting</u>	<u>Approx. No.</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	<u>birds included under</u>			
4.	<u>dec. forest -</u>			
5.	_____	_____	_____	_____
6.	<u>birds on creek observed from this marsh -</u>			
7.	<u>grebe, gulls, heron, osprey</u>			
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____

10. \_\_\_\_\_

Mammals: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
1.				
2.				
3.				
4.		mammals included under		
5.		dec. forest		
6.				
7.				
8.				
9.				
10.				

Reptiles and Amphibians: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
1.				
2.				
3.		reptiles & amp. included under		
4.		dec. forest		
5.				
6.				



- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_

**Miscellaneous Notes:**

ECOLOGICAL EVALUATION  
FIELD DATA SHEET - TERRESTRIAL

Project Name: Habitat Evaluation

Location: MCB Camp Lejeune, Jacksonville, NC

Date: 12/6/94

Sampling Location: Tarawa Terrace

Data Collected By: ZSS, CDC

Habitat Type: open area

Vegetation: sparse - limited to grasses and  
seedling/sapling Loblollies

Trees:

Dominant Species:

- |                |           |
|----------------|-----------|
| 1. _____       | 6. _____  |
| 2. _____       | 7. _____  |
| 3. <u>none</u> | 8. _____  |
| 4. _____       | 9. _____  |
| 5. _____       | 10. _____ |

Secondary Species:

- |                |           |
|----------------|-----------|
| 1. _____       | 6. _____  |
| 2. _____       | 7. _____  |
| 3. <u>none</u> | 8. _____  |
| 4. _____       | 9. _____  |
| 5. _____       | 10. _____ |

**Saplings/Shrubs:**

**Dominant Species:**

- |                                       |           |
|---------------------------------------|-----------|
| 1. _____                              | 6. _____  |
| 2. _____                              | 7. _____  |
| 3. <i>loblolly pine - Pinus taeda</i> | 8. _____  |
| 4. _____                              | 9. _____  |
| 5. _____                              | 10. _____ |

**Secondary Species:**

- |                |           |
|----------------|-----------|
| 1. _____       | 6. _____  |
| 2. _____       | 7. _____  |
| 3. <i>none</i> | 8. _____  |
| 4. _____       | 9. _____  |
| 5. _____       | 10. _____ |

**Woody Vines:**

**Dominant Species:**

- |                |           |
|----------------|-----------|
| 1. _____       | 6. _____  |
| 2. _____       | 7. _____  |
| 3. _____       | 8. _____  |
| 4. <i>none</i> | 9. _____  |
| 5. _____       | 10. _____ |

**Secondary Species:**

- |                |           |
|----------------|-----------|
| 1. _____       | 6. _____  |
| 2. _____       | 7. _____  |
| 3. <i>none</i> | 8. _____  |
| 4. _____       | 9. _____  |
| 5. _____       | 10. _____ |

Herbs:

Dominant Species:

- |                 |           |
|-----------------|-----------|
| 1. _____        | 6. _____  |
| 2. <i>grass</i> | 7. _____  |
| 3. _____        | 8. _____  |
| 4. _____        | 9. _____  |
| 5. _____        | 10. _____ |

Secondary Species:

- |          |           |
|----------|-----------|
| 1. _____ | 6. _____  |
| 2. _____ | 7. _____  |
| 3. _____ | 8. _____  |
| 4. _____ | 9. _____  |
| 5. _____ | 10. _____ |

Birds: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Sex</u>	<u>Feeding</u>	<u>Nesting</u>	<u>Approx. No.</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	<i>listed with deciduous forest</i>			
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____

10. \_\_\_\_\_

Mammals: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
----------------	-----------------	-------------	-----------------------	------------

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. *listed with deciduous forest*

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

Reptiles and Amphibians: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
----------------	-----------------	-------------	-----------------------	------------

1. \_\_\_\_\_

2. \_\_\_\_\_

3. *listed with deciduous forest*

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

**Miscellaneous Notes:**

ECOLOGICAL EVALUATION  
FIELD DATA SHEET - TERRESTRIAL

Project Name: Habitat Evaluation

Location: MCB Camp Lejeune, Jacksonville, NC

Date: 12/6/94

Sampling Location: Tarawa Terrace

Data Collected By: LSS, CDC

Habitat Type: wooded wetland

Vegetation: deciduous trees - exhibiting adaptations (aerial roots, buttressed trunks) for wet conditions

Trees:

Dominant Species:

1. Sweetbay - Magnolia 6. \_\_\_\_\_
2. \_\_\_\_\_ virginiana - 7. \_\_\_\_\_
3. in some areas 8. \_\_\_\_\_
4. \_\_\_\_\_ 9. \_\_\_\_\_
5. \_\_\_\_\_ 10. \_\_\_\_\_

Secondary Species:

1. Tulip Poplar - tulipifera <sup>Liriodendron</sup> 6. Black gum - Nyssa sylvatica
2. Rd maple - acer <sup>rubrum</sup> 7. \_\_\_\_\_
3. Sweet gum - styraciflua <sup>Liquidambar</sup> 8. \_\_\_\_\_
4. Red bay - Persea borbonia 9. \_\_\_\_\_
5. Loblolly - taeda <sup>Pinus</sup> 10. \_\_\_\_\_

**Saplings/Shrubs:**

**Dominant Species:**

- |                    |           |
|--------------------|-----------|
| 1. _____           | 6. _____  |
| 2. _____           | 7. _____  |
| 3. <u>none</u>     | 8. _____  |
| 4. <u>dominant</u> | 9. _____  |
| 5. _____           | 10. _____ |

**Secondary Species:**

- |                                     |           |
|-------------------------------------|-----------|
| 1. <u>blueberry - Vaccinium sp.</u> | 6. _____  |
| 2. _____                            | 7. _____  |
| 3. _____                            | 8. _____  |
| 4. _____                            | 9. _____  |
| 5. _____                            | 10. _____ |

**Woody Vines:**

**Dominant Species:**

- |                         |           |
|-------------------------|-----------|
| 1. _____                | 6. _____  |
| 2. <u>none dominant</u> | 7. _____  |
| 3. _____                | 8. _____  |
| 4. _____                | 9. _____  |
| 5. _____                | 10. _____ |

**Secondary Species:**

- |                                      |           |
|--------------------------------------|-----------|
| 1. <u>Poison Ivy - Rhus radicans</u> | 6. _____  |
| 2. <u>wild Grape - Vitis sp.</u>     | 7. _____  |
| 3. _____                             | 8. _____  |
| 4. _____                             | 9. _____  |
| 5. _____                             | 10. _____ |



Herbs:

Dominant Species:

- |                         |           |
|-------------------------|-----------|
| 1. _____                | 6. _____  |
| 2. _____                | 7. _____  |
| 3. <u>none dominant</u> | 8. _____  |
| 4. _____                | 9. _____  |
| 5. _____                | 10. _____ |

Secondary Species:

- |                                   |           |
|-----------------------------------|-----------|
| 1. <u>sparse - limited to</u>     | 6. _____  |
| 2. <u>clumps of</u>               | 7. _____  |
| 3. <u>Cinnamon fern - Osmunda</u> | 8. _____  |
| 4. _____ <u>cinnamomea</u>        | 9. _____  |
| 5. _____                          | 10. _____ |

Birds: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Sex</u>	<u>Feeding</u>	<u>Nesting</u>	<u>Approx. No.</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	<u>listed w. deciduous forest</u>			
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____

10. \_\_\_\_\_

Mammals: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
----------------	-----------------	-------------	-----------------------	------------

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. *listed with deciduous forest*

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

Reptiles and Amphibians: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
----------------	-----------------	-------------	-----------------------	------------

1. \_\_\_\_\_

2. \_\_\_\_\_

3. *listed with deciduous forest*

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_

**Miscellaneous Notes:**

**APPENDIX O.2**  
**SURFACE WATER, SEDIMENT, AND**  
**BENTHIC MACROINVERTEBRATE**

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**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-WT-SW/SD01 Date: 6-23-94 (SD) Time: 1930 (SD)  
 Samplers: AMB, JEZ Date: 6-23-94 (SD) Time: 1945 (SD)  
 Water Body: West Trib to Northeast Creek State: NC County: Onslow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dip method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: \_\_\_\_\_

Estimated Stream Width: 5-7 ft Est. Stream Depth: 6<sup>0.5</sup> ft Riffle: - ft Run: 100% Pool: - ft

Stream Type: Cold Water Warm Water Velocity: slow Channelized: Yes  No \_\_\_\_\_

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SAND, fine grained w/ little silt, 0 to 4"  
SANDY CLAY fine grained 4" to 6"

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
Surface 6"	20.6	5.56	3.6	34.6	0

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: \*

Weather Conditions: \_\_\_\_\_ Tide: NA In Out

Comments: \* water has reddish/orange color w/ some precipitate

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-WT-SW/SD02 Date: 6-23-94 (sw) Time: 1830 (sw)  
 Samplers: A.M.B., J.E.R. Date: 6-23-94 (SD) Time: 1855 (SD)  
 Water Body: west trib to northeast creek State: NC County: Rowan

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dip method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 3-10<sup>ft</sup> Est. Stream Depth: 0.4 ft Riffle: 506 ft Run: 506 ft Pool: — ft

Stream Type: Cold Water Warm Water Velocity: fast Channelized: Yes  No

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate: sand

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SAND, fine grained w/ little silt 0 to 3"  
Root material (peat like) 3" to 6"

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>Surface</u>	<u>20.3</u>	<u>5.79</u>	<u>9.1</u>	<u>161</u>	<u>0</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: None

Weather Conditions: \_\_\_\_\_ Tide: NA In Out

Comments: # Channel ~ 10' wide water at sample location ~ 3' wide

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 7-WT-SW/SD03 Date: 6/24/94 (sw) Time: 1105 (sw)  
 Samplers: AMB, JFZ Date: 6-24-94 (SA) Time: 1120 (SD)  
 Water Body: West Trib. to Northeast Creek State: NC County: Orange

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water  
 SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dip Method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: 10-15 ft Est. Stream Depth: 2.0 ft Riffle: - ft Run: 100% ft Pool: - ft

Stream Type: Cold Water Warm Water Velocity: Neg Channelized: Yes - No ✓

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNH

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SILTY SAND, fine grained

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
Surface	28.6	7.33	5.20	26,900	23
2.0'	29.1	7.80	4.90	31,100	28.5

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: None brown/yellow

Weather Conditions: Partly cloudy, warm, humid, breezy, temp in 80's Tide: In Out

Comments: 35' upstream (northerly direction) from mouth.

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 7-DDSW/S001 Date: 6-22-94 (SW) Time: 1242 (SW)  
 Samplers: AMB, JFZ Date: 6-22-94 (SD) Time: 1255 (SD)  
 Water Body: Ditch to lead to Northeast Creek State: NC County: Onslow  
 Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water  
 SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dip method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 4 ft Est. Stream Depth: 7 ft Riffle: 0% ft Run: 50% ft Pool: 50% ft

Stream Type: Cold Water Warm Water Velocity: NEG Channelized: Yes  No \_\_\_\_\_

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: Silty SAND, fine grained w/ trace medium grained SAND.

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>Bottom</u>	<u>23</u>	<u>5.83</u>	<u>0.87</u>	<u>199</u>	<u>0</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Clear

Weather Conditions: Clear, (Sunny) hot/humid, temp 95° Tide: NA In Out

Comments: \_\_\_\_\_



SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 7-DOSW/SD02 Date: 6-22-94 (SW) Time: 1402 (SW)  
 Samplers: AMB, JEL Date: 6-22-94 (SD) Time: 1420 (SD)  
 Water Body: Ditch to W Tob to Northwest State: NC County: Durham  
 Sample Type: Fish brook Benthic Macroinvertebrate Sediment Surface Water  
 SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dip method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 1-2 ft Est. Stream Depth: 1-2 in Riffle: 0% Run: 80% Pool: 20%

Stream Type: Cold Water Warm Water Velocity: None Channelized: Yes  No \_\_\_\_\_

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: silty-sand, fine grained w/medium grained sand  
trace

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>Bottom</u>	<u>24.2</u>	<u>5.61</u>	<u>5.6</u>	<u>125</u>	<u>0</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: clear

Weather Conditions: clear, (sunny) hot, humid, temp 95° Tide: NA In Out

Comments: 4 ft channel saturated soil

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-ET-SW/SD01 Date: 6-23-94 (Sat) Time: 1303 (Water)  
 Samplers: AMB, JEZ Date: 6-23-94 (SO) Time: 1320 (SO)  
 Water Body: East 1/2 to Northeast Creek State: NC County: Onslow  
 Sample Type: Fish Benthic Macroinvertebrate (Sediment) (Surface Water)  
 SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer (Sediment Corer) Spoon Other: Dip method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: (Forest) Urban Industrial Other: \_\_\_\_\_  
 Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: 10 ft Est. Stream Depth: 0.5 ft Riffle: — ft Run: 100% Pool: — ft  
 Stream Type: Cold Water (Warm Water) Velocity: tidal Channelized: Yes  No   
 Canopy Cover: Open Partly Open Partly Shaded (Shaded)

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical (Anaerobic) Other: \_\_\_\_\_  
 Sediment Oils: (Absent) Slight Moderate Profuse HNA  
 Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA  
 Sediment Description: ROTTED material w/ little to some silty SAND  
fine grained

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>6"</u>	<u>26.4</u>	<u>6.95</u>	<u>1.1</u>	<u>12500</u>	<u>10</u>

Water Odors: (Normal) Sewage Petroleum Chemical Other: \_\_\_\_\_  
 Water Surface Oils: Slick Sheen (None) Secchi: NA ft.  
 Turbidity: Clear (Slightly Turbid) Turbid Opaque Water Color: NONE  
 Weather Conditions: Partly cloudy, hot, humid <sup>Temp 90's</sup> Tide: (In) Out

Comments: distance from drainage culvert is 50'  
down stream.

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-ET-SW/SD02 Date: 6-24-94(Sa) Time: 1000(Sa)  
 Samplers: AMB, JER Date: 6-24-94(Sa) Time: 1020(Sa)  
 Water Body: East Trib to Northwest Creek State: NC County: Oswego

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water  
 SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dip Method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 20 ft Est. Stream Depth: 3.0 ft Riffle: — ft Run: 100% Pool: — ft

Stream Type: Cold Water Warm Water Velocity: neg Channelized: Yes — No ✓

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNH

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: N/A Replicate #2: N/A Replicate #3: N/A

Sediment Description: Top 1" - silt, remainder (Rooted material - root-like)

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
Surface	28.2	7.42	3.3	29,600	26
3.0'	28.2	7.49	2.5	31,000	27.8

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: N/A ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: None

Weather Conditions: Partly cloudy, warm, humid temp in 80's Tide: In Out

Comments: ~ 20' upstream from mouth

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-NC-SW/SD01 Date: 6-24-94 (su) Time: 1212 (su)  
 Samplers: AMB, JEZ Date: 6-24-94 (SD) Time: 1232 (SD)  
 Water Body: Northeast Creek State: NC County: Darlow  
 Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water  
 SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Core Spoon Other: Dip Method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 1/2 mi ft Est. Stream Depth: \* ft Riffle: - ft Run: 100% ft Pool: - ft

Stream Type: Cold Water Warm Water Velocity: None Channelized: Yes - No ✓

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: Top One inch - silt - root (rooted material - root like)

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>mid</u>	<u>29.5</u>	<u>7.53</u>	<u>3.8</u>	<u>3,200</u>	<u>28.8</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: some Brown/ Yellow

Weather Conditions: partly cloudy, hot, humid 90's Tide: In Out

Comments: \*collected sample in 1' of water 1' away from shore - depth of creek unknown

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-UCOZ-SW/SD Date: 6-26-94 (SW) Time: 1210 (SW)  
 Samplers: JEZ, AMB Date: 6-26-94 (SD) Time: \_\_\_\_\_  
 Water Body: Northwest Creek State: NC County: Quail

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dip method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: \_\_\_\_\_

Estimated Stream Width: 1/2 mile ft Est. Stream Depth: \_\_\_\_\_ ft Riffle: \_\_\_\_\_ ft Run: 100 ft Pool: \_\_\_\_\_ ft

Stream Type: Cold Water Warm Water Velocity: 1.6 ft/s Channelized: Yes \_\_\_\_\_ No

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SILTY SAND, fine grained w/ rooted material (peat like)

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
Surface	27.9	7.22	.1	25,900	27

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Brown/Yellow

Weather Conditions: partly cloudy, warm, humid, breezy temp in 80's Tide: In Out

Comments: sample location is 20' downstream of unnamed tributary

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-NC03-SW/SD Date: 6-26-94 (SW) Time: 11:30 (SW)

Samplers: JEZ, AMB Date: 6-26-94 (SD) Time: \_\_\_\_\_

Water Body: Northeast Creek State: NC County: Onslow

Sample Type: Fish Benthic Macroinvertebrate Sediment ? Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar - Kemmerer Sediment Corer Spoon Other: Dip method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: 1/2 mile Est. Stream Depth: \_\_\_\_\_ ft Riffle: \_\_\_\_\_ ft Run: 1006 ft Pool: \_\_\_\_\_ ft

Stream Type: Cold Water Warm Water Velocity: Visible Channelized: Yes \_\_\_ No

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SAND, fine grained w/ trace silt and rooted, woody material (peat like)

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>surface</u>	<u>28.7</u>	<u>7.66</u>	<u>3.3</u>	<u>30,000</u>	<u>27</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Brown/Yellow

Weather Conditions: partly cloudy, warm humid Breezy, temp in 80's Tide: In Out

Comments: \_\_\_\_\_

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-NC04-SW/SD Date: 6-26-94 (SW) Time: 1005  
 Samplers: JEZ, AMB Date: 6-26-94 (SN) Time: \_\_\_\_\_  
 Water Body: Northeast Creek State: NC County: Onslow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon ...Other: Dip Net Prod.

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 1/2 mi ft Est. Stream Depth: \_\_\_\_\_ ft Riffle: \_\_\_\_\_ ft Run: 100% ft Pool: \_\_\_\_\_ ft

Stream Type: Cold Water Warm Water Velocity: Measurable Channelized: Yes \_\_\_\_\_ No X

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SAND, fine to medium grained w/ trace silt

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>surface</u>	<u>28.6</u>	<u>7.95</u>	<u>6.9</u>	<u>28,400</u>	<u>25</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Not Brown/Yellow

Weather Conditions: partly cloudy, warm, bit humid, breezy, temp in 80's Tide: In Out

Comments: Location is 20' downstream from west Tributary

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-NC-SW/SD05 Date: 6-24-94 Time: 1302 (SW)  
 Samplers: AMB, JFZ Date: 6-24-94 Time: 1323 (SD)  
 Water Body: Northeast Creek State: NC County: Onslow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water  
 SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dip Method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_  
 Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 1/2 mi ft Est. Stream Depth: \* ft Riffle: - ft Run: 100% ft Pool: - ft  
 Stream Type: Cold Water Warm Water Velocity: Neg Channelized: Yes - No ✓  
 Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_  
 Sediment Oils: Absent Slight Moderate Profuse HNu  
 Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA  
 Sediment Description: Top 0.1m - 1cm (Silt), Rest (dark like material - Post like)

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>mid</u>	<u>30.3</u>	<u>7.89</u>	<u>4.9</u>	<u>31,800</u>	<u>28.5</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_  
 Water Surface Oils: Slick Sheen None Secchi: NA ft.  
 Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: None  
 Weather Conditions: Partly cloudy, breezy, hot, humid 90's Tide: In Out

Comments: \*collected sample in 1' of water 1' from shore  
Depth of creek unknown



**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-NC-SW/5006 Date: 6-24-94 Time: 1350 (sw)  
 Samplers: AMB, JEZ Date: 6-24-94 Time: 1403 (SD)  
 Water Body: Northeast Creek State: NC County: Onslow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dip Method

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 1/2 mi ft Est. Stream Depth: 4 ft Riffle: - ft Run: 100% ft Pool: - ft

Stream Type: Cold Water Warm Water Velocity: Neg Channelized: Yes - No X

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNK

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SAND, fine to medium grained w/ trace silt and shell material

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>mid</u>	<u>30.1</u>	<u>8.15</u>	<u>2.4</u>	<u>31,800</u>	<u>29.5</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: None

Weather Conditions: Partly cloudy, breezy hot, humid 70's Tide: In Out

Comments: \* collected sample in 4' of water 1' from shore - Depth of Creek is unknown

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-MA-SD01 Date: 6/23/94 Time: 0920  
 Samplers: AMB, JEZ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Water Body: NA State: NC County: Darlow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: \_\_\_\_\_

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: NA

Aquatic Vegetation: NA

Estimated Stream Width: NA ft Est. Stream Depth: NA ft Riffle: NA ft Run: NA ft Pool: NA ft

Stream Type: Cold Water Warm Water Velocity: NA Channelized: Yes No

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNU

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SILTY SAND, fine grained. Water table encountered at 4" (bgs).

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NA

Weather Conditions: Clear (Sunny) hot, humid temp 90's Tide: In Out

Comments: \* Sediment corer pushed sample into the ground - therefore a stainless steel spoon was used to collect the sample

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-MA-SD02 Date: 6-23-94 Time: 1038  
 Samplers: AMB, JEZ Date: — Time: —  
 Water Body: NA State: NC County: aslow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: —

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: —

Shore Vegetation: NA

Aquatic Vegetation: NA

Estimated Stream Width: NA ft Est. Stream Depth: NA ft Riffle: NA ft Run: NA ft Pool: NA ft

Stream Type: Cold Water ~~Warm Water~~ Velocity: NA Channelized: Yes ~~No~~

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: —

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: Silty SAND, fine grained. water table is confirmed at 1.0' (bgs)

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

Water Odors: Normal ~~Sewage~~ ~~Petroleum~~ Chemical Other: —

Water Surface Oils: Stick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NA

Weather Conditions: clear, (sunny) hot, humid 90's Tide: In ~~Out~~

Comments: —

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-MA-5003 Date: 6-23-74 Time: 1410  
 Samplers: NMA, JER Date: — Time: —  
 Water Body: NA State: NC County: Onslow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: —

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: —

Shore Vegetation: —

Aquatic Vegetation: NA

Estimated Stream Width: NA ft Est. Stream Depth: NA ft Riffle: NA ft Run: NA ft Pool: NA ft

Stream Type: ~~Cold Water~~ ~~Warm Water~~ Velocity: NA Channelized: Yes ~~No~~

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: —

Sediment Oils: Absent Slight Moderate Profuse H2S

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SILTY SAND, fine grained w/ trace rooted material, water at 6"

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

Water Odors: ~~Normal~~ ~~Sewage~~ ~~Petroleum~~ ~~Chemical~~ Other: —

Water Surface Oils: ~~Slick~~ ~~Sheen~~ ~~None~~ Secchi: NA ft.

Turbidity: Clear ~~Slightly Turbid~~ ~~Turbid~~ ~~Opaque~~ Water Color: NA

Weather Conditions: overcast, windy, thunder Tide: In ~~Out~~

Comments: —

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-MA-SD04 Date: 6-23-94 Time: 1228  
 Samplers: AMB, JEL Date: — Time: —  
 Water Body: NA State: MA, NC County: Owens

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: —

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: —

Shore Vegetation: 1

Aquatic Vegetation: NA

Estimated Stream Width: NA ft Est. Stream Depth: NA ft Riffle: NA ft Run: NA ft Pool: NA ft

Stream Type: Cold Water ~~Warm Water~~ Velocity: NA Channelized: Yes ~~No~~

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: —

Sediment Oils: Absent Slight Moderate Profuse HNU

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: SILTY SAND, fine grained. water table is  
confined 1' (bgs)

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

Water Odors: Normal Sewage Petroleum Chemical Other: —

Water Surface Oils: Slack Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NA

Weather Conditions: clear, (sunny), hot, humid <sup>temp</sup> 90's Tide: In ~~Out~~

Comments: pipeline is 10' due east of sample location

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 7-WT 01 BN Date: 6-25-94 Time: 1642

Samplers: A.M.B., J.E.Z. Date: \_\_\_\_\_ Time: \_\_\_\_\_

Water Body: West Trib to Northcoast State: NC County: Oswalo

Sample Type: Fish  Benthic Macroinvertebrate  Sediment  Surface Water

SAMPLING EQUIPMENT: Seine  Gill Net  Ponar  Kemmerer  Sediment Corer  Spoon  Other: \_\_\_\_\_

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest  Urban  Industrial  Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: 5-7 ft Est. Stream Depth: 0.5 ft Riffle: - ft Run: 1006 ft Pool: - ft

Stream Type: Cold Water  Warm Water  Velocity: slow Channelized: Yes  No

Canopy Cover: Open  Partly Open  Partly Shaded  Shaded

Sediment/Substrate:

Sediment Odors: Normal  Sewage  Petroleum  Chemical  Anaerobic  Other: \_\_\_\_\_

Sediment Oils: Absent  Slight  Moderate  Profuse  HNu

Ponar Grab: Number of Jars Filled with Sediments \_\_\_\_\_ Replicate: #1: 1 Replicate #2: 1 Replicate #3: 1

Sediment Description: SILTY CLAY w/ trace fine SAND. Medium to coarse gravel. Worms are noted

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>Surface</u>	<u>21.1</u>	<u>5.49</u>	<u>2.8</u>	<u>35.3</u>	<u>0</u>

Water Odors: Normal  Sewage  Petroleum  Chemical  Other: \_\_\_\_\_

Water Surface Oils: Slick  Sheen  None  Secchi: NA ft.

Turbidity: Clear  Slightly Turbid  Turbid  Opaque  Water Color: 4

Weather Conditions: \_\_\_\_\_ Tide: NA in Out

Comments: \* Water has a reddish/orange color w/ some precipitate

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-WT 02 BN Date: 6-25-94 Time: 1604  
 Samplers: AMB, JEL Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Water Body: West Trib to Northwest Creek State: NC County: Cashier

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: \_\_\_\_\_  
Pedike

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: 3-10 ft Est. Stream Depth: 0.4 ft Riffle: 506 ft Run: 506 ft Pool: — ft

Stream Type: Cold Water Warm Water Velocity: fast Channelized: Yes ✓ No \_\_\_\_\_

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: 1 Replicate #2: 1 Replicate #3: 1

Sediment Description: SAND, medium to coarse grained w/ little gravel and fine grained SAND 20% (Seived out) worms are noted.

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>Surface</u>	<u>21.4</u>	<u>5.63</u>	<u>4.0</u>	<u>150</u>	<u>0</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NA

Weather Conditions: \_\_\_\_\_ Tide: NA In Out

Comments: \_\_\_\_\_

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-WT03-BN Date: 6/25/94 Time: 0950  
 Samplers: AMB, JFZ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Water Body: West Trib to Northeast Creek State: NC County: Ashe

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Pellets Kemmerer Sediment Corer Spoon Other: \_\_\_\_\_

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: 10-15 ft Est. Stream Depth: 2 ft Riffle: - ft Run: 1006 ft Pool: - ft

Stream Type: Cold Water Warm Water Velocity: 1.4 Channelized: Yes No

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: 1 Replicate #2: 1 Replicate #3: 1

Sediment Description: SILTY SAND, fine grained. Some organic material (woody debris), worms are present. Little <sup>COARSE</sup> medium grained SAND

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>Surface</u>	<u>30.1</u>	<u>7.55</u>	<u>3.5</u>	<u>31,200</u>	<u>27</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: \_\_\_\_\_ ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Brown/Yellow

Weather Conditions: \_\_\_\_\_ Tide: In Out

Comments: location adjacent to 7-WT-SW(S)D03



**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-NC01-BN Date: 6/25/94 Time: 1225  
 Samplers: AMB, JER Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Water Body: Northeast Creek State: NC County: Onslow

Sample Type: Fish  **Benthic Macroinvertebrate**  Sediment  Surface Water

SAMPLING EQUIPMENT: Seine  Gill Net  **Ponar**  Kemmerer  Sediment Corer  Spoon  Other: \_\_\_\_\_  
*white*

Riparian Zone/Instream Features

Predominant Surrounding Land Use: **Forest**  Urban  **Industrial**  Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: <sup>112 m/s</sup> ~~100 ft~~ Est. Stream Depth: ~~1.5~~ ft Riffle: ~~1~~ ft Run: 1006 ft Pool: \_\_\_\_\_ ft

Stream Type: Cold Water  **Warm Water**  Velocity: 1.5 Channelized: Yes  No

Canopy Cover: **Open**  Partly Open  Partly Shaded  Shaded

Sediment/Substrate:

Sediment Odors: **Normal**  Sewage  Petroleum  Chemical  Anaerobic  Other: \_\_\_\_\_

Sediment Oils: **Absent**  Slight  Moderate  Profuse  HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: 6 Replicate #2: 3 Replicate #3: 7

Sediment Description: <sup>100%</sup> organic material (wood) and (rooted material)  
all silt. worms are noted

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>Surface</u>	<u>30.1</u>	<u>7.41</u>	<u>.8</u>	<u>32,100</u>	<u>29</u>

Water Odors: **Normal**  Sewage  Petroleum  Chemical  Other: \_\_\_\_\_

Water Surface Oils: Slick  Sheen  **None**  Secchi: NA ft.

Turbidity: Clear  Slightly Turbid  **Turbid**  Opaque  Water Color: Brown / Yellow

Weather Conditions: \_\_\_\_\_ Tide: In  Out

Comments: located adjacent to station 7-NC SW/SD 01  
\* Depth not measured due to large size of creek

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-NC02-BN Date: 6/25/94 Time: 1140  
 Samplers: AMB, JEZ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Water Body: Northeast Creek State: NC County: Onslow

Sample Type: Fish  Benthic Macroinvertebrate  Sediment  Surface Water

SAMPLING EQUIPMENT: Seine  Gill Net  Ponar  Kemmerer  Sediment Corer  Spoon  Other: \_\_\_\_\_  
*Petite*

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest  Urban  Industrial  Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: 1/2 mile Est. Stream Depth: \* ft Riffle: — ft Run: 100% ft Pool: — ft

Stream Type: Cold Water  Warm Water  Velocity: Negligible Channelized: Yes  No

Canopy Cover: Open  Partly Open  Partly Shaded  Shaded

Sediment/Substrate:

Sediment Odors: Normal  Sewage  Petroleum  Chemical  Anaerobic  Other: \_\_\_\_\_

Sediment Oils: Absent  Slight  Moderate  Profuse  H<sub>2</sub>Nu

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: 3 Replicate #2: 2 Replicate #3: 8

Sediment Description: SAND, fine grained w/ trace silt and organic material (woody) w/ some coarse grained SAND, worms noted

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>Surface</u>	<u>29.1</u>	<u>7.22</u>	<u>2.8</u>	<u>31,800</u>	<u>28</u>

Water Odors: Normal  Sewage  Petroleum  Chemical  Other: \_\_\_\_\_

Water Surface Oils: Slick  Sheen  None  Secchi: NA ft.

Turbidity: Clear  Slightly Turbid  Turbid  Opaque  Water Color: Brown / Yellow

Weather Conditions: \_\_\_\_\_ Tide: In  Out

Comments: location adjacent to 7-NC-SW/SD03  
\* Depth not measured due to large size of creek

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-NC03-BN Date: 6/25/94 Time: 1055  
 Samplers: AMB, JEZ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Water Body: Northeast Creek State: NC County: Onslow

Sample Type: Fish  Benthic Macroinvertebrate  Sediment  Surface Water

SAMPLING EQUIPMENT: Seine  Gill Net  Ponar  Kemmerer  Sediment Corer  Spoon  Other: \_\_\_\_\_  
*Potter*

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest  Urban  Industrial  Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: 1/2 mile Est. Stream Depth: \* ft Riffle: — ft Run: 1006 ft Pool: — ft

Stream Type: Cold Water  Warm Water  Velocity: None Channelized: Yes  No

Canopy Cover: Open  Partly Open  Partly Shaded  Shaded

Sediment/Substrate:

Sediment Odors: Normal  Sewage  Petroleum  Chemical  Anaerobic  Other: \_\_\_\_\_

Sediment Oils: Absent  Slight  Moderate  Profuse  HNu

Ponar Grab: Number of Jars Filled with Sediments \_\_\_\_\_ Replicate: #1: 1 Replicate #2: 1 Replicate #3: 1

Sediment Description: SILTY SAND, fine grained, some organic material  
(woody debris, worms are present. Little coarse grained SAND

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
Surface	30.1	7.61	2.93	32,300	29

Water Odors: Normal  Sewage  Petroleum  Chemical  Other: \_\_\_\_\_

Water Surface Oils: Slick  Sheen  None  Secchi: NA ft.

Turbidity: Clear  Slightly Turbid  Turbid  Opaque  Water Color: Brown/Yellow

Weather Conditions: \_\_\_\_\_ Tide: In  Out

Comments: location adjacent to 7-NC-SWYS D07  
\* Depth not measured due to large size of creek

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 7-WCOA-BN Date: 6-25-94 Time: 1330  
 Samplers: AMB, TEZ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Water Body: Northeast Creek State: NC County: Onslow

Sample Type: Fish  Benthic Macroinvertebrate  Sediment  Surface Water

SAMPLING EQUIPMENT: Seine  Gill Net  Ponar  Kemmerer  Sediment Corer  Spoon  Other: \_\_\_\_\_  
*Petite*

Riparian Zone/Instream Features

Predominant Surrounding Land Use:  Forest  Urban  Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 42 miles Est. Stream Depth: \* ft Riffle: — ft Run: 100% Pool: — ft

Stream Type: Cold Water   Warm Water Velocity: Neg Channelized: Yes  No

Canopy Cover:  Open  Partly Open  Partly Shaded  Shaded

Sediment/Substrate:

Sediment Odors:  Normal  Sewage  Petroleum  Chemical  Anaerobic Other: \_\_\_\_\_

Sediment Oils:  Absent  Slight  Moderate  Profuse  HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: 1 Replicate #2: 2 Replicate #3: 2

Sediment Description: SAND, fine to coarse grained w/ little silt and some gravel. SHELL material throughout sample.

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>Surface</u>	<u>29.0</u>	<u>8.45</u>	<u>5.3</u>	<u>32,300</u>	<u>28</u>

Water Odors:  Normal  Sewage  Petroleum  Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick  Sheen   None Secchi: N/A ft.

Turbidity: Clear  Slightly Turbid   Turbid  Opaque Water Color: Brown/Yellow

Weather Conditions: \_\_\_\_\_ Tide: In  Out

Comments: location adjacent to station 7-WC SW/SD 06  
\* Depth

**APPENDIX P**  
**ENDANGERED SPECIES SURVEY**

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Critical species list - Camp Lejeune endangered species and special-interest communities survey

Principal Investigator: Richard LeBlond, 326-1440.

List current as of 9-30-91.

Replaces list of 6-30-91.

"?" = Species names followed by a "?" are less than confidently identified. They are nonetheless caught in this biological safety net, the mesh size of which errs on the side of diversity. Until identification is confirmed (most of these are represented by a specimen), these site records should be regarded as tentative.

Species sites are listed chronologically under the species name; with the 1990 month and day of discovery listed first, followed by the site's sector site number, community type and UTM grid number. Sites documented prior to the start of the current survey are indicated by the parenthetical date of discovery following the site name (see Rhexia aristosa at FD-1). Prior sites not yet relocated during the current survey are indicated by "---" in the date column (see Rhynchospora tracyi at FD-1).

Status codes. Federal status is listed first, and separated from the state status by a comma; e.g., Rhexia aristosa FC2,T (Federal Candidate level 2, state Threatened). Species with state status only are indicated by a single code without comma; e.g., Rhynchospora tracyi SR (Significantly Rare).

FE = Federal Endangered

FT = Federal Threatened

FC1 = Federal Candidate level 1. At risk. Listing warranted but precluded by higher priorities.

FC2 = Federal Candidate level 2. Vulnerable. Listing warranted but precluded by higher priorities.

F3C = Federal Candidate level 3C. More abundant and/or less threatened than previously known.

E = State Endangered

T = State Threatened

SC = State Special Concern

C = State Candidate

SR = State Significantly Rare

W = State Watch List (W1)

W3 = " " " , undocumented state occurrence prior to Lejeune site.

proposed = proposed for listing as State Candidate, Significantly Rare or Watch List based on current evidence

List of species and communities by sector - Camp Lejeune  
endangered species and special-interest communities survey

List current as of 9-30-91.  
 Replaces list of 6-30-91.

		<u>Status</u>	<u>UTM Grid</u>
<b><u>SECTOR E</u></b>			
E-1	Upper Beach		907266-
	Amaranthus pumilus (1988)	FC2,T	949297
E-5	Brackish Marsh		860237
	Parietaria praetermissa	W	
	Solanum pseudogracile	W	
<b><u>SECTOR F</u></b>			
FA-1	Depression Meadow		878409
	Aristida palustris	SR	
	Burmannia biflora	W	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora wrightiana	W	
FA-2	Road Meadow		895385
	Rhynchospora nitens	W	
	Rhynchospora pusilla	W	
FA-4	Depression Meadow		883407
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora harperi	C	
FB-1	Wet Pine Flatwoods		927413
	Amphicarpum purshii	SR	
	Lysimachia loomisii	W	
	Panicum tenerum	SR	
	Xyris difformis var. cunctissii	W	
FB-2	Road Meadow		926409
	Rhynchospora pusilla	W	
	Rhynchospora nitens	W	
FB-3	Wet Pine Flatwoods		937416
	Lysimachia loomisii	W	
	Pleea tenuifolia	W	
	Scleria minor	SR	
	Tofieldia glabra	FC2,C	

(FB-3 cont.)		
	<i>Xyris difformis</i> var. <i>curtissii</i>	W
	<i>Xyris elliotii</i>	SR
FB-4	Wet Pine Flatwoods	939426
	<i>Lysimachia loomisii</i>	W
	<i>Rhynchospora harveyi</i>	W
	<i>Rhynchospora pusilla</i>	W
	<i>Scleria minor</i>	SR
FC-2	Flatwood/Swamp Ecotone	922413
	<i>Anthaenantia rufa</i>	W
	<i>Helianthus heterophyllus</i>	W
	<i>Lysimachia loomisii</i>	W
	<i>Oxypolis ternata</i>	FC2, T
FC-3	Depression Meadow	918318
	<i>Aristida palustris</i>	SR
	<i>Bartonia verna</i>	W
	<i>Burmannia biflora</i>	W
	<i>Dichanthelium erectifolium</i>	SR
	<i>Litsea aestivalis</i>	FC2, C
	<i>Muhlenbergia torreyana</i>	F3C, E
	<i>Paspalum praecox</i>	W
	<i>Rhexia aristosa</i>	FC2, T
	<i>Rhynchospora cephalantha</i> f. <i>antrorsa</i>	unusual/rare
	<i>Rhynchospora tracyi</i>	SR
FC-4	Pocosin Ecotone	919376
	<i>Andropogon capillipes</i>	W
	<i>Gentiana autumnalis</i>	W
FD-1	Cypress Savanna	904377
	<i>Agalinis linifolia</i>	SR
	<i>Anthaenantia rufa</i>	W
	<i>Aristida palustris</i>	SR
	<i>Bartonia verna</i>	W
	<i>Burmannia biflora</i>	W
	<i>Carex verrucosa</i>	SR
	<i>Coelorachis rugosa</i>	W
	<i>Dichanthelium</i> sp. 1 = <i>Panicum hirstii</i>	FC2, C
	<i>Dichanthelium erectifolium</i>	SR
	<i>Lobelia boykinii</i>	FC2, C
	<i>Lysimachia loomisii</i>	W
	<i>Muhlenbergia torreyana</i>	F3C, E
	<i>Panicum tenerum</i>	SR
	<i>Paspalum praecox</i>	W
	<i>Rhexia aristosa</i>	FC2, T
	<i>Rhynchospora cephalantha</i> f. <i>antrorsa</i>	unusual/rare
	<i>Rhynchospora harperi</i>	C
	<i>Rhynchospora tracyi</i> (1984)	SR
	<i>Rhynchospora wrightiana</i>	W
	<i>Scleria georgiana</i>	C
	<i>Spiranthes laciniata</i>	C



(FD-1 cont.)			
	Xyris baldwiniana		W
FD-3	Small Depression Pond		899378
	Carex verrucosa		SR
	Eleocharis equisetoides		SR

SECTOR G

G-10	Pocosin Ecotone		929348
	Lysimachia asperulifolia		FE, E

GA-1	Depression Meadow, Wet Pine Flatwoods		894359
	Agalinis linifolia		SR
	Andropogon capillipes		W
	Aristida palustris		SR
	Burmannia biflora		W
	Dichanthelium erectifolium		SR
	Eleocharis equisetoides		SR
	Eleocharis melanocarpa		C
	Gentiana autumnalis		W
	Panicum tenerum		SR
	Rhexia aristosa		FC2, T
	Rhynchospora tracyi		SR
	Scleria georgiana		C

GA-2	Depression Meadow		896360
	Andropogon capillipes		W
	Agalinis linifolia		SR
	Aristida palustris		SR
	Burmannia biflora		W
	Dichanthelium erectifolium		SR
	Panicum tenerum		SR
	Pleea tenuifolia		W
	Rhexia aristosa		FC2, T
	Rhynchospora wrightiana		W
	Scleria georgiana		C

GA-3	Cypress Savanna		898360
	Agalinis linifolia		SR
	Andropogon capillipes		W
	Aristida palustris		SR
	Burmannia biflora		W
	Carex verrucosa		SR
	Coelorachis rugosa		W
	Dichanthelium erectifolium		SR
	Eleocharis equisetoides		SR
	Panicum tenerum		SR
	Paspalum praecox		W
	Rhexia aristosa		FC2, T
	Rhynchospora pusilla		W
	Rhynchospora tracyi		SR
	Scleria georgiana		C

GA-4	Savanna		899349
	<i>Asclepias pedicellata</i>	C	
	<i>Dichanthelium erectifolium</i>	SR	
	<i>Dionaea muscipula</i>	FC2, C-SC	
	<i>Lysimachia loomisii</i>	W	
	<i>Oxypolis ternata</i>	FC2, C	
	<i>Pleea tenuifolia</i>	W	
	<i>Polygala brevifolia</i>	W	
	<i>Polygala hookeri</i>	C	
	<i>Rhynchospora pallida</i>	SR	
	<i>Sarracenia rubra</i> ssp. <i>rubra</i>	W	
	<i>Solidago pulchra</i>	FC2, C	
	<i>Tofieldia glabra</i>	FC2, C	
	<i>Xyris baldwiniana</i>	W	
GA-5	Depression Meadow		901361
	<i>Agalinis linifolia</i>	SR	
	<i>Anthaenantia rufa</i>	W	
	<i>Aristida palustris</i>	SR	
	<i>Burmannia biflora</i>	W	
	<i>Carex verrucosa</i>	SR	
	<i>Dichanthelium erectifolium</i>	SR	
	<i>Eleocharis equisetoides</i>	SR	
	<i>Panicum tenerum</i>	SR	
	<i>Paspalum praecox</i>	W	
	<i>Rhexia aristosa</i>	FC2, T	
	<i>Rhynchospora inundata</i>	W	
	<i>Rhynchospora tracyi</i>	SR	
	<i>Xyris smalliana</i>	W	
GB-1	Wet Pine Flatwoods/Small Stream Pocosin		908376
	<i>Rhynchospora elliottii</i>	W	
GB-2	Road Meadow		907376
	<i>Agalinis virgata</i>	C	
GB-3	Road Meadow		929368
	<i>Calopogon barbatus</i>	W	
	<i>Dionaea muscipula</i>	FC2, C-SC	
	<i>Solidago pulchra</i>	FC2, C	
GB-4	Road Meadow		931365
	<i>Dionaea muscipula</i>	FC2, C-SC	
	<i>Rhynchospora pallida</i>	SR	
	<i>Solidago pulchra</i>	FC2, C	
GB-5	Wet Pine Flatwoods		932364
	<i>Dionaea muscipula</i>	FC2, C-SC	
	<i>Solidago pulchra</i>	FC2, C	
	<i>Tofieldia glabra</i>	FC2, C	

GB-6	Pocosin Ecotone Amphicarpum purshii Dionaea muscipula Solidago pulchra	SR FC2,C-SC FC2,C	935364
GB-7	Road Meadow Rhexia aristosa Solidago pulchra	FC2,T FC2,C	940364
GB-8	Road Meadow Bartonia verna Solidago pulchra Tofieldia glabra	W FC2,C FC2,C	932368
GB-9	Road Meadow Juncus validus	W	934362
GB-10	Road Depression Meadow Calopogon barbatus	W	918374
GC-1	Small Depression Pond Agalinis linifolia Aristida palustris Coelorachis rugosa Dichanthelium erectifolium Eleocharis tricostata Panicum tenerum Paspalum praecox Rhexia aristosa Rhynchospora tracyi	SR SR W SR W SR W FC2,T SR	946360
GC-2	Small Depression Pond Agalinis linifolia Aristida palustris Burmanna biflora Cladium mariscoides Dichanthelium erectifolium Eleocharis equisetoides Ludwigia linifolia Panicum tenerum Paspalum praecox Rhexia aristosa Rhynchospora harperi Rhynchospora pusilla Rhynchospora tracyi Scleria georgiana	SR SR W SR SR SR SR SR SR W FC2,T C W SR C	949357
GC-3	Pocosin Ecotone Amphicarpum purshii	SR	945342
GC-5	Depression Meadow Eleocharis tricostata Panicum tenerum	W SR	940345

GC-6.	Depression Meadow		942358
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Litsea aestivalis	FC2,C	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora wrightiana	W	
	Scleria georgiana	C	
GC-7	Depression Meadow		942359
	Aristida palustris	SR	
	Litsea aestivalis	FC2,C	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhexia cubensis	SR	
	Sarracenia rubra ssp. rubra	W	
GC-8	Small Depression Pond		947356
	Rhexia aristosa	FC2,T	
	Rhexia aristosa X cubensis	undescribed taxon	
	Rhexia cubensis	SR	
GC-9	Depression Meadow		949356
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Rhexia aristosa	FC2,T	
GC-10	Depression Meadow		948356
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Eleocharis tricostata	W	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora tracyi	SR	
	Scleria georgiana	C	
GC-11	Flatwoods Road Meadow		949364
	Andropogon capillipes	W	
GC-12	Streamhead Pocosin		944348
	Amphicarpum purshii	SR	
	Dionaea muscipula	FC2,C-SC	
	Peltandra sagittifolia	SR	
	Rhynchospora pallida	SR	
	Solidago pulchra	FC2,C	
	Tofieldia glabra	FC2,C	

GD-1	Road Meadow		938326
	<i>Amphicarpum purshii</i>	SR	
	<i>Rhexia cubensis</i>	SR	
GD-2	Small Depression Pond		938335
	<i>Eleocharis tricostata</i>	W	
GD-3	Small Depression Pond		937335
	<i>Eleocharis vivipara</i>	W	
	<i>Litsea aestivalis</i>	FC2,C	
	<i>Rhexia aristosa</i>	FC2,T	
	<i>Xyris smalliana</i>	W	
GD-4	Small Depression Pond		936336
	<i>Dichanthelium erectifolium</i>	SR	
	<i>Eleocharis melanocarpa</i>	C	
	<i>Eleocharis tricostata</i>	W	
	<i>Rhexia aristosa</i>	FC2,T	
GD-5	Road Meadow		921333
	<i>Agalinis linifolia</i>	SR	
	<i>Dionaea muscipula</i>	FC2,C-SC	
	<i>Pleea tenuifolia</i>	W	
	<i>Rhynchospora pusilla</i>	W	
	<i>Solidago pulchra</i>	FC2,C	
GD-6	Road Meadow		922332
	<i>Rhexia aristosa</i>	FC2,T	
	<i>Rhexia aristosa</i> X <i>cubensis</i>	undescribed taxon	
	<i>Rhexia cubensis</i>	SR	
	<i>Rhynchospora pusilla</i>	W	
	<i>Xyris baldwiniana</i>	W	
GE-1	Flatwoods/Pocosin Ecotone		910328
	<i>Calamovilfa brevipilis</i>	F3C,E	
	<i>Carex elliotii</i>	W	
	<i>Dionaea muscipula</i> (1988)	FC2,C-SC	
	<i>Ludwigia microcarpa</i> (1988)	W	
	<i>Lysimachia asperulifolia</i> (1988)	FE,E	
	<i>Polygala brevifolia</i>	W	
	<i>Rhynchospora pallida</i>	SR	
	<i>Solidago pulchra</i> (1988)	FC2,C	
	<i>Tofieldia glabra</i>	FC2,C	
GE-2	Pocosin Ecotone		918333
	<i>Amphicarpum purshii</i>	SR	
	<i>Dionaea muscipula</i>	FC2,C-SC	
	<i>Oxypolis ternata</i>	FC2,C	
	<i>Pleea tenuifolia</i>	W	
	<i>Polygala brevifolia</i>	W	
	<i>Rhynchospora pallida</i>	SR	
	<i>Rhynchospora wrightiana</i>	W	
	<i>Solidago pulchra</i>	FC2,C	
	<i>Tofieldia glabra</i>	FC2,C	

GE-3	Road Depression Meadow		907330
	Amphicarpum purshii	SR	
	Calamovilfa brevipilis	F3C,E	
	Dionaea muscipula	FC2,C-SC	
	Pleea tenuifolia	W	
GE-4	Small Depression Pond		907328
	Rhexia aristosa	FC2,T	
	Rhynchospora inundata	W	
GF-1	Wet Pine Flatwoods		949331
	Agaliniis fasciculata	W	
	Agaliniis virgata	C	
	Calopogon barbatus	W	
	Gentiana autumnalis	W	
	Tofieldia glabra	FC2,C <sub>3</sub>	
GF-1	Road Meadow		949331
	Andropogon capillipes	W	
GF-3	Depression Meadow		906327
	Rhexia aristosa	FC2,T	
GF-5	Road Meadow		944326
	Agaliniis linifolia	SR	
	Ludwigia microcarpa	W	
	Rhexia aristosa	FC2,T	
	Xyris baldwiniana	W	
GG-1	Depression Meadow		934317
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhexia cubensis	SR	
	Rhynchospora inundata	W	
	Rhynchospora tracyi	SR	
	Rhynchospora wrightiana	W	
GG-2	Road Meadow		943325
	Eleocharis tricostata	W	
	Ludwigia microcarpa	W	
GH-1	Coastal Fringe Sandhill		?
	Cladina evansii	W	
GI-1	Coastal Fringe Sandhill		?
	Cladina evansii	W	

SECTOR H

HA-3	Depression Meadow		876335
	Aristida palustris	SR	
	Burmannis biflora	W	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Ludwigia linifolia	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora harperi	C	
	Rhynchospora nitens	W	
	Rhynchospora wrightiana	W	
	Scleria georgiana	C	
HA-5	Depression Meadow		874336
	Aristida palustris	SR	
	Dichanthelium erectifolium	SR	
	Ludwigia linifolia	SR	
	Rhexia aristosa	FC2, T	
	Scleria georgiana	C	
HA-6	Small Depression Pond		873334
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Eleocharis tricostata	W	
	Rhexia aristosa	FC2, T	
	Rhynchospora harperi	C	
	Rhynchospora nitens	W	
	Scleria reticularis var. reticularis	C	
HA-7	Small Depression Pond		872334
	Dichanthelium erectifolium	SR	
	Ludwigia linifolia	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora nitens	W	
	Scleria reticularis var. reticularis	C	
HA-8	Small Depression Pond		872333
	Coelorachis rugosa	W	
	Rhynchospora nitens	W	
	Scleria reticularis var. reticularis	C	
HA-9	Road Meadow (best treated as extension of HA-10)		871336
	Scleria georgiana	C	
HA-10	Small Depression Pond		870337
	Scleria georgiana	C	
HA-11	Small Depression Pond		869338
	Ludwigia linifolia	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora nitens	W	
	Scleria reticularis var. reticularis	C	

HB-1	Flatwoods/Pocosin Ecotone		876311
	Carex elliotii	W	
	Dionaea muscipula	FC2, C-SC	
	Polygala brevifolia	W	
HB-2	Flatwoods/Pocosin Ecotone		875317
	Amphicarpum purshii	SR	
	Lysimachia asperulifolia (P. Robinson)	FE, E	
	Polygala brevifolia	W	
	Solidago pulchra	FC2, C	
HB-3	Small Depression Pond		878328
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Dionaea muscipula	FC2, C-SC	
	Ludwigia linifolia	SR	
	Oxypolis ternata	FC2, C	
	Paspalum praecox	W	
	Rhexia aristosa	FC2, T	
	Rhynchospora harperi	C	
	Solidago pulchra	FC2, C	
HB-5	Wet Pine Flatwoods, Pocosin		870320
	Asclepias pedicellata	C	
	Calopogon barbatus	W	
	Solidago pulchra	FC2, C	
	Sporopolus species 1	FC2, T	
HD-1	Small Depression Pond/Black Gum Swamp		878337
	Dichanthelium erectifolium	SR	
	Rhexia aristosa	FC2, T	
HD-2	Depression Meadow/Small Depression Pond		876339
	Aristida palustris	SR	
	Burmannia biflora	W	
	Rhexia aristosa	FC2, T	
HD-3	Depression Meadow/Small Depression Pond		871341
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Eleocharis robbinsii	C	
	Myriophyllum laxum	FC2, T	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora harperi	C	
	Rhynchospora inundata	W	
	Rhynchospora nitens	W	
	Rhynchospora pleiantha	SR	
	Rhynchospora tracyi	SR	
	Sceleria georgiana	C	



HE-1	Depression Meadow		893334
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmanna biflora	W	
	Rhexia aristosa	FC2, T	
HE-2	Depression Meadow		892334
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Bartonia verna	W	
	Burmanna biflora	W	
	Rhexia aristosa	FC2, T	
	Rhynchospora wrightiana	W	
HE-3	Depression Meadow		889332
	Aristida palustris	SR	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Ludwigia linifolia	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora harperi	C	
	Rhynchospora inundata	W	
	Rhynchospora tracyi	SR	
	Scleria reticularis var. reticularis	C	
	Xyris smalliana	W	
HE-4	Small Stream Pocosin		895331
	Rhynchospora inundata	W	
HE-5	Depression Meadow		896332
	Aristida palustris	SR	
	Burmanna biflora	W	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora harperi	C	
	Rhynchospora inundata	W	
HE-6	Small Depression Pond		882329
	Burmanna biflora	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2, T	
	Rhexia aristosa X cubensis	undescribed taxon	
	Rhexia cubensis	SR	
	Rhynchospora scirpoides	C	
	Rhynchospora tracyi	SR	
	Rhynchospora wrightiana	W	

HE-7.	Road Meadow		880330
	Agalinis fasciculata	W	
	Rhexia aristosa	FC2, T	
	Rhynchospora pusilla	W	
	Rhynchospora nitens	W	
HE-8	Pocosin Ecotone		883329
	Dionaea muscipula	FC2, C-SC	
HE-8	Road Depression Meadow		882328
	Paspalum praecox	W	
HF-1	Small Depression Pond/Depression Meadow		900316
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Eleocharis tricostata	W	
	Ludwigia linifolia	SR	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2, T	
	Rhynchospora tracyi	SR	
	Rhynchospora wrightiana	W	
	Scleria georgiana	C	
	Spiranthes laciniata	C	
	Xyris smalliana	W	
HF-2	Road Meadow		899316
	Aristida palustris	SR	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora inundata	W	
	Rhynchospora nitens	W	
	Rhynchospora pallida	SR	
	Rhynchospora wrightiana	W	
	Sagittaria graminea var. chapmanii	C	
HF-3	Small Depression Pond		898318
	Aristida palustris	SR	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2, T	
	Sagittaria graminea var. chapmanii	C	
HF-3	Road Meadow		898318
	Amphicarpum purshii	SR	
HF-4	Road Meadow		898319
	Agalinis linifolia	SR	
	Rhexia aristosa	FC2, T	
	Rhexia cubensis	SR	

(HF-4 cont.)			
	Rhynchospora nitens	W	
	Sagittaria graminea var. chapmanii	C	
HF-5	Flatwoods/Pocosin Ecotone		896319
	Carex elliotii	W	
	Rhexia cubensis	SR	
	Rhynchospora pallida	SR	
HF-6	Road Meadow		894319
	Rhexia aristosa	FC2, T	
	Rhynchospora pallida	SR	
HF-7	Small Depression Pond		892318
	Eleocharis equisetoides	SR	
	Rhynchospora inundata	W	
	Xyris smalliana	W	
HF-8	Road Meadow		896311
	Amphicarpum purshii	SR	
HF-8	Small Depression Pond		896312
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Eleocharis elongata	C	
	Eleocharis equisetoides	SR	
	Eleocharis tricostata	W	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2, T	
	Rhexia cubensis	SR	
	Rhynchospora inundata	W	
	Rhynchospora pleiantha	C	
HF-9	Road Meadow		889313
	Amphicarpum purshii	SR	
HF-11	Small Depression Pond		897309
	Agalinis linifolia	SR	
	Carex verrucosa	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora inundata	W	
	Spiranthes laciniata	C	
	Sporobolus species 1 (into HF-20)	FC2, T	
HF-12	Small Depression Pond		897308
	Eleocharis elongata	C	
	Eleocharis equisetoides	SR	

HF-13	Small Depression Pond		895309
	Carex verrucosa	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora inundata	W	
	Rhynchospora tracyi	SR	
HF-14	Pocosin Ecotone		894312
	Amphicarpum purshii	SR	
	Rhexia aristosa	FC2, T	
HF-15	Small Depression Pond		894310
	Eleocharis equisetoides	SR	
	Litsea aestivalis	FC2, C	
	Scirpus etuberculatus	SR	
HF-15	Pond/Flatwoods Ecotone		894310
	Asclepias pedicellata	C	
HF-16	Small Depression Pond		892308
	Eleocharis robbinsii? (too deep to wade)	C	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2, T	
	Rhexia cubensis	SR	
	Rhynchospora inundata	W	
	Rhynchospora scirpoides	C	
HF-17	Small Depression Pond		891306
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Eleocharis robbinsii	C	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2, T	
	Rhynchospora scirpoides	C	
	Rhynchospora tracyi	SR	
	Rhynchospora wrightiana	W	
	Utricularia olivacea	T	
	Xyris smalliana	W	
HF-18	Depression Meadow		898308
	Agalinis linifolia	SR	
	Coelorachis rugosa	W	
	Paspalum praecox	W	
	Rhexia aristosa	FC2, T	
HF-19	Small Depression Pocosin		897307
	Amphicarpum purshii (into HF-20)	SR	
HF-20	Flatwoods/Pocosin Ecotone		897308
	Amphicarpum purshii	SR	
	Solidago pulchra	FC2, C	
	Sporobolus species 1	FC2, T	

HF-21	Small Depression Pond Coelorachis rugosa	W	899310
HF-22	Road Depression Meadow Juncus validus	W	902306
HF-23	Small Stream Swamp Carex albicans var. emmonsii	W	905302
HF-24	Road/Pocosin Ecotone Dionaea muscipula Rhynchospora pallida	FC2, C-SC SR	900309
HF-25	Road Depression Meadow Andropogon capillipes Burmanna biflora Dichanthelium wrightianum Dionaea muscipula Ludwigia microcarpa Paspalum praecox Polygala brevifolia Rhynchospora nitens Rhynchospora pallida Solidago pulchra Xyris baldwiniana	W W W FC2, C-SC W W W W W SR FC2, C W	904310

### SECTOR I

IA-1	Small Depression Pond Rhynchospora inundata Rhynchospora scirpoides	W C	886297
IA-2	Small Depression Pond Burmanna biflora Eleocharis equisetoides Eleocharis vivipara (?) Panicum tenerum Rhynchospora inundata Rhynchospora scirpoides	W SR W SR W C	890296
IA-3	Wet Pine Flatwoods Asclepias pedicellata	C	887298
IC-2	Small Depression Pond Eleocharis equisetoides Rhynchospora inundata	SR W	875279
IC-3	Small Depression Pond Eleocharis equisetoides	SR	869280

IC-4	Small Depression Pond Eleocharis equisetoides Rhynchospora inundata Sagittaria engelmanniana	SR W W	870280
IC-6	Coastal Fringe Sandhill Cladina evansii	W	859270
IC-7	Small Depression Pond Eleocharis equisetoides	SR	862270
IC-8	Coastal Fringe Sandhill Cladina evansii	W	?
IC-9	Maritime Forest Cynanchum angustifolium Iresine rhizomatosa Sageretia minutiflora	W W C	853258
IC-10	Coastal Fringe Evergreen Forest Asplenium platyneuron var. bacculum-rubrum Cornus asperifolia Rhynchospora miliacea	W C W	856262
IC-11	Seepage Meadow Eleocharis montevidensis	proposed	867259
IE-2	Pocosin Ecotone Dionaea muscipula	FC2, C-SC	873291

SECTOR J

JB-1	Small Stream Swamp Carex chapmanii Carex floridana	FC2, T W	819305
JC-1	Small Depression Pond Eleocharis melanocarpa	C	844290

SECTOR K

KA-1	Small Stream Swamp Carex floridana	W	797390
KC-1	Wet Pine Flatwoods Buchnera floridana Calamovilfa brevipilis Dionaea muscipula Pilea tenuifolia Rhynchospora pallida Solidago pulchra	W F3C, E FC2, C-SC W SR FC2, C	772377

SECTOR L

LA-1	Road Depression Meadow	727352-
	Wet Pine Flatwoods	724337
	Dionaea muscipula	FC2, C-SC
	Pleea tenuifolia	W
	Rhynchospora pusilla	W
	Xyris elliotii	SR
LB-1	Road Meadow (US 17)	725306-724337
	Savanna	
	Agalinis aphylla	C
	Agalinis fasciculata	W
	Agalinis virgata	C
	Amphicarpum purshii	SR
	Andropogon capillipes	W
	Asclepias pedicellata	C
	Bartonia verna	W
	Calamovilfa brevipilis	F3C, E
	Calopogon barbatus	W
	Dionaea muscipula	FC2, C-SC
	Gentiana autumnalis	W
	Linum floridanum var. chrysocarpum	SR
	Oxypolis ternata	FC2, C
	Pleea tenuifolia	W
	Polygala brevifolia	W
	Rhynchospora nitens	W
	Rhynchospora pallida	SR
	Rhynchospora pusilla	W
	Solidago pulchra	FC2, C
	Sporobolus species 1	FC2, T
	Tofieldia glabra	FC2, C
	Xyris baldwiniana	W
	Xyris elliotii	SR
	Xyris flabelliformis	C
LB-3	Mesic Pine Flatwoods	734330
	Carex chapmanii	FC2, T
	Carex floridana	W
LB-4	Powerline Depression Meadow	743296-747287
	Carex elliotii	W
	Polygala brevifolia	W
LC-1	Road Meadow (NC 210)	752270-745287
	Agalinis fasciculata	W
	Agalinis tenella	W
	Andropogon capillipes	W
	Dionaea muscipula	FC2, C-SC
	Xyris difformis var. curtissii	W
	Xyris elliotii	SR

LC-2	Powerline Depression Meadow	747287-764282
	Andropogon capillipes	W
	Carex elliotii	W
	Dionaea muscipula	FC2,C-SC
	Rhexia aristosa	FC2,T
	Rhynchospora oligantha	C

SECTOR M

MB-1	Mesic Pine Flatwoods	770398
	Carex floridana	W
MD-1	Small Stream Swamp	752393-
	Carex chapmanii	FC2,T 752372
	Carex floridana	W
	Scirpus lineatus	C
	Senecio glabellus	W
ME-1	Road Meadow (US 17)	728353-735387
	Oxypolis ternata	FC2,C
MF-1	Wet Pine Flatwoods, Pocosin Ecotone	776370
	Andropogon capillipes	C
	Calamovilfa brevipilis	F3C,E
	Calopogon barbatus	W
	Carex elliotii	W
	Dionaea muscipula	FC2,C-SC
	Polygala brevifolia	W
	Solidago pulchra	FC2,C

SECTOR Q

QA-1	Small Depression Pocosin	943390
	Litsea aestivalis (1984)	FC2,C
QA-2	Small Depression Pond	941391
QA-3	Depression Meadow	946402
	Anthaenantia rufa	W
	Aristida palustris	SR
	Burmannia biflora	W
	Coelorachis rugosa	W
	Dichantherium erectifolium	SR
	Dichantherium sp. 1 =Panicum hirstii	FC2,C
	Eleocharis equisetoides	SR
	Lobelia boykinii	FC2,C
	Muhlenbergia torreyana	F3C,E
	Panicum tenerum	SR
	Paspalum praecox	W
	Rhexia aristosa	FC2,T
	Rhynchospora elliotii	W
	Rhynchospora harperi	C



(QA-3	Depression Meadow cont.)		
	Rhynchospora tracyi	SR	
	Scleria georgiana	C	
	Spiranthes laciniata	C	
	Xyris smalliana	W	
			946401
QA-3	Pocosin Ecotone	SR	
	Amphicarpum purshii	W	
	Gentiana autumnalis	W	
	Rhynchospora nitens		
			940403
QA-4	Wet Pine Flatwoods	W	
	Andropogon capillipes		
			950414
QA-5	Wet Pine Flatwoods	W	
	Andropogon capillipes	W	
	Gentiana autumnalis		
			944392
QA-6	Depression Meadow	SR	
	Aristida palustris	SR	
	Carex verrucosa	SR	
	Panicum tenerum	W	
	Rhynchospora inundata		
			944424
QA-7	Small Stream Swamp	FC2, T	
	Carex chapmanii	W	
	Carex elliotii	W	
	Rhynchospora miliacea	C	
	Scirpus lineatus		
QB-1	Nonriverine Swamp Forest ( <u>Nyssa biflora</u> variant)		953375
	"Peterson's Quagmire"		
			943375
QB-2	Road Meadow (Lyman Road)	W	
	Anthaenantia rufa	W	
	Coelorachis rugosa	FC2, C-SC	
	Dionaea muscipula	W	
	Gentiana autumnalis	W	
	Paspalum praecox	proposed	
	Paspalum stramineum var. stramineum	W	
	Polygala brevifolia	W	
	Rhynchospora nitens	SR	
	Rhynchospora oligantha	SR	
	Rhynchospora pallida	C	
	Scleria georgiana	SR	
	Scleria minor	W	
	Solidago gracillima	FC2, C	
	Solidago pulchra	FC2, C	
	Tofieldia glabra	W	
	Xyris baldwiniana		

QB-3. Small Depression Pond  
Eleocharis tricostata  
Rhexia cubensis  
Rhynchospora wrightiana

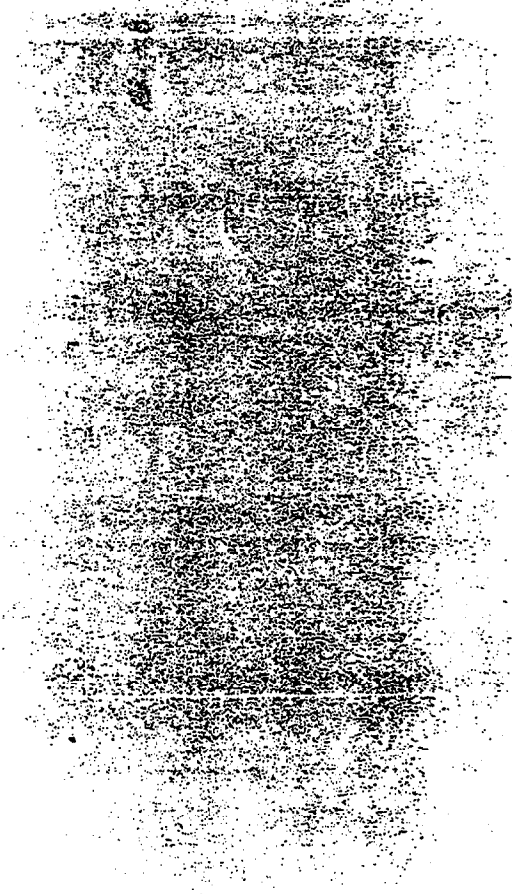
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W  
SR  
W

RB-1 Road Meadow  
Ludwigia microcarpa

888434

W



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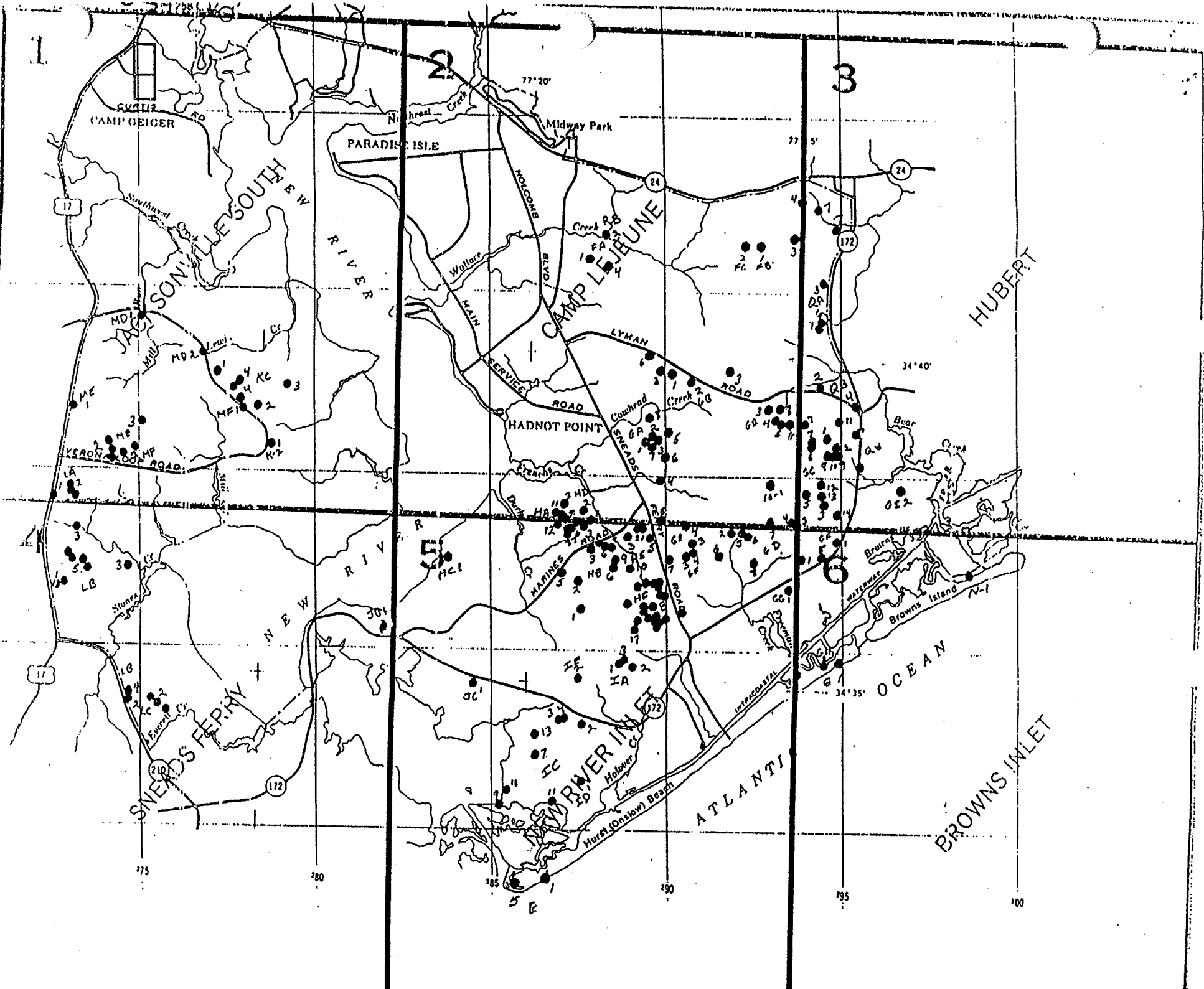
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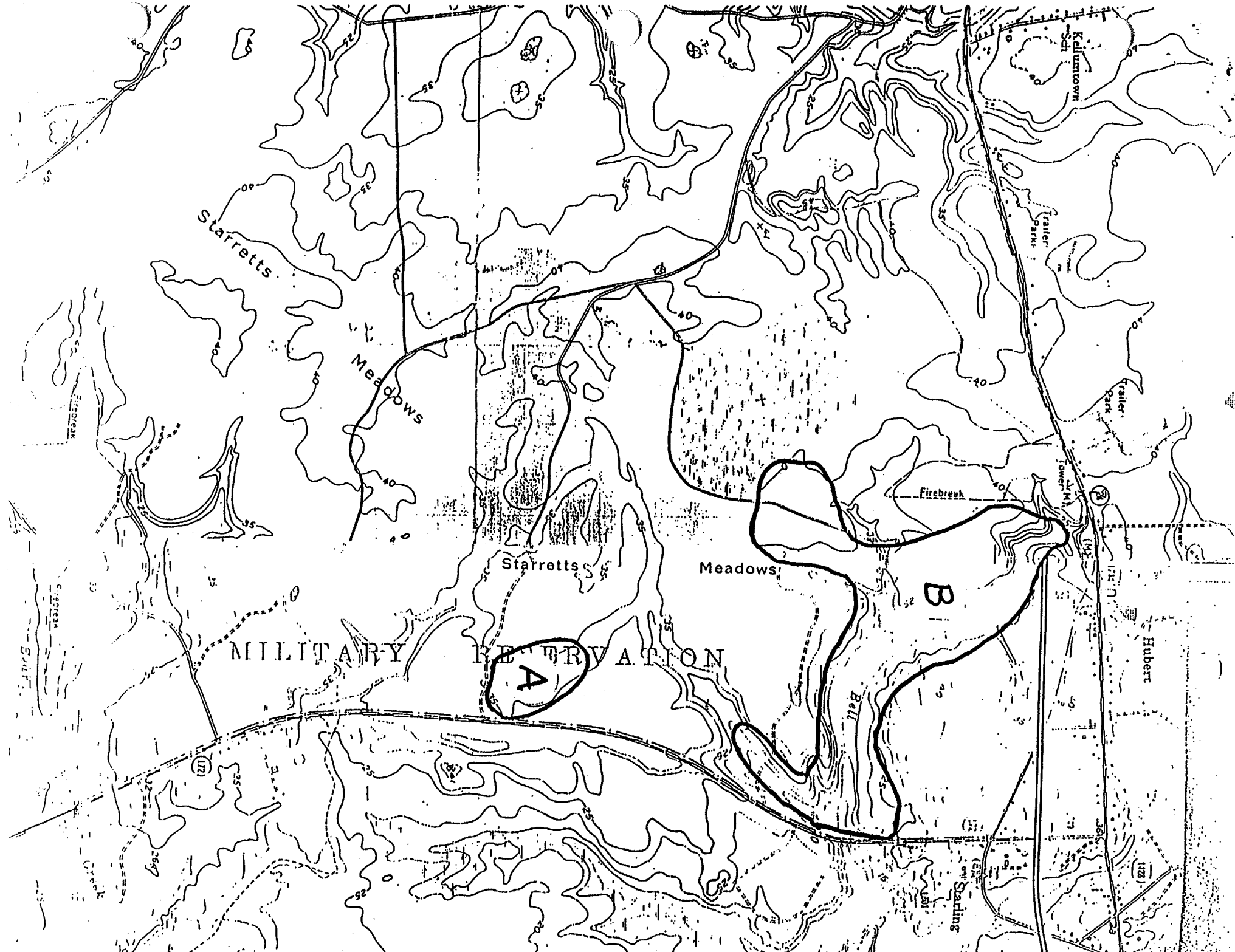
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BROWNS INLET

AREAS OF SIGNIFICANT NATURAL VALUE

<u>Site</u>	<u>Name</u>	<u>UTM Grid</u>
A	Starretts Meadow QA-3 Depression Meadow	946402
B	Pocosin Road Flatwoods and Bell Swamp FB-3 Wet Pine Flatwoods FB-4 Wet Pine Flatwoods QA-7 Small Stream Swamp	937416 939426 944424
C	Lyman Road Cypress Savanna FD-1 Cypress Savanna	904377
D	Cowhead Creek Limesinks GA-1 depression meadow GA-2 depression meadow GA-3 cypress savanna GA-5 depression meadow	894359 896360 897359 901361
E	Jumping Run Savanna GA-4 savanna/flatwoods/pocosin	899349
F	OP-3 Flatwoods and Pocosin GB-3 road depression meadow GB-4 road depression meadow GB-5 wet pine flatwoods	929368 931365 932364
G	Spring Branch Limesinks GC-1 small depression pond GC-2 small depression pond GC-6 depression meadow GC-7 depression meadow GC-8 small depression pond GC-9 depression meadow	946360 949357 942358 942359 947356 949356
H	Weil Point Road Limesinks HA-2 depression meadow HA-3 depression meadow HA-4 depression meadow HA-5 depression meadow HA-6 small depression pond HA-7 small depression pond HA-8 small depression pond HD-3 depression meadow	878335 876335 875334 874336 873334 872334 872333 871341
I	Alligator Meadow Limesinks HE-1 depression meadow HE-2 depression meadow HE-3 depression meadow HE-4 small stream pocosin HE-5 depression meadow	893334 892334 889332 895331 896332

<u>Site</u>	<u>Name</u>	<u>UTM Grid</u>	
J	Loosestrife Pocosin		
	GE-1 flatwoods/pocosin	910328	
	GE-2 flatwoods/pocosin	918333	
	GE-3 flatwoods/pocosin	907330	
K	Africa Pond Limesinks		
	HF-8 small depression pond	896312	
	HF-10 small depression pond	890312	
	HF-11 small depression pond	897309	
	HF-12 small depression pond	897308	
	HF-13 small depression pond	895309	
	HF-14 wet pine flatwoods/pocosin ecotone	894312	
	HF-15 small depression pond	894310	
	HF-16 small depression pond	892308	
	HF-17 small depression pond	891306	
	HF-18 depression meadow	898308	
	HF-19 small depression pocosin	897307	
	HF-20 wet pine flatwoods/pocosin ecotone	897308	
	L	Mill Run Swamp	
		MD-1 Small Stream Swamp/hardwood forest	752393- 752372
	M	Verona Loop Road Flatwoods	
		KC-1 wet pine flatwoods	772377
		MF-1 flatwoods and pocosin	776370
	N	Millstone Creek Swamp	
		LB-3 small stream swamp	724337-
O	Dixon Flatwoods		
	LB-1 flatwoods/pocosin/roadside	725315 743325	



Starretts

Meadows

Starretts

Meadows

MILITARY RESERVATION

A

B

Bell

Firebreak

Kalamoon Sch

Trailer Park

Trailer Park

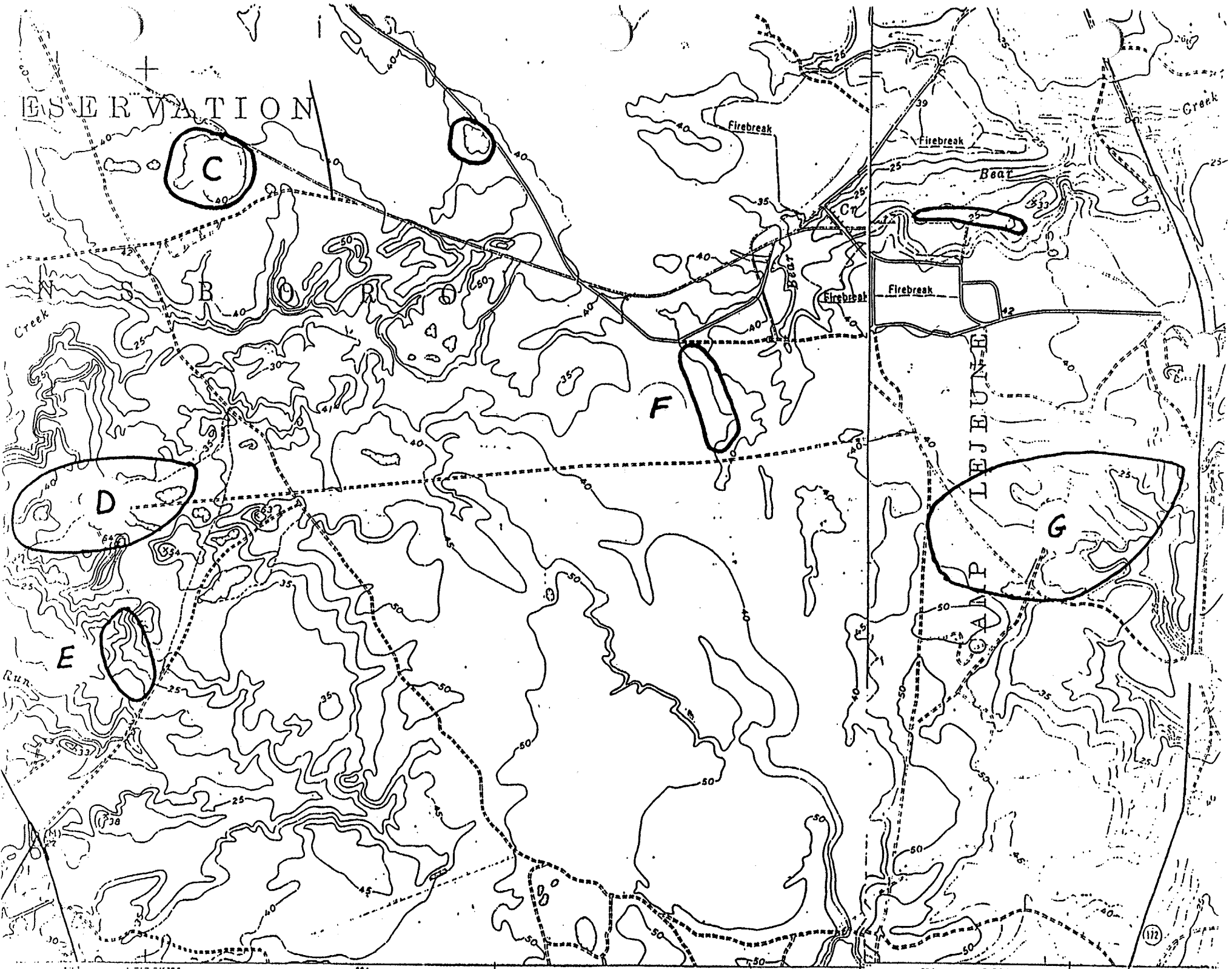
Hubert

Staring

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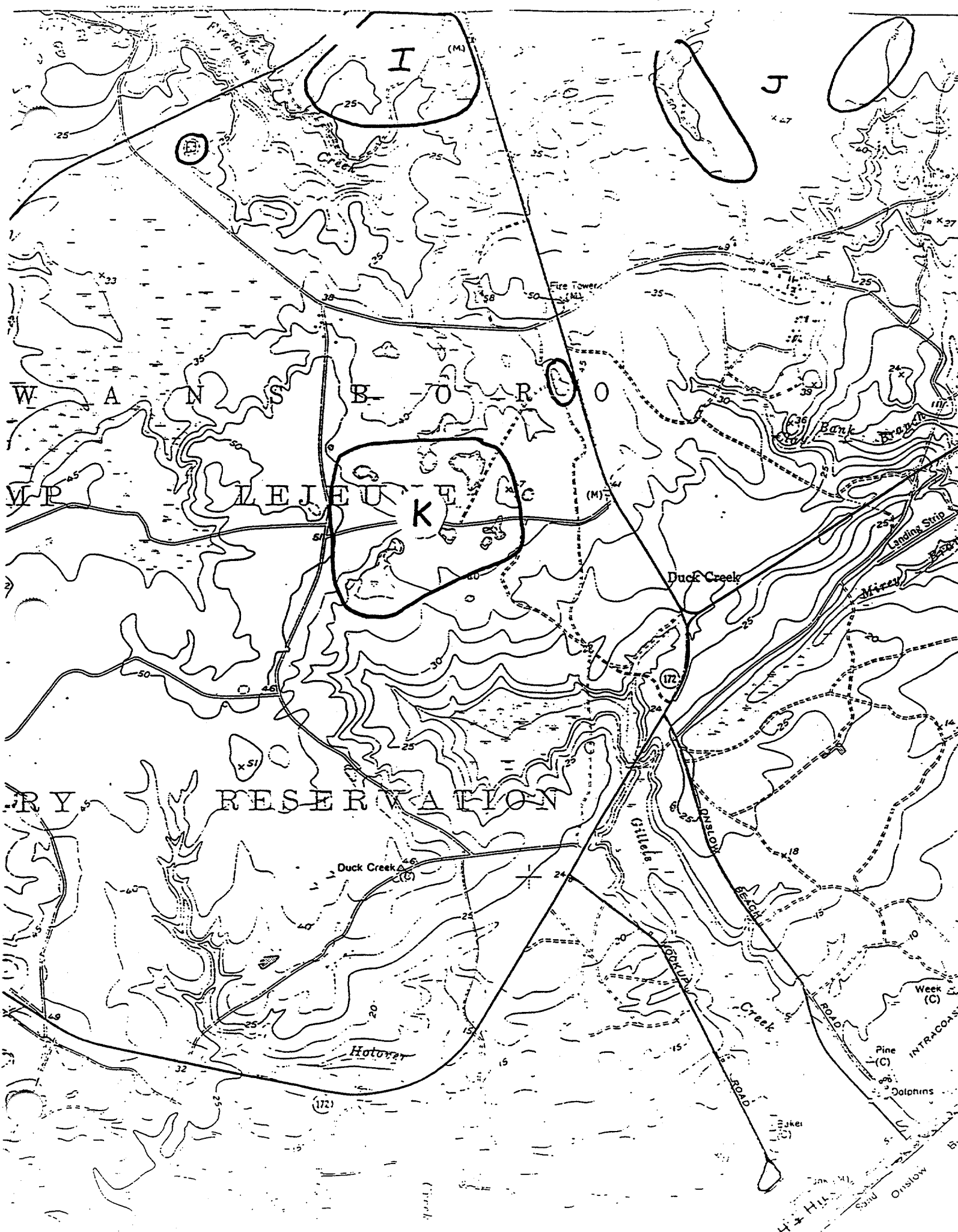
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RESERVATION









W A N E K O  
R E S E R V A T I O N

W A B A N E K O  
R E S E R V A T I O N

Duck Creek  
(C)

Hotover

Duck Creek

Landing Strip

Week (C)

Pine (C)

Dolphins

Hills  
Oislow





O

CAMP LEJEUNE

MILITARY RESERVATION

DIXON

Bank (M)

Stones Landing

Muddy Creek

Creek

Creek

Creek

Hillstone

N

LINE

COAST

SEABOARD

BM 67

BM 66

(M)

210

563

Creek

266

x56

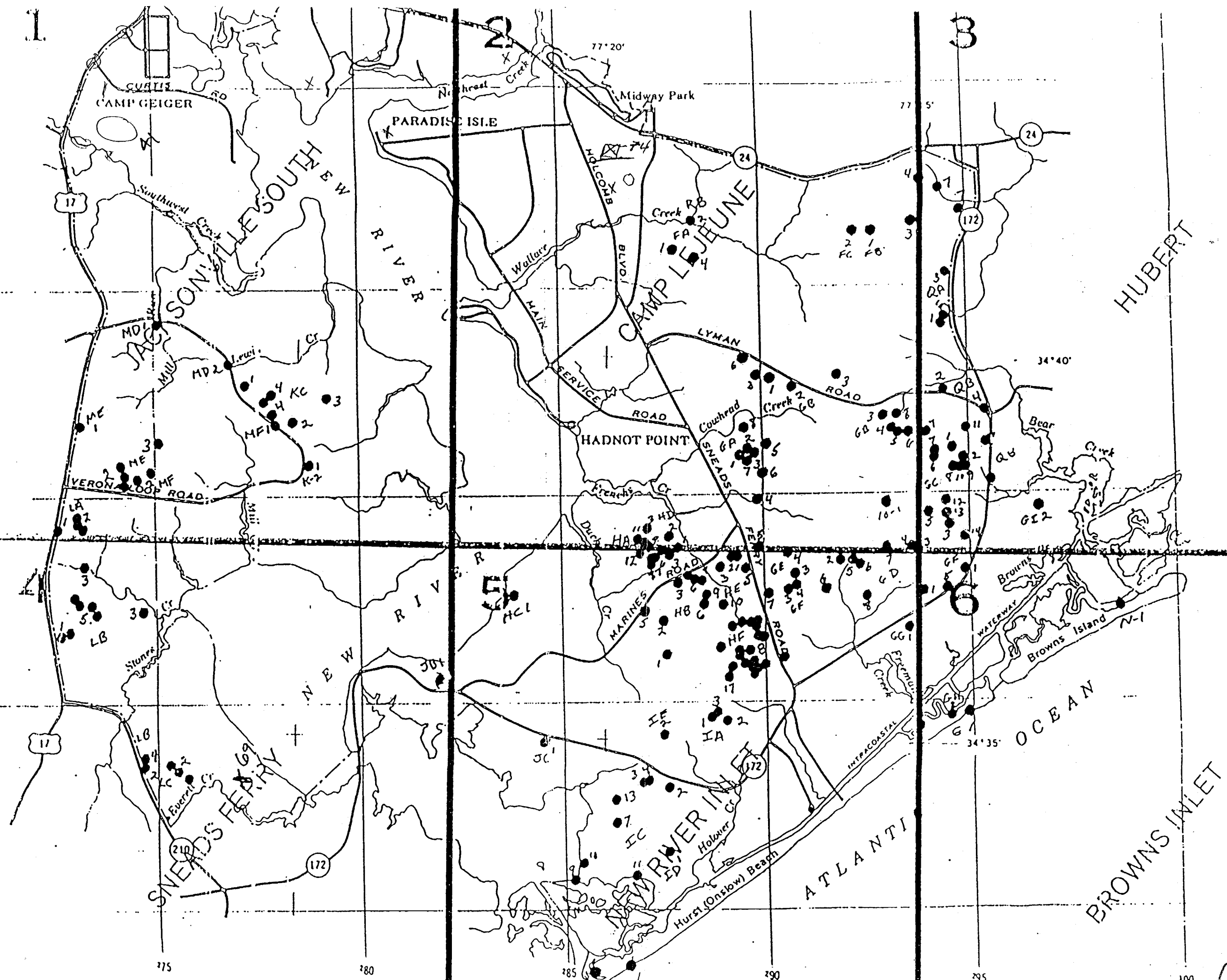
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**APPENDIX Q**  
**EARTHWORM STUDY RESULTS**

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**APPENDIX Q.1**  
**BASELINE EARTHWORM ANALYTICAL DATA**

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**POSITIVE DETECTION SUMMARY**  
**OPERABLE UNIT No. 11**  
**SITE 7 - BACKGROUND - EARTHWORM SAMPLES**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TAL INORGANICS**

Client Sample ID:	7-EW-BK01	7-EW-BK02	7-EW-BK03
Laboratory Sample ID:	AC6206	AC6207	AC6208
Date Sampled:	10/17/94	10/17/94	10/17/94

	<u>UNITS</u>			
Aluminum	MG/KG	66.9	59.6	87.8
Barium	MG/KG	1.2	1.5	1.9
Cadmium	MG/KG	1.4	0.96 J	1.8
Calcium	MG/KG	1540	1410	2260
Cobalt	MG/KG	2.1	3.1	3.5 J
Copper	MG/KG	ND	2 J	2.2 J
Iron	MG/KG	158 J	169 J	203 J
Lead	MG/KG	0.67	3	1.2
Magnesium	MG/KG	168	131	132
Manganese	MG/KG	3.4	2.9	2.5
Mercury	MG/KG	ND	0.11	ND
Potassium	MG/KG	1640	1090	1080
Selenium	MG/KG	1.4	2.1	3.4
Sodium	MG/KG	811	669	773
Zinc	MG/KG	50.3 J	218 J	128 J

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - BACKGROUND - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-EW-BK01	7-EW-BK02	7-EW-BK03
Laboratory Sample ID:	AC6206	AC6207	AC6208
Date Sampled:	10/17/94	10/17/94	10/17/94

	UNITS			
Aluminum	MG/KG	66.9	59.6	87.8
Antimony	MG/KG	8.9 U	8.9 U	9.9 U
Arsenic	MG/KG	1.8 U	1.8 U	2 U
Barium	MG/KG	1.2	1.5	1.9
Beryllium	MG/KG	0.18 U	0.18 U	0.2 U
Cadmium	MG/KG	1.4	0.96 J	1.8
Calcium	MG/KG	1540	1410	2260
Chromium	MG/KG	1.8 U	1.8 U	2 U
Cobalt	MG/KG	2.1	3.1	3.5 J
Copper	MG/KG	1.8 U	2 J	2.2 J
Iron	MG/KG	158 J	169 J	203 J
Lead	MG/KG	0.67	3	1.2
Magnesium	MG/KG	168	131	132
Manganese	MG/KG	3.4	2.9	2.5
Mercury	MG/KG	0.08 U	0.11	0.1 U
Nickel	MG/KG	3.6 U	3.6 U	4 U
Potassium	MG/KG	1640	1090	1080
Selenium	MG/KG	1.4	2.1	3.4
Silver	MG/KG	0.89 U	0.89 U	0.99 U
Sodium	MG/KG	811	669	773
Thallium	MG/KG	1.8 U	1.8 U	2 U
Vanadium	MG/KG	1.8 U	1.8 U	2 U
Zinc	MG/KG	50.3 J	218 J	128 J



FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - BACKGROUND - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	LOCATION OF	FREQUENCY	
Laboratory Sample ID:	NONDETECTED	NONDETECTED	DETECTED	DETECTED	MAXIMUM	OF	
Date Sampled:	NONDETECTED	NONDETECTED	DETECTED	DETECTED	DETECTED	DETECTION	
	<u>UNITS</u>						
Aluminum	MG/KG	NA	NA	59.6	87.8	7-EW-BK03	3/3
Antimony	MG/KG	8.9 U	9.9 U	ND	ND		0/3
Arsenic	MG/KG	1.8 U	2 U	ND	ND		0/3
Barium	MG/KG	NA	NA	1.2	1.9	7-EW-BK03	3/3
Beryllium	MG/KG	0.18 U	0.2 U	ND	ND		0/3
Cadmium	MG/KG	NA	NA	0.96 J	1.8	7-EW-BK03	3/3
Calcium	MG/KG	NA	NA	1410	2260	7-EW-BK03	3/3
Chromium	MG/KG	1.8 U	2 U	ND	ND		0/3
Cobalt	MG/KG	NA	NA	2.1	3.5 J	7-EW-BK03	3/3
Copper	MG/KG	1.8 U	1.8 U	2 J	2.2 J	7-EW-BK03	2/3
Iron	MG/KG	NA	NA	158 J	203 J	7-EW-BK03	3/3
Lead	MG/KG	NA	NA	0.67	3	7-EW-BK02	3/3
Magnesium	MG/KG	NA	NA	131	168	7-EW-BK01	3/3
Manganese	MG/KG	NA	NA	2.5	3.4	7-EW-BK01	3/3
Mercury	MG/KG	0.08 U	0.1 U	0.11	0.11	7-EW-BK02	1/3
Nickel	MG/KG	3.6 U	4 U	ND	ND		0/3
Potassium	MG/KG	NA	NA	1080	1640	7-EW-BK01	3/3
Selenium	MG/KG	NA	NA	1.4	3.4	7-EW-BK03	3/3
Silver	MG/KG	0.89 U	0.99 U	ND	ND		0/3
Sodium	MG/KG	NA	NA	669	811	7-EW-BK01	3/3
Thallium	MG/KG	1.8 U	2 U	ND	ND		0/3
Vanadium	MG/KG	1.8 U	2 U	ND	ND		0/3
Zinc	MG/KG	NA	NA	50.3 J	218 J	7-EW-BK02	3/3

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - BACKGROUND - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-EW-BK01	7-EW-BK02	7-EW-BK03
Laboratory Sample ID:	AC6206	AC6207	AC6208
Date Sampled:	10/17/94	10/17/94	10/17/94

	UNITS			
Aluminum	MG/KG	66.9	59.6	87.8
Antimony	MG/KG	4.45 U	4.45 U	4.95 U
Arsenic	MG/KG	0.9 U	0.9 U	1 U
Barium	MG/KG	1.2	1.5	1.9
Beryllium	MG/KG	0.09 U	0.09 U	0.1 U
Cadmium	MG/KG	1.4	0.96 J	1.8
Calcium	MG/KG	1540	1410	2260
Chromium	MG/KG	0.9 U	0.9 U	1 U
Cobalt	MG/KG	2.1	3.1	3.5 J
Copper	MG/KG	0.9 U	2 J	2.2 J
Iron	MG/KG	158 J	169 J	203 J
Lead	MG/KG	0.67	3	1.2
Magnesium	MG/KG	168	131	132
Manganese	MG/KG	3.4	2.9	2.5
Mercury	MG/KG	0.04 U	0.11	0.05 U
Nickel	MG/KG	1.8 U	1.8 U	2 U
Potassium	MG/KG	1640	1090	1080
Selenium	MG/KG	1.4	2.1	3.4
Silver	MG/KG	0.445 U	0.445 U	0.495 U
Sodium	MG/KG	811	669	773
Thallium	MG/KG	0.9 U	0.9 U	1 U
Vanadium	MG/KG	0.9 U	0.9 U	1 U
Zinc	MG/KG	50.3 J	218 J	128 J

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11**  
**SITE 7 - BACKGROUND - EARTHWORM SAMPLES**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TAL INORGANICS**

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL	
	<u>UNITS</u>					
Aluminum	MG/KG	87.8	71.4	14.6	96.1	114.3
Antimony	MG/KG	ND	NA	NA	NA	NA
Arsenic	MG/KG	ND	NA	NA	NA	NA
Barium	MG/KG	1.9	1.5	0.4	2.1	3.0
Beryllium	MG/KG	ND	NA	NA	NA	NA
Cadmium	MG/KG	1.8	1.4	0.4	2.1	4.5
Calcium	MG/KG	2260	1736.7	457.9	2508.6	3634.5
Chromium	MG/KG	ND	NA	NA	NA	NA
Cobalt	MG/KG	3.5 J	2.9	0.7	4.1	6.4
Copper	MG/KG	2.2 J	1.7	0.7	2.9	17.0
Iron	MG/KG	203 J	176.7	23.5	216.2	239.6
Lead	MG/KG	3	1.6	1.2	3.7	469.9
Magnesium	MG/KG	168	143.7	21.1	179.2	200.4
Manganese	MG/KG	3.4	2.9	0.5	3.7	4.2
Mercury	MG/KG	0.11	0.1	0.0	0.1	1.3
Nickel	MG/KG	ND	NA	NA	NA	NA
Potassium	MG/KG	1640	1270.0	320.5	1810.3	2562.2
Selenium	MG/KG	3.4	2.3	1.0	4.0	18.3
Silver	MG/KG	ND	NA	NA	NA	NA
Sodium	MG/KG	811	751.0	73.5	874.9	950.1
Thallium	MG/KG	ND	NA	NA	NA	NA
Vanadium	MG/KG	ND	NA	NA	NA	NA
Zinc	MG/KG	218 J	132.1	83.9	273.6	35194.8

POSITIVE DETECTION SUMMARY  
OPERABLE UNIT No. 11  
SITE 7 - BACKGROUND - EARTHWORM SAMPLES  
REMEDIAL INVESTIGATION CTO-0274  
MCB CAMP LEJEUNE, NORTH CAROLINA  
METHOD 8080 PESTICIDE/PCBS

Client Sample ID:  
Laboratory Sample ID:  
Date Sampled:

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PESTICIDE/PCBs                      UNITS

No Positives Detected.

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - BACKGROUND - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 METHOD 8080 PESTICIDE/PCBS

Client Sample ID:	7-EW-BK01	7-EW-BK02	7-EW-BK03
Laboratory Sample ID:	AC6206	AC6207	AC6208
Date Sampled:	10/17/94	10/17/94	10/17/94

	UNITS			
<u>PESTICIDE/PCBS</u>				
alpha-BHC	UG/KG	2.3 U	2 U	3.1 UJ
beta-BHC	UG/KG	8.3 U	4 U	9.9 UJ
delta-BHC	UG/KG	15 U	6 U	6 UJ
Lindane (gamma-BHC)	UG/KG	4.7 U	6.4 U	6.5 UJ
Heptachlor	UG/KG	11 U	14 U	23 UJ
Aldrin	UG/KG	2 U	2 U	2 UJ
Heptachlor epoxide	UG/KG	60 U	60 U	60 UJ
Endosulfan I	UG/KG	10 U	10 U	10 UJ
Dieldrin	UG/KG	2 U	2 U	2 UJ
4,4'-DDE	UG/KG	4.9 U	5.1 U	5.8 UJ
Endrin	UG/KG	4 U	4 U	4.3 UJ
Endosulfan II	UG/KG	2 U	2 U	2.1 UJ
4,4'-DDD	UG/KG	8 U	8 U	8 UJ
Endosulfan sulfate	UG/KG	40 U	40 U	40 UJ
4,4'-DDT	UG/KG	8 U	8 U	8 UJ
Methoxychlor	UG/KG	120 U	120 U	120 UJ
Endrin aldehyde	UG/KG	16 U	16 U	16 UJ
Chlordane (Technical)	UG/KG	49 U	30 U	49 UJ
Toxaphene	UG/KG	160 U	160 U	160 UJ
Aroclor 1016	UG/KG	45 UJ	41 UJ	61 UJ
Aroclor 1232	UG/KG	45 UJ	41 UJ	61 UJ
Aroclor 1242	UG/KG	45 UJ	41 UJ	61 UJ
Aroclor 1248	UG/KG	45 UJ	41 UJ	61 UJ
Aroclor 1254	UG/KG	76 UJ	78 UJ	78 UJ
Aroclor 1260	UG/KG	76 UJ	80 UJ	78 UJ

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - BACKGROUND - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 METHOD 8080 PESTICIDE/PCBS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
	<u>PESTICIDE/PCBS</u>					
alpha-BHC	UG/KG	2 U	3.1 UJ	ND	ND	0/3
beta-BHC	UG/KG	4 U	9.9 UJ	ND	ND	0/3
delta-BHC	UG/KG	6 U	15 U	ND	ND	0/3
Lindane (gamma-BHC)	UG/KG	4.7 U	6.5 UJ	ND	ND	0/3
Heptachlor	UG/KG	11 U	23 UJ	ND	ND	0/3
Aldrin	UG/KG	2 U	2 U	ND	ND	0/3
Heptachlor epoxide	UG/KG	60 U	60 U	ND	ND	0/3
Endosulfan I	UG/KG	10 U	10 U	ND	ND	0/3
Dieldrin	UG/KG	2 U	2 U	ND	ND	0/3
4,4'-DDE	UG/KG	4.9 U	5.8 UJ	ND	ND	0/3
Endrin	UG/KG	4 U	4.3 UJ	ND	ND	0/3
Endosulfan II	UG/KG	2 U	2.1 UJ	ND	ND	0/3
4,4'-DDD	UG/KG	8 U	8 U	ND	ND	0/3
Endosulfan sulfate	UG/KG	40 U	40 U	ND	ND	0/3
4,4'-DDT	UG/KG	8 U	8 U	ND	ND	0/3
Methoxychlor	UG/KG	120 U	120 U	ND	ND	0/3
Endrin aldehyde	UG/KG	16 U	16 U	ND	ND	0/3
Chlordane (Technical)	UG/KG	30 U	49 U	ND	ND	0/3
Toxaphene	UG/KG	160 U	160 U	ND	ND	0/3
Aroclor 1016	UG/KG	41 UJ	61 UJ	ND	ND	0/3
Aroclor 1232	UG/KG	41 UJ	61 UJ	ND	ND	0/3
Aroclor 1242	UG/KG	41 UJ	61 UJ	ND	ND	0/3
Aroclor 1248	UG/KG	41 UJ	61 UJ	ND	ND	0/3
Aroclor 1254	UG/KG	76 UJ	78 UJ	ND	ND	0/3
Aroclor 1260	UG/KG	76 UJ	80 UJ	ND	ND	0/3

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - BACKGROUND - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 METHOD 8080 PESTICIDE/PCBS

Client Sample ID:	7-EW-BK01	7-EW-BK02	7-EW-BK03
Laboratory Sample ID:	AC6206	AC6207	AC6208
Date Sampled:	10/17/94	10/17/94	10/17/94

<u>PESTICIDE/PCBS</u>	<u>UNITS</u>			
alpha-BHC	UG/KG	1.15 U	1 U	1.55 UJ
beta-BHC	UG/KG	4.15 U	2 U	4.95 UJ
delta-BHC	UG/KG	7.5 U	3 U	3 UJ
Lindane (gamma-BHC)	UG/KG	2.35 U	3.2 U	3.25 UJ
Heptachlor	UG/KG	5.5 U	7 U	11.5 UJ
Aldrin	UG/KG	1 U	1 U	1 UJ
Heptachlor epoxide	UG/KG	30 U	30 U	30 UJ
Endosulfan I	UG/KG	5 U	5 U	5 UJ
Dieldrin	UG/KG	1 U	1 U	1 UJ
4,4'-DDE	UG/KG	2.45 U	2.55 U	2.9 UJ
Endrin	UG/KG	2 U	2 U	2.15 UJ
Endosulfan II	UG/KG	1 U	1 U	1.05 UJ
4,4'-DDD	UG/KG	4 U	4 U	4 UJ
Endosulfan sulfate	UG/KG	20 U	20 U	20 UJ
4,4'-DDT	UG/KG	4 U	4 U	4 UJ
Methoxychlor	UG/KG	60 U	60 U	60 UJ
Endrin aldehyde	UG/KG	8 U	8 U	8 UJ
Chlordane (Technical)	UG/KG	24.5 U	15 U	24.5 UJ
Toxaphene	UG/KG	80 U	80 U	80 UJ
Aroclor 1016	UG/KG	22.5 UJ	20.5 UJ	30.5 UJ
Aroclor 1232	UG/KG	22.5 UJ	20.5 UJ	30.5 UJ
Aroclor 1242	UG/KG	22.5 UJ	20.5 UJ	30.5 UJ
Aroclor 1248	UG/KG	22.5 UJ	20.5 UJ	30.5 UJ
Aroclor 1254	UG/KG	38 UJ	39 UJ	39 UJ
Aroclor 1260	UG/KG	38 UJ	40 UJ	39 UJ

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11**  
**SITE 7 - BACKGROUND - EARTHWORM SAMPLES**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**METHOD 8080 PESTICIDE/PCBS**

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>				
	<u>PESTICIDE/PCBs</u>				
alpha-BHC	UG/KG	ND	NA	NA	NA
beta-BHC	UG/KG	ND	NA	NA	NA
delta-BHC	UG/KG	ND	NA	NA	NA
Lindane (gamma-BHC)	UG/KG	ND	NA	NA	NA
Heptachlor	UG/KG	ND	NA	NA	NA
Aldrin	UG/KG	ND	NA	NA	NA
Heptachlor epoxide	UG/KG	ND	NA	NA	NA
Endosulfan I	UG/KG	ND	NA	NA	NA
Dieldrin	UG/KG	ND	NA	NA	NA
4,4'-DDE	UG/KG	ND	NA	NA	NA
Endrin	UG/KG	ND	NA	NA	NA
Endosulfan II	UG/KG	ND	NA	NA	NA
4,4'-DDD	UG/KG	ND	NA	NA	NA
Endosulfan sulfate	UG/KG	ND	NA	NA	NA
4,4'-DDT	UG/KG	ND	NA	NA	NA
Methoxychlor	UG/KG	ND	NA	NA	NA
Endrin aldehyde	UG/KG	ND	NA	NA	NA
Chlordane (Technical)	UG/KG	ND	NA	NA	NA
Toxaphene	UG/KG	ND	NA	NA	NA
Aroclor 1016	UG/KG	ND	NA	NA	NA
Aroclor 1232	UG/KG	ND	NA	NA	NA
Aroclor 1242	UG/KG	ND	NA	NA	NA
Aroclor 1248	UG/KG	ND	NA	NA	NA
Aroclor 1254	UG/KG	ND	NA	NA	NA
Aroclor 1260	UG/KG	ND	NA	NA	NA



**APPENDIX Q.2**  
**EARTHWORM ANALYTICAL DATA**

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POSITIVE DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-EW-02	7-EW-03	7-EW-04	7-EW-05	7-EW-06	7-EW-07
Laboratory Sample ID:	AC9558	AC9559	AC9560	AC9561	AC9562	AC9563
Date Sampled:	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94

	UNITS						
Aluminum	MG/KG	ND	85.9	100	761	532	513
Barium	MG/KG	0.54 J	1.2 J	1.4 J	3.8 J	3.1 J	2.2 J
Cadmium	MG/KG	1.5	1.5	ND	ND	ND	ND
Calcium	MG/KG	792	1480	2080	1250	618	987
Cobalt	MG/KG	2.8	3.7	2.2	3.5	2.3	3.5
Copper	MG/KG	ND	ND	ND	ND	ND	1.9
Iron	MG/KG	72.1	132	76.4	331	265	253
Lead	MG/KG	1 J	3.5 J	0.72 J	7 J	13.7 J	12.6 J
Magnesium	MG/KG	129	125	139	151	118	147
Manganese	MG/KG	2 J	2.3 J	3.6 J	2.6 J	2.5 J	3.1 J
Mercury	MG/KG	ND	0.09	ND	ND	ND	ND
Potassium	MG/KG	1420	1280	1170	1390	1130	1620
Selenium	MG/KG	2.3	3.1	0.98	1.3	1.4	1.3
Sodium	MG/KG	665	778	685	921	942	799
Zinc	MG/KG	34.4	222	48.4	66.2	63.4	77.2

POSITIVE DETECTION SUMMARY  
OPERABLE UNIT No. 11  
SITE 7 - EARTHWORM SAMPLES  
REMEDIAL INVESTIGATION CTO-0274  
MCB CAMP LEJEUNE, NORTH CAROLINA  
TAL INORGANICS

Client Sample ID: 7-EW-08  
Laboratory Sample ID: AC9564  
Date Sampled: 11/14/94

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	<u>UNITS</u>	
Aluminum	MG/KG	164
Barium	MG/KG	1.5 J
Cadmium	MG/KG	1.4
Calcium	MG/KG	1340
Cobalt	MG/KG	3.9
Copper	MG/KG	1.9
Iron	MG/KG	94.2
Lead	MG/KG	1.1 J
Magnesium	MG/KG	112
Manganese	MG/KG	2.5 J
Mercury	MG/KG	ND
Potassium	MG/KG	1130
Selenium	MG/KG	2.1
Sodium	MG/KG	908
Zinc	MG/KG	64.4

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-EW-02	7-EW-03	7-EW-04	7-EW-05	7-EW-06	7-EW-07
Laboratory Sample ID:	AC9558	AC9559	AC9560	AC9561	AC9562	AC9563
Date Sampled:	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94

	UNITS						
Aluminum	MG/KG	23.5 U	85.9	100	761	532	513
Antimony	MG/KG	9.4 U	8.8 U	9.6 U	9.6 U	9.4 U	9.3 U
Arsenic	MG/KG	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Barium	MG/KG	0.54 J	1.2 J	1.4 J	3.8 J	3.1 J	2.2 J
Beryllium	MG/KG	0.19 U	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U
Cadmium	MG/KG	1.5	1.5	0.96 U	0.96 U	0.94 U	0.93 U
Calcium	MG/KG	792	1480	2080	1250	618	987
Chromium	MG/KG	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Cobalt	MG/KG	2.8	3.7	2.2	3.5	2.3	3.5
Copper	MG/KG	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9
Iron	MG/KG	72.1	132	76.4	331	265	253
Lead	MG/KG	1 J	3.5 J	0.72 J	7 J	13.7 J	12.6 J
Magnesium	MG/KG	129	125	139	151	118	147
Manganese	MG/KG	2 J	2.3 J	3.6 J	2.6 J	2.5 J	3.1 J
Mercury	MG/KG	0.08 U	0.09	0.1 U	0.1 U	0.08 U	0.1 U
Nickel	MG/KG	3.8 U	3.5 U	3.8 U	3.8 U	3.8 U	3.7 U
Potassium	MG/KG	1420	1280	1170	1390	1130	1620
Selenium	MG/KG	2.3	3.1	0.98	1.3	1.4	1.3
Silver	MG/KG	0.94 U	0.88 U	0.96 U	0.96 U	0.94 U	0.93 U
Sodium	MG/KG	665	778	685	921	942	799
Thallium	MG/KG	1.9 UJ	1.8 UJ	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ
Vanadium	MG/KG	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Zinc	MG/KG	34.4	222	48.4	66.2	63.4	77.2

FREQUENCY OF DETECTION SUMMARY  
OPERABLE UNIT No. 11  
SITE 7 - EARTHWORM SAMPLES  
REMEDIAL INVESTIGATION CTO-0274  
MCB CAMP LEJEUNE, NORTH CAROLINA  
TAL INORGANICS

Client Sample ID: 7-EW-08  
Laboratory Sample ID: AC9564  
Date Sampled: 11/14/94

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	<u>UNITS</u>	
Aluminum	MG/KG	164
Antimony	MG/KG	9.1 U
Arsenic	MG/KG	1.8 U
Barium	MG/KG	1.5 J
Beryllium	MG/KG	0.18 U
Cadmium	MG/KG	1.4
Calcium	MG/KG	1340
Chromium	MG/KG	1.8 U
Cobalt	MG/KG	3.9
Copper	MG/KG	1.9
Iron	MG/KG	94.2
Lead	MG/KG	1.1 J
Magnesium	MG/KG	112
Manganese	MG/KG	2.5 J
Mercury	MG/KG	0.09 U
Nickel	MG/KG	3.6 U
Potassium	MG/KG	1130
Selenium	MG/KG	2.1
Silver	MG/KG	0.91 U
Sodium	MG/KG	908
Thallium	MG/KG	1.8 UJ
Vanadium	MG/KG	1.8 U
Zinc	MG/KG	64.4

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION	
	<u>UNITS</u>						
Aluminum	MG/KG	23.5 U	23.5 U	85.9	761	7-EW-05	6/7
Antimony	MG/KG	8.8 U	9.6 U	ND	ND		0/7
Arsenic	MG/KG	1.8 U	1.9 U	ND	ND		0/7
Barium	MG/KG	NA	NA	0.54 J	3.8 J	7-EW-05	7/7
Beryllium	MG/KG	0.18 U	0.19 U	ND	ND		0/7
Cadmium	MG/KG	0.93 U	0.96 U	1.4	1.5	7-EW-03	3/7
Calcium	MG/KG	NA	NA	618	2080	7-EW-04	7/7
Chromium	MG/KG	1.8 U	1.9 U	ND	ND		0/7
Cobalt	MG/KG	NA	NA	2.2	3.9	7-EW-08	7/7
Copper	MG/KG	1.8 U	1.9 U	1.9	1.9	7-EW-08	2/7
Iron	MG/KG	NA	NA	72.1	331	7-EW-05	7/7
Lead	MG/KG	NA	NA	0.72 J	13.7 J	7-EW-06	7/7
Magnesium	MG/KG	NA	NA	112	151	7-EW-05	7/7
Manganese	MG/KG	NA	NA	2 J	3.6 J	7-EW-04	7/7
Mercury	MG/KG	0.08 U	0.1 U	0.09	0.09	7-EW-03	1/7
Nickel	MG/KG	3.5 U	3.8 U	ND	ND		0/7
Potassium	MG/KG	NA	NA	1130	1620	7-EW-07	7/7
Selenium	MG/KG	NA	NA	0.98	3.1	7-EW-03	7/7
Silver	MG/KG	0.88 U	0.96 U	ND	ND		0/7
Sodium	MG/KG	NA	NA	665	942	7-EW-06	7/7
Thallium	MG/KG	1.8 UJ	1.9 UJ	ND	ND		0/7
Vanadium	MG/KG	1.8 U	1.9 U	ND	ND		0/7
Zinc	MG/KG	NA	NA	34.4	222	7-EW-03	7/7

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11**  
**SITE 7 - EARTHWORM SAMPLES**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TAL INORGANICS**

Client Sample ID:	7-EW-02	7-EW-03	7-EW-04	7-EW-05	7-EW-06	7-EW-07
Laboratory Sample ID:	AC9558	AC9559	AC9560	AC9561	AC9562	AC9563
Date Sampled:	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94

	UNITS						
Aluminum	MG/KG	11.75 U	85.9	100	761	532	513
Antimony	MG/KG	4.7 U	4.4 U	4.8 U	4.8 U	4.7 U	4.65 U
Arsenic	MG/KG	0.95 U	0.9 U	0.95 U	0.95 U	0.95 U	0.95 U
Barium	MG/KG	0.54 J	1.2 J	1.4 J	3.8 J	3.1 J	2.2 J
Beryllium	MG/KG	0.095 U	0.09 U	0.095 U	0.095 U	0.095 U	0.095 U
Cadmium	MG/KG	1.5	1.5	0.48 U	0.48 U	0.47 U	0.465 U
Calcium	MG/KG	792	1480	2080	1250	618	987
Chromium	MG/KG	0.95 U	0.9 U	0.95 U	0.95 U	0.95 U	0.95 U
Cobalt	MG/KG	2.8	3.7	2.2	3.5	2.3	3.5
Copper	MG/KG	0.95 U	0.9 U	0.95 U	0.95 U	0.95 U	1.9
Iron	MG/KG	72.1	132	76.4	331	265	253
Lead	MG/KG	1 J	3.5 J	0.72 J	7 J	13.7 J	12.6 J
Magnesium	MG/KG	129	125	139	151	118	147
Manganese	MG/KG	2 J	2.3 J	3.6 J	2.6 J	2.5 J	3.1 J
Mercury	MG/KG	0.04 U	0.09	0.05 U	0.05 U	0.04 U	0.05 U
Nickel	MG/KG	1.9 U	1.75 U	1.9 U	1.9 U	1.9 U	1.85 U
Potassium	MG/KG	1420	1280	1170	1390	1130	1620
Selenium	MG/KG	2.3	3.1	0.98	1.3	1.4	1.3
Silver	MG/KG	0.47 U	0.44 U	0.48 U	0.48 U	0.47 U	0.465 U
Sodium	MG/KG	665	778	685	921	942	799
Thallium	MG/KG	0.95 UJ	0.9 UJ	0.95 UJ	0.95 UJ	0.95 UJ	0.95 UJ
Vanadium	MG/KG	0.95 U	0.9 U	0.95 U	0.95 U	0.95 U	0.95 U
Zinc	MG/KG	34.4	222	48.4	66.2	63.4	77.2

STATISTICAL SUMMARY  
OPERABLE UNIT No. 11  
SITE 7 - EARTHWORM SAMPLES  
REMEDIAL INVESTIGATION CTO-0274  
MCB CAMP LEJEUNE, NORTH CAROLINA  
TAL INORGANICS

Client Sample ID: 7-EW-08  
Laboratory Sample ID: AC9564  
Date Sampled: 11/14/94

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	<u>UNITS</u>	
Aluminum	MG/KG	164
Antimony	MG/KG	4.55 U
Arsenic	MG/KG	0.9 U
Barium	MG/KG	1.5 J
Beryllium	MG/KG	0.09 U
Cadmium	MG/KG	1.4
Calcium	MG/KG	1340
Chromium	MG/KG	0.9 U
Cobalt	MG/KG	3.9
Copper	MG/KG	1.9
Iron	MG/KG	94.2
Lead	MG/KG	1.1 J
Magnesium	MG/KG	112
Manganese	MG/KG	2.5 J
Mercury	MG/KG	0.045 U
Nickel	MG/KG	1.8 U
Potassium	MG/KG	1130
Selenium	MG/KG	2.1
Silver	MG/KG	0.455 U
Sodium	MG/KG	908
Thallium	MG/KG	0.9 UJ
Vanadium	MG/KG	0.9 U
Zinc	MG/KG	64.4



STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:				NORMAL	LOG NORMAL	
Laboratory Sample ID:		MAXIMUM	ARITHMETIC	UPPER 95%	UPPER 95%	
Date Sampled:		DETECTED	MEAN	CONFIDENCE	CONFIDENCE	
				INTERVAL	INTERVAL	
	<u>UNITS</u>					
Aluminum	MG/KG	761	309.7	288.2	521.3	10280.2
Antimony	MG/KG	ND	NA	NA	NA	NA
Arsenic	MG/KG	ND	NA	NA	NA	NA
Barium	MG/KG	3.8 J	2.0	1.1	2.8	4.5
Beryllium	MG/KG	ND	NA	NA	NA	NA
Cadmium	MG/KG	1.5	0.9	0.5	1.3	1.9
Calcium	MG/KG	2080	1221.0	486.9	1578.6	1863.5
Chromium	MG/KG	ND	NA	NA	NA	NA
Cobalt	MG/KG	3.9	3.1	0.7	3.6	3.9
Copper	MG/KG	1.9	1.2	0.5	1.6	1.7
Iron	MG/KG	331	174.8	105.8	252.5	385.6
Lead	MG/KG	13.7 J	5.7	5.6	9.8	66.1
Magnesium	MG/KG	151	131.6	14.6	142.3	144.2
Manganese	MG/KG	3.6 J	2.7	0.5	3.0	3.1
Mercury	MG/KG	0.09	0.1	0.0	0.1	0.1
Nickel	MG/KG	ND	NA	NA	NA	NA
Potassium	MG/KG	1620	1305.7	182.5	1439.7	1460.3
Selenium	MG/KG	3.1	1.8	0.7	2.3	2.7
Silver	MG/KG	ND	NA	NA	NA	NA
Sodium	MG/KG	942	814.0	113.3	897.2	915.1
Thallium	MG/KG	ND	NA	NA	NA	NA
Vanadium	MG/KG	ND	NA	NA	NA	NA
Zinc	MG/KG	222	82.3	63.1	128.7	153.9

POSITIVE DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 METHIOD 8080 PESTICIDE/PCBS

Client Sample ID:	7-EW-04	7-EW-05	7-EW-06	7-EW-07
Laboratory Sample ID:	AC9560	AC9561	AC9562	AC9563
Date Sampled:	11/14/94	11/14/94	11/14/94	11/14/94

	<u>UNITS</u>				
<u>PESTICIDE/PCBS</u>					
Dieldrin	UG/KG	ND	2.4	20	19
4,4'-DDE	UG/KG	ND	2.1	9.3	9.8
Aroclor 1254	UG/KG	110	ND	ND	ND

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 METHIOD 8080 PESTICIDE/PCBS

Client Sample ID:	7-EW-02	7-EW-03	7-EW-04	7-EW-05	7-EW-06	7-EW-07
Laboratory Sample ID:	AC9558	AC9559	AC9560	AC9561	AC9562	AC9563
Date Sampled:	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94

	<u>UNITS</u>					
<u>PESTICIDE/PCBs</u>						
alpha-BHC	UG/KG	4.3 U	2 U	2.2 U	2 U	2 U
beta-BHC	UG/KG	8.5 U	3.9 U	7.9 U	4 U	3.9 U
delta-BHC	UG/KG	13 U	5.9 U	6.6 U	6 U	5.9 U
Lindane (gamma-BHC)	UG/KG	4.3 U	2 U	2.2 U	2 U	2 U
Heptachlor	UG/KG	4.3 U	2 U	2.2 U	2 U	2 U
Aldrin	UG/KG	4.3 U	2 U	2.2 U	2 U	2 U
Heptachlor epoxide	UG/KG	130 U	59 U	66 U	60 U	59 U
Endosulfan I	UG/KG	21 U	10 U	11 U	10 U	10 U
Dieldrin	UG/KG	4.3 U	2 U	3.9 U	2.4	20
4,4'-DDE	UG/KG	4.3 U	2.7 U	7.8 U	2.1	9.3
Endrin	UG/KG	8.5 U	3.9 U	4.4 U	4 U	3.9 U
Endosulfan II	UG/KG	4.3 U	2 U	2.2 U	2 U	2 U
4,4'-DDD	UG/KG	17 U	7.9 U	8.8 U	8 U	7.8 U
Endosulfan sulfate	UG/KG	85 U	39 U	44 U	40 U	39 U
4,4'-DDT	UG/KG	17 U	8 U	9 U	8 U	8 U
Methoxychlor	UG/KG	260 U	120 U	130 U	120 U	120 U
Endrin aldehyde	UG/KG	34 U	16 U	18 U	16 U	16 U
Chlordane (Technical)	UG/KG	21 U	10 U	56 U	19 U	10 U
Toxaphene	UG/KG	340 U	160 U	180 U	160 U	160 U
Aroclor 1016	UG/KG	85 U	39 U	44 U	40 U	39 U
Aroclor 1232	UG/KG	85 U	39 U	44 U	40 U	39 U
Aroclor 1242	UG/KG	85 U	39 U	44 U	40 U	39 U
Aroclor 1248	UG/KG	85 U	39 U	44 U	40 U	39 U
Aroclor 1254	UG/KG	170 U	79 U	110	80 U	90 U
Aroclor 1260	UG/KG	170 U	79 U	88 U	80 U	78 U

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 METHIOD 8080 PESTICIDE/PCBS

Client Sample ID: 7-EW-08  
 Laboratory Sample ID: AC9564  
 Date Sampled: 11/14/94

<u>PESTICIDE/PCBS</u>	<u>UNITS</u>	
alpha-BHC	UG/KG	1.9 U
beta-BHC	UG/KG	3.9 U
delta-BHC	UG/KG	5.8 U
Lindane (gamma-BHC)	UG/KG	1.9 U
Heptachlor	UG/KG	2.6 U
Aldrin	UG/KG	3.1 U
Heptachlor epoxide	UG/KG	58 U
Endosulfan I	UG/KG	10 U
Dieldrin	UG/KG	3.2 U
4,4'-DDE	UG/KG	4.9 U
Endrin	UG/KG	3.9 U
Endosulfan II	UG/KG	1.9 U
4,4'-DDD	UG/KG	7.8 U
Endosulfan sulfate	UG/KG	39 U
4,4'-DDT	UG/KG	8 U
Methoxychlor	UG/KG	120 U
Endrin aldehyde	UG/KG	16 U
Chlordane (Technical)	UG/KG	51 U
Toxaphene	UG/KG	160 U
Aroclor 1016	UG/KG	20 U
Aroclor 1232	UG/KG	20 U
Aroclor 1242	UG/KG	20 U
Aroclor 1248	UG/KG	20 U
Aroclor 1254	UG/KG	40 U
Aroclor 1260	UG/KG	40 U

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 METHIOD 8080 PESTICIDE/PCBS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>						
	<u>PESTICIDE/PCBs</u>						
	alpha-BHC	UG/KG 1.9 U	4.3 U	ND	ND		0/7
	beta-BHC	UG/KG 3.9 U	8.5 U	ND	ND		0/7
	delta-BHC	UG/KG 5.8 U	13 U	ND	ND		0/7
	Lindane (gamma-BHC)	UG/KG 1.9 U	4.3 U	ND	ND		0/7
	Heptachlor	UG/KG 2 U	4.3 U	ND	ND		0/7
	Aldrin	UG/KG 2 U	4.3 U	ND	ND		0/7
	Heptachlor epoxide	UG/KG 58 U	130 U	ND	ND		0/7
	Endosulfan I	UG/KG 10 U	21 U	ND	ND		0/7
	Dieldrin	UG/KG 2 U	4.3 U	2.4	20	7-EW-06	3/7
	4,4'-DDE	UG/KG 2.7 U	7.8 U	2.1	9.8	7-EW-07	3/7
	Endrin	UG/KG 3.9 U	8.5 U	ND	ND		0/7
	Endosulfan II	UG/KG 1.9 U	4.3 U	ND	ND		0/7
	4,4'-DDD	UG/KG 7.8 U	17 U	ND	ND		0/7
	Endosulfan sulfate	UG/KG 39 U	85 U	ND	ND		0/7
	4,4'-DDT	UG/KG 8 U	17 U	ND	ND		0/7
	Methoxychlor	UG/KG 120 U	260 U	ND	ND		0/7
	Endrin aldehyde	UG/KG 16 U	34 U	ND	ND		0/7
	Chlordane (Technical)	UG/KG 10 U	56 U	ND	ND		0/7
	Toxaphene	UG/KG 160 U	340 U	ND	ND		0/7
	Aroclor 1016	UG/KG 20 U	85 U	ND	ND		0/7
	Aroclor 1232	UG/KG 20 U	85 U	ND	ND		0/7
	Aroclor 1242	UG/KG 20 U	85 U	ND	ND		0/7
	Aroclor 1248	UG/KG 20 U	85 U	ND	ND		0/7
	Aroclor 1254	UG/KG 40 U	170 U	110	110	7-EW-04	1/7
	Aroclor 1260	UG/KG 40 U	170 U	ND	ND		0/7

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 METHIOD 8080 PESTICIDE/PCBS

Client Sample ID:	7-EW-02	7-EW-03	7-EW-04	7-EW-05	7-EW-06	7-EW-07
Laboratory Sample ID:	AC9558	AC9559	AC9560	AC9561	AC9562	AC9563
Date Sampled:	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94	11/14/94

	<u>UNITS</u>					
<u>PESTICIDE/PCBS</u>						
alpha-BHC	UG/KG	2.15 U	1 U	1.1 U	1 U	1 U
beta-BHC	UG/KG	4.25 U	1.95 U	3.95 U	2 U	1.95 U
delta-BHC	UG/KG	6.5 U	2.95 U	3.3 U	3 U	2.95 U
Lindane (gamma-BHC)	UG/KG	2.15 U	1 U	1.1 U	1 U	1 U
Heptachlor	UG/KG	2.15 U	1 U	1.1 U	1 U	1 U
Aldrin	UG/KG	2.15 U	1 U	1.1 U	1 U	1 U
Heptachlor epoxide	UG/KG	65 U	29.5 U	33 U	30 U	29.5 U
Endosulfan I	UG/KG	10.5 U	5 U	5.5 U	5 U	5 U
Dieldrin	UG/KG	2.15 U	1 U	1.95 U	2.4	20
4,4'-DDE	UG/KG	2.15 U	1.35 U	3.9 U	2.1	9.3
Endrin	UG/KG	4.25 U	1.95 U	2.2 U	2 U	1.95 U
Endosulfan II	UG/KG	2.15 U	1 U	1.1 U	1 U	1 U
4,4'-DDD	UG/KG	8.5 U	3.95 U	4.4 U	4 U	3.9 U
Endosulfan sulfate	UG/KG	42.5 U	19.5 U	22 U	20 U	19.5 U
4,4'-DDT	UG/KG	8.5 U	4 U	4.5 U	4 U	4 U
Methoxychlor	UG/KG	130 U	60 U	65 U	60 U	60 U
Endrin aldehyde	UG/KG	17 U	8 U	9 U	8 U	8 U
Chlordane (Technical)	UG/KG	10.5 U	5 U	28 U	9.5 U	5 U
Toxaphene	UG/KG	170 U	80 U	90 U	80 U	80 U
Aroclor 1016	UG/KG	42.5 U	19.5 U	22 U	20 U	19.5 U
Aroclor 1232	UG/KG	42.5 U	19.5 U	22 U	20 U	19.5 U
Aroclor 1242	UG/KG	42.5 U	19.5 U	22 U	20 U	19.5 U
Aroclor 1248	UG/KG	42.5 U	19.5 U	22 U	20 U	19.5 U
Aroclor 1254	UG/KG	85 U	39.5 U	110	40 U	45 U
Aroclor 1260	UG/KG	85 U	39.5 U	44 U	40 U	39 U

STATISTICAL SUMMARY  
OPERABLE UNIT No. 11  
SITE 7 - EARTHWORM SAMPLES  
REMEDIAL INVESTIGATION CTO-0274  
MCB CAMP LEJEUNE, NORTH CAROLINA  
METHIOD 8080 PESTICIDE/PCBS

Client Sample ID: 7-EW-08  
Laboratory Sample ID: AC9564  
Date Sampled: 11/14/94

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<u>PESTICIDE/PCBS</u>	<u>UNITS</u>	
alpha-BHC	UG/KG	0.95 U
beta-BHC	UG/KG	1.95 U
delta-BHC	UG/KG	2.9 U
Lindane (gamma-BHC)	UG/KG	0.95 U
Heptachlor	UG/KG	1.3 U
Aldrin	UG/KG	1.55 U
Heptachlor epoxide	UG/KG	29 U
Endosulfan I	UG/KG	5 U
Dieldrin	UG/KG	1.6 U
4,4'-DDE	UG/KG	2.45 U
Endrin	UG/KG	1.95 U
Endosulfan II	UG/KG	0.95 U
4,4'-DDD	UG/KG	3.9 U
Endosulfan sulfate	UG/KG	19.5 U
4,4'-DDT	UG/KG	4 U
Methoxychlor	UG/KG	60 U
Endrin aldehyde	UG/KG	8 U
Chlordane (Technical)	UG/KG	25.5 U
Toxaphene	UG/KG	80 U
Aroclor 1016	UG/KG	10 U
Aroclor 1232	UG/KG	10 U
Aroclor 1242	UG/KG	10 U
Aroclor 1248	UG/KG	10 U
Aroclor 1254	UG/KG	20 U
Aroclor 1260	UG/KG	20 U

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SAMPLES  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 METHOD 8080 PESTICIDE/PCBS

Client Sample ID: Laboratory Sample ID: Date Sampled:		MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
	<u>UNITS</u>					
	<u>PESTICIDE/PCBs</u>					
	alpha-BHC	UG/KG	ND	NA	NA	NA
	beta-BHC	UG/KG	ND	NA	NA	NA
	delta-BHC	UG/KG	ND	NA	NA	NA
	Lindane (gamma-BHC)	UG/KG	ND	NA	NA	NA
	Heptachlor	UG/KG	ND	NA	NA	NA
	Aldrin	UG/KG	ND	NA	NA	NA
	Heptachlor epoxide	UG/KG	ND	NA	NA	NA
	Endosulfan I	UG/KG	ND	NA	NA	NA
	Dieldrin	UG/KG	20	6.9	8.6	13.2
	4,4'-DDE	UG/KG	9.8	4.4	3.6	7.1
	Endrin	UG/KG	ND	NA	NA	NA
	Endosulfan II	UG/KG	ND	NA	NA	NA
	4,4'-DDD	UG/KG	ND	NA	NA	NA
	Endosulfan sulfate	UG/KG	ND	NA	NA	NA
	4,4'-DDT	UG/KG	ND	NA	NA	NA
	Methoxychlor	UG/KG	ND	NA	NA	NA
	Endrin aldehyde	UG/KG	ND	NA	NA	NA
	Chlordane (Technical)	UG/KG	ND	NA	NA	NA
	Toxaphene	UG/KG	ND	NA	NA	NA
	Aroclor 1016	UG/KG	ND	NA	NA	NA
	Aroclor 1232	UG/KG	ND	NA	NA	NA
	Aroclor 1242	UG/KG	ND	NA	NA	NA
	Aroclor 1248	UG/KG	ND	NA	NA	NA
	Aroclor 1254	UG/KG	110	55.3	31.0	78.1
	Aroclor 1260	UG/KG	ND	NA	NA	NA



**APPENDIX Q.3**  
**ANALYTICAL SOIL DATA FROM THE EARTHWORM STATIONS**

POSITIVE DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SOILS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-WM-SB01	7-WM-SB02	7-WM-SB03
Laboratory Sample ID:	AC9587	AC9598	AC9601
Date Sampled:	11/14/94	11/14/94	11/14/94

	<u>UNITS</u>			
Aluminum	MG/KG	1500	6450	2610
Barium	MG/KG	12.1	29.9	6.4
Beryllium	MG/KG	ND	0.31	ND
Calcium	MG/KG	214	1270	226
Chromium	MG/KG	4	8.3	2.3
Copper	MG/KG	ND	5.8	ND
Iron	MG/KG	767	2840	1160
Lead	MG/KG	9.3	131	8.3
Magnesium	MG/KG	60.8	221	69.4
Manganese	MG/KG	1.9	18.1	8.3
Selenium	MG/KG	1.4	ND	ND
Sodium	MG/KG	61.2	57.5	28.2
Vanadium	MG/KG	3.5	10.4	3.1
Zinc	MG/KG	6.1	45.7	7
Moisture	%	28.77	21.52	11.08

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SOILS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:	7-WM-SB01	7-WM-SB02	7-WM-SB03
Laboratory Sample ID:	AC9587	AC9598	AC9601
Date Sampled:	11/14/94	11/14/94	11/14/94

	UNITS			
Aluminum	MG/KG	1500	6450	2610
Antimony	MG/KG	13.9 U	12.7 U	10.9 U
Arsenic	MG/KG	2.8 U	2.5 U	2.2 U
Barium	MG/KG	12.1	29.9	6.4
Beryllium	MG/KG	0.28 U	0.31	0.22 U
Cadmium	MG/KG	1.4 U	1.3 U	1.1 U
Calcium	MG/KG	214	1270	226
Chromium	MG/KG	4	8.3	2.3
Cobalt	MG/KG	2.8 U	2.5 U	2.2 U
Copper	MG/KG	2.8 U	5.8	2.2 U
Iron	MG/KG	767	2840	1160
Lead	MG/KG	9.3	131	8.3
Magnesium	MG/KG	60.8	221	69.4
Manganese	MG/KG	1.9	18.1	8.3
Mercury	MG/KG	0.14 U	0.13 U	0.11 U
Nickel	MG/KG	5.6 U	5.1 U	4.4 U
Potassium	MG/KG	278 U	255 U	218 U
Selenium	MG/KG	1.4	1.3 U	1.1 U
Silver	MG/KG	1.4 U	1.3 U	1.1 U
Sodium	MG/KG	61.2	57.5	28.2
Thallium	MG/KG	2.8 U	2.5 U	2.2 U
Vanadium	MG/KG	3.5	10.4	3.1
Zinc	MG/KG	6.1	45.7	7
Moisture	%	28.77	21.52	11.08

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SOILS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Client Sample ID:		MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	LOCATION OF	FREQUENCY
Laboratory Sample ID:		NONDETECTED	NONDETECTED	DETECTED	DETECTED	MAXIMUM	OF
Date Sampled:		NONDETECTED	NONDETECTED	DETECTED	DETECTED	DETECTED	DETECTION
	<u>UNITS</u>						
Aluminum	MG/KG	NA	NA	1500	6450	7-WM-SB02	3/3
Antimony	MG/KG	10.9 U	13.9 U	ND	ND		0/3
Arsenic	MG/KG	2.2 U	2.8 U	ND	ND		0/3
Barium	MG/KG	NA	NA	6.4	29.9	7-WM-SB02	3/3
Beryllium	MG/KG	0.22 U	0.28 U	0.31	0.31	7-WM-SB02	1/3
Cadmium	MG/KG	1.1 U	1.4 U	ND	ND		0/3
Calcium	MG/KG	NA	NA	214	1270	7-WM-SB02	3/3
Chromium	MG/KG	NA	NA	2.3	8.3	7-WM-SB02	3/3
Cobalt	MG/KG	2.2 U	2.8 U	ND	ND		0/3
Copper	MG/KG	2.2 U	2.8 U	5.8	5.8	7-WM-SB02	1/3
Iron	MG/KG	NA	NA	767	2840	7-WM-SB02	3/3
Lead	MG/KG	NA	NA	8.3	131	7-WM-SB02	3/3
Magnesium	MG/KG	NA	NA	60.8	221	7-WM-SB02	3/3
Manganese	MG/KG	NA	NA	1.9	18.1	7-WM-SB02	3/3
Mercury	MG/KG	0.11 U	0.14 U	ND	ND		0/3
Nickel	MG/KG	4.4 U	5.6 U	ND	ND		0/3
Potassium	MG/KG	218 U	278 U	ND	ND		0/3
Selenium	MG/KG	1.1 U	1.3 U	1.4	1.4	7-WM-SB01	1/3
Silver	MG/KG	1.1 U	1.4 U	ND	ND		0/3
Sodium	MG/KG	NA	NA	28.2	61.2	7-WM-SB01	3/3
Thallium	MG/KG	2.2 U	2.8 U	ND	ND		0/3
Vanadium	MG/KG	NA	NA	3.1	10.4	7-WM-SB02	3/3
Zinc	MG/KG	NA	NA	6.1	45.7	7-WM-SB02	3/3
Moisture	%						

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11**  
**SITE 7 - EARTHWORM SOILS**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TAL INORGANICS**

Client Sample ID:	7-WM-SB01	7-WM-SB02	7-WM-SB03
Laboratory Sample ID:	AC9587	AC9598	AC9601
Date Sampled:	11/14/94	11/14/94	11/14/94

	<u>UNITS</u>			
Aluminum	MG/KG	1500	6450	2610
Antimony	MG/KG	6.95 U	6.35 U	5.45 U
Arsenic	MG/KG	1.4 U	1.25 U	1.1 U
Barium	MG/KG	12.1	29.9	6.4
Beryllium	MG/KG	0.14 U	0.31	0.11 U
Cadmium	MG/KG	0.7 U	0.65 U	0.55 U
Calcium	MG/KG	214	1270	226
Chromium	MG/KG	4	8.3	2.3
Cobalt	MG/KG	1.4 U	1.25 U	1.1 U
Copper	MG/KG	1.4 U	5.8	1.1 U
Iron	MG/KG	767	2840	1160
Lead	MG/KG	9.3	131	8.3
Magnesium	MG/KG	60.8	221	69.4
Manganese	MG/KG	1.9	18.1	8.3
Mercury	MG/KG	0.07 U	0.065 U	0.055 U
Nickel	MG/KG	2.8 U	2.55 U	2.2 U
Potassium	MG/KG	139 U	127.5 U	109 U
Selenium	MG/KG	1.4	0.65 U	0.55 U
Silver	MG/KG	0.7 U	0.65 U	0.55 U
Sodium	MG/KG	61.2	57.5	28.2
Thallium	MG/KG	1.4 U	1.25 U	1.1 U
Vanadium	MG/KG	3.5	10.4	3.1
Zinc	MG/KG	6.1	45.7	7
Moisture	%	28.77	21.52	11.08

**STATISTICAL SUMMARY**  
**OPERABLE UNIT No. 11**  
**SITE 7 - EARTHWORM SOILS**  
**REMEDIAL INVESTIGATION CTO-0274**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**TAL INORGANICS**

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL	
	<b>UNITS</b>					
Aluminum	MG/KG	6450	3520.0	2597.4	7898.9	878067.0
Antimony	MG/KG	ND	NA	NA	NA	NA
Arsenic	MG/KG	ND	NA	NA	NA	NA
Barium	MG/KG	29.9	16.1	12.3	36.8	5407.8
Beryllium	MG/KG	0.31	0.2	0.1	0.4	3.9
Cadmium	MG/KG	ND	NA	NA	NA	NA
Calcium	MG/KG	1270	570.0	606.2	1592.1	79003798.7
Chromium	MG/KG	8.3	4.9	3.1	10.1	331.4
Cobalt	MG/KG	ND	NA	NA	NA	NA
Copper	MG/KG	5.8	2.8	2.6	7.2	5384.6
Iron	MG/KG	2840	1589.0	1101.1	3445.3	127491.1
Lead	MG/KG	131	49.5	70.6	168.5	6727597277439.2
Magnesium	MG/KG	221	117.1	90.1	269.0	23631.8
Manganese	MG/KG	18.1	9.4	8.2	23.2	6977440.3
Mercury	MG/KG	ND	NA	NA	NA	NA
Nickel	MG/KG	ND	NA	NA	NA	NA
Potassium	MG/KG	ND	NA	NA	NA	NA
Selenium	MG/KG	1.4	0.9	0.5	1.6	8.9
Silver	MG/KG	ND	NA	NA	NA	NA
Sodium	MG/KG	61.2	49.0	18.1	79.4	366.8
Thallium	MG/KG	ND	NA	NA	NA	NA
Vanadium	MG/KG	10.4	5.7	4.1	12.6	444.1
Zinc	MG/KG	45.7	19.6	22.6	57.7	10317353.2

Moisture            %

POSITIVE DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SOILS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL PESTICIDE/PCBS

Client Sample ID:	7-WM-SB01	7-WM-SB02	7-WM-SB03
Laboratory Sample ID:	AC9587	AC9598	AC9601
Date Sampled:	11/14/94	11/14/94	11/14/94

	<u>UNITS</u>			
<u>PESTICIDE/PCBS</u>				
delta-BHC	UG/KG	ND	3.1 J	ND
Heptachlor epoxide	UG/KG	ND	2.5	ND
Dieldrin	UG/KG	ND	280	ND
4,4'-DDE	UG/KG	ND	160	7.3
Endosulfan II	UG/KG	ND	4.6 J	3.9 J
4,4'-DDD	UG/KG	ND	18	ND
4,4'-DDT	UG/KG	6.4	140	7.2
Endrin aldehyde	UG/KG	ND	6.7 NJ	ND
alpha-Chlordane	UG/KG	ND	24 J	ND
gamma-Chlordane	UG/KG	ND	7.5 J	ND

FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SOILS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL PESTICIDE/PCBS

Client Sample ID:	7-WM-SB01	7-WM-SB02	7-WM-SB03
Laboratory Sample ID:	AC9587	AC9598	AC9601
Date Sampled:	11/14/94	11/14/94	11/14/94

PESTICIDE/PCBs	UNITS			
	7-WM-SB01	7-WM-SB02	7-WM-SB03	
alpha-BHC	UG/KG	2.4 U	2.2 U	1.9 U
beta-BHC	UG/KG	2.4 U	2.2 U	1.9 U
delta-BHC	UG/KG	2.4 U	3.1 J	1.9 U
Lindane (gamma-BHC)	UG/KG	2.4 U	2.2 U	1.9 U
Heptachlor	UG/KG	2.4 U	2.2 U	1.9 U
Aldrin	UG/KG	2.4 U	2.2 U	1.9 U
Heptachlor epoxide	UG/KG	2.4 U	2.5	1.9 U
Endosulfan I	UG/KG	2.4 U	2.2 U	1.9 U
Dieldrin	UG/KG	4.6 U	280	3.7 U
4,4'-DDE	UG/KG	4.6 U	160	7.3
Endrin	UG/KG	4.6 U	4.2 U	3.7 U
Endosulfan II	UG/KG	4.6 U	4.6 J	3.9 J
4,4'-DDD	UG/KG	4.6 U	18	3.7 U
Endosulfan sulfate	UG/KG	4.6 U	4.2 U	3.7 U
4,4'-DDT	UG/KG	6.4	140	7.2
Methoxychlor	UG/KG	24 U	22 U	19 U
Endrin ketone	UG/KG	4.6 U	4.2 U	3.7 U
Endrin aldehyde	UG/KG	4.6 U	6.7 NJ	3.7 U
alpha-Chlordane	UG/KG	2.4 U	24 J	1.9 U
gamma-Chlordane	UG/KG	2.4 U	7.5 J	1.9 U
Toxaphene	UG/KG	240 U	220 U	190 U
Aroclor 1016	UG/KG	46 U	42 U	37 U
Aroclor 1221	UG/KG	94 U	85 U	74 U
Aroclor 1232	UG/KG	46 U	42 U	37 U
Aroclor 1242	UG/KG	46 U	42 U	37 U
Aroclor 1248	UG/KG	46 U	42 U	37 U
Aroclor 1254	UG/KG	46 U	42 U	37 U
Aroclor 1260	UG/KG	46 U	42 U	37 U



FREQUENCY OF DETECTION SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SOILS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL PESTICIDE/PCBS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
	<u>UNITS</u>					
	<u>PESTICIDE/PCBs</u>					
alpha-BHC	UG/KG	1.9 U	2.4 U	ND	ND	0/3
beta-BHC	UG/KG	1.9 U	2.4 U	ND	ND	0/3
delta-BHC	UG/KG	1.9 U	2.4 U	3.1 J	3.1 J	7-WM-SB02 1/3
Lindane (gamma-BHC)	UG/KG	1.9 U	2.4 U	ND	ND	0/3
Heptachlor	UG/KG	1.9 U	2.4 U	ND	ND	0/3
Aldrin	UG/KG	1.9 U	2.4 U	ND	ND	0/3
Heptachlor epoxide	UG/KG	1.9 U	2.4 U	2.5	2.5	7-WM-SB02 1/3
Endosulfan I	UG/KG	1.9 U	2.4 U	ND	ND	0/3
Dieldrin	UG/KG	3.7 U	4.6 U	280	280	7-WM-SB02 1/3
4,4'-DDE	UG/KG	4.6 U	4.6 U	7.3	160	7-WM-SB02 2/3
Endrin	UG/KG	3.7 U	4.6 U	ND	ND	0/3
Endosulfan II	UG/KG	4.6 U	4.6 U	3.9 J	4.6 J	7-WM-SB02 2/3
4,4'-DDD	UG/KG	3.7 U	4.6 U	18	18	7-WM-SB02 1/3
Endosulfan sulfate	UG/KG	3.7 U	4.6 U	ND	ND	0/3
4,4'-DDT	UG/KG	NA	NA	6.4	140	7-WM-SB02 3/3
Methoxychlor	UG/KG	19 U	24 U	ND	ND	0/3
Endrin ketone	UG/KG	3.7 U	4.6 U	ND	ND	0/3
Endrin aldehyde	UG/KG	3.7 U	4.6 U	6.7 NJ	6.7 NJ	7-WM-SB02 1/3
alpha-Chlordane	UG/KG	1.9 U	2.4 U	24 J	24 J	7-WM-SB02 1/3
gamma-Chlordane	UG/KG	1.9 U	2.4 U	7.5 J	7.5 J	7-WM-SB02 1/3
Toxaphene	UG/KG	190 U	240 U	ND	ND	0/3
Aroclor 1016	UG/KG	37 U	46 U	ND	ND	0/3
Aroclor 1221	UG/KG	74 U	94 U	ND	ND	0/3
Aroclor 1232	UG/KG	37 U	46 U	ND	ND	0/3
Aroclor 1242	UG/KG	37 U	46 U	ND	ND	0/3
Aroclor 1248	UG/KG	37 U	46 U	ND	ND	0/3
Aroclor 1254	UG/KG	37 U	46 U	ND	ND	0/3
Aroclor 1260	UG/KG	37 U	46 U	ND	ND	0/3

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SOILS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL PESTICIDE/PCBS

Client Sample ID:	7-WM-SB01	7-WM-SB02	7-WM-SB03
Laboratory Sample ID:	AC9587	AC9598	AC9601
Date Sampled:	11/14/94	11/14/94	11/14/94

	UNITS			
PESTICIDE/PCBs				
alpha-BHC	UG/KG	1.2 U	1.1 U	0.95 U
beta-BHC	UG/KG	1.2 U	1.1 U	0.95 U
delta-BHC	UG/KG	1.2 U	3.1 J	0.95 U
Lindane (gamma-BHC)	UG/KG	1.2 U	1.1 U	0.95 U
Heptachlor	UG/KG	1.2 U	1.1 U	0.95 U
Aldrin	UG/KG	1.2 U	1.1 U	0.95 U
Heptachlor epoxide	UG/KG	1.2 U	2.5	0.95 U
Endosulfan I	UG/KG	1.2 U	1.1 U	0.95 U
Dieldrin	UG/KG	2.3 U	280	1.85 U
4,4'-DDE	UG/KG	2.3 U	160	7.3
Endrin	UG/KG	2.3 U	2.1 U	1.85 U
Endosulfan II	UG/KG	2.3 U	4.6 J	3.9 J
4,4'-DDD	UG/KG	2.3 U	18	1.85 U
Endosulfan sulfate	UG/KG	2.3 U	2.1 U	1.85 U
4,4'-DDT	UG/KG	6.4	140	7.2
Methoxychlor	UG/KG	12 U	11 U	9.5 U
Endrin ketone	UG/KG	2.3 U	2.1 U	1.85 U
Endrin aldehyde	UG/KG	2.3 U	6.7 NJ	1.85 U
alpha-Chlordane	UG/KG	1.2 U	24 J	0.95 U
gamma-Chlordane	UG/KG	1.2 U	7.5 J	0.95 U
Toxaphene	UG/KG	120 U	110 U	95 U
Aroclor 1016	UG/KG	23 U	21 U	18.5 U
Aroclor 1221	UG/KG	47 U	42.5 U	37 U
Aroclor 1232	UG/KG	23 U	21 U	18.5 U
Aroclor 1242	UG/KG	23 U	21 U	18.5 U
Aroclor 1248	UG/KG	23 U	21 U	18.5 U
Aroclor 1254	UG/KG	23 U	21 U	18.5 U
Aroclor 1260	UG/KG	23 U	21 U	18.5 U

STATISTICAL SUMMARY  
 OPERABLE UNIT No. 11  
 SITE 7 - EARTHWORM SOILS  
 REMEDIAL INVESTIGATION CTO-0274  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TCL PESTICIDE/PCBS

Client Sample ID: Laboratory Sample ID: Date Sampled:	MAXIMUM DETECTED	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG NORMAL UPPER 95% CONFIDENCE INTERVAL
<b>PESTICIDE/PCBS</b>	<b>UNITS</b>				
alpha-BHC	UG/KG	ND	NA	NA	NA
beta-BHC	UG/KG	ND	NA	NA	NA
delta-BHC	UG/KG	3.1 J	1.8	1.2	105.3
Lindane (gamma-BHC)	UG/KG	ND	NA	NA	NA
Heptachlor	UG/KG	ND	NA	NA	NA
Aldrin	UG/KG	ND	NA	NA	NA
Heptachlor epoxide	UG/KG	2.5	1.6	0.8	26.1
Endosulfan I	UG/KG	ND	NA	NA	NA
Dieldrin	UG/KG	280	94.7	160.5	365.2
4,4'-DDE	UG/KG	160	56.5	89.6	207.7
Endrin	UG/KG	ND	NA	NA	NA
Endosulfan II	UG/KG	4.6 J	3.6	1.2	5.6
4,4'-DDD	UG/KG	18	7.4	9.2	22.9
Endosulfan sulfate	UG/KG	ND	NA	NA	NA
4,4'-DDT	UG/KG	140	51.2	76.9	180.8
Methoxychlor	UG/KG	ND	NA	NA	163078360718037.6
Endrin ketone	UG/KG	ND	NA	NA	NA
Endrin aldehyde	UG/KG	6.7 NJ	3.6	2.7	8.1
alpha-Chlordane	UG/KG	24 J	8.7	13.2	31.0
gamma-Chlordane	UG/KG	7.5 J	3.2	3.7	9.5
Toxaphene	UG/KG	ND	NA	NA	NA
Aroclor 1016	UG/KG	ND	NA	NA	NA
Aroclor 1221	UG/KG	ND	NA	NA	NA
Aroclor 1232	UG/KG	ND	NA	NA	NA
Aroclor 1242	UG/KG	ND	NA	NA	NA
Aroclor 1248	UG/KG	ND	NA	NA	NA
Aroclor 1254	UG/KG	ND	NA	NA	NA
Aroclor 1260	UG/KG	ND	NA	NA	NA

**APPENDIX R**  
**BENTHIC MACROINVERTEBRATE**  
**LABORATORY BENCH SHEETS**

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October 31, 1994

Baker Environmental, Inc.  
Airport Office Park, Building 3  
420 Rouser Road  
Coraopolis, Pennsylvania 15108

Attn: Mr. Aaron Bernhardt

Dear Aaron,

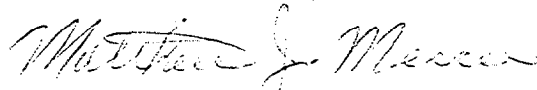
Here are copies of the benchsheets and table for the Camp Lejeune - Site 7 samples. We had to separate the NC and WT stations because they wouldn't fit across the page, but it is still one table and will be priced accordingly.

Ecologically speaking, the communities represented by the NC and WT stations are typical of soft-bottom, euryhaline (i.e., wide range in salinity) habitats. However, as indicated by Table 7 there is a shift in diversity and taxa richness as you go from NC02 to NC03. Especially notice that several taxa, particularly the Oligochaetes, the amphipod Corophium lacustre, the isopod Cyathura polita, and the chironomid Chironomus decorus gr. drop out entirely. These organisms can handle oligohaline (i.e., low salinity: 0.5 - 3.0ppt) environments, but they do not like continuous exposure to higher salinities (i.e., mesohaline: 3.0 - 16.5ppt; polyhaline: 16.5 - 30.0ppt; marine: >30.0ppt).

Without knowing the particulars at the WT stations, it is hard to say why the communities at WT01 and WT02 are so depauperate. Perhaps the tidal fluctuation is very great or there are extremely low levels of dissolved oxygen. Both stations stand in contrast to WT03 which exhibited a typical oligohaline community. The disappearance of Limnodrilus hoffmeisteri from WT02 to WT03 is indicative of the increased salinity, but why these aren't present at WT01 is a mystery.

If I can be of further help in unraveling some of these questions, please don't hesitate to call.

At your service,



Matthew J. Mercer  
Environmental Scientist



**INVERTEBRATE SECTION**  
**LABORATORY IDENTIFICATION BENCH SHEET**

Client: BAKER ENVIRONMENTAL Job Number/Task: 04919-03  
 Location: NEW R. EST - CAMP LEJUE SITE 7 Sample ID: 7-NC01-B1  
 Coll Date: 6/94 Prelim. Sorter: JLF Split Sorter: \_\_\_\_\_  
 Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: \_\_\_\_\_ Presort ID Time: 0.5 Date-Identifier: 9/30/94 gmsm  
 Split/Midge and worm ID Time: 0.5 Date-Identifier: 9/30/94 gmsm  
 QA/QC Time: \_\_\_\_\_

4 42  
=

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
<u>5 of 32</u>	<u>TUBIFICIDA</u>	→	<u>32</u>					<u>TUBIFICIDAE</u>
	<u>CAPITELLIDA</u>	<u>Capitella capitata</u>	<u>28</u>					
	<u>PHYLLODOCIDA</u>	<u>Nereis succinea</u>	<u>58</u>					
	<u>TEREBELLIDH</u>	<u>Hypaniola grayi</u>	<u>11</u>					
	<u>SPIONIDA</u>	<u>Polydora sp.</u>	<u>1</u>					
	<u>AMPHIPODA</u>	<u>Corophium lacustre</u>	<u>1</u>					
	<u>11</u>	<u>Gammarus mucronatus</u>	<u>1</u>					
<u>0 of 42</u>	<u>DIPTERA</u>	<u>Chironomus decorus sp.</u>	<u>42</u>					
	<u>VENTROIDA</u>	<u>Macoma tent</u>	<u>2</u>					

**INVERTEBRATE SECTION  
LABORATORY IDENTIFICATION BENCH SHEET**

Client: BAKER ENVIRONMENTAL

Job Number/Task: 04919-03

Location: NEW R. EST - CAMP LEJUNE - SITE 7

Sample ID: TNCOI-BN02

Coll Date: 6/94 Prelim. Sorter: SWA

Split Sorter: \_\_\_\_\_

Subsampled Taxa: \_\_\_\_\_

ID Time Budget: 2.0

Presort ID Time: 0.25

Date-Identifier: 10/10/94 MAM

Split/Midge and worm ID Time: \_\_\_\_\_

Date-Identifier: \_\_\_\_\_

QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	Presort Number	Split/QA/QC Number	Comments
	<u>TUBIFICIDA</u>	<u>→</u>	<u>1</u>			<u>TUBIFICIDAE</u>
			<u>11</u>			
	<u>PHYLLOPODA</u>	<u>Nereis succinea</u>	<u>116</u>			
	<u>TEREBELLIDA</u>	<u>Hypania grayi</u>	<u>7</u>			
	<u>CAPITELLIDA</u>	<u>Capitella capitata</u>	<u>11</u>			
	<u>TANAIDACEA</u>	<u>Leptochelia rapax</u>	<u>1</u>			
	<u>ISOPODA</u>	<u>Edotea triloba</u>	<u>1</u>			
	<u>AMPHIPODA</u>	<u>Gammarus mucronatus</u>	<u>1</u>			
	"	<u>Melita nitida</u>	<u>2</u>			
	<u>DIPTERA</u>	<u>Chironomid</u>	<u>9</u>			<u>(1 pupae)</u>
	"	<u>Tribelos jucundum</u>	<u>1</u>			

# INVERTEBRATE SECTION LABORATORY IDENTIFICATION BENCH SHEET

Client: BAKER ENVIRONMENTAL Job Number/Task: 04919-03  
 Location: NEW RI. EST. - CAMP LETUENE SITE Sample ID: 7-NC01-8A  
 Coll Date: 6/94 Prelim. Sorter: JLF Split Sorter: \_\_\_\_\_  
 Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 20 Presort ID Time: 0.25 Date-Identifier: 70/10/94msm  
 Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
 QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
	<u>TURBELLIDA</u>	→	<u>17</u>					<u>TURBELLIDAE</u>
	<u>CAPITELLIDA</u>	<u>Capitella capitata</u>	<u>45</u>					
	<u>PHYLLODOCIDA</u>	<u>Nereis succinea</u>	<u>152</u>					
	<u>SPIONIDA</u>	<u>Polydora sp.</u>	<u>7</u>					
	<u>TEREBELLIDA</u>	<u>Hypania grayi</u>	<u>6</u>					
	<u>TANAIDACEA</u>	<u>Leptochelia rapax</u>	<u>3</u>					
	<u>ISOPODA</u>	<u>Edotea triloba</u>	<u>1</u>					
	<u>AMPHIPODA</u>	<u>Cocophium lacustre</u>	<u>2</u>					
	"	<u>Gammarus mucronatus</u>	<u>6</u>					
	<u>MEIOGASTROPODA</u>	→	<u>1</u>					<u>NATICIDAE</u>

Notes:



# INVERTEBRATE SECTION LABORATORY IDENTIFICATION BENCH SHEET

SUBJECT

Client: BAKER ENVIRONMENTAL Job Number/Task: 04919-03  
 Location: NEW RIVER EST - CAMP LEJUNE SITE 7, Sample ID: 7-NCO2-BNO  
 Coll Date: 6/94 Prelim. Sorter: CRE Split Sorter: \_\_\_\_\_

Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 2.0 Presort ID Time: 0.25 Date-Identifier: 10/10/94  
 Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
 QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
	<u>TUBIFICIDA</u>	<u>→</u>	<u>8</u>					<u>TUBIFICIDAE</u>
	<u>CAPITELLIDA</u>	<u>Capitella capitata</u>	<u>26</u>					
	<u>PHYLLODOIDA</u>	<u>Nereis succinea</u>	<u>73</u>					
	<u>TANAIDACEA</u>	<u>Leptochelia ruppax</u>	<u>1</u>					
	<u>ISOPODA</u>	<u>Eudotea triibbana</u>	<u>2</u>					
	<u>AMPHIRODA</u>	<u>Gammarus mucronatus</u>	<u>2</u>					
	<u>DECAPODA</u>	<u>Palaemonetes pugio</u>	<u>1</u>					
	<u>VENEROIDA</u>	<u>Macoma tenta</u>	<u>4</u>					

**INVERTEBRATE SECTION  
LABORATORY IDENTIFICATION BENCH SHEET**

511032

Client: BAKER ENVIRONMENTAL Job Number/Task: 04919 3  
 Location: NEW R. EST. - CAMP LEJEUNE SITE 7 Sample ID: 7-NCOZ-B.  
 Coll Date: 6/94 Prelim. Sorter: DEB Split Sorter: \_\_\_\_\_  
 Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 2.0 Presort ID Time: 0.25 Date-Identifier: 10/10/94M  
 Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
 QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
	<i>TUBIFICIDA</i>	→	1					<i>TUBIFICIDA</i>
	<i>CAPITELLIDA</i>	<i>Capitella capitata</i>	4					
	<i>PHYLLODOCIDA</i>	<i>Nereis succinea</i>	42					
	<i>SPIONIDA</i>	<i>Polydora sp.</i>	1					
	<i>ISOPODA</i>	<i>Edotea triloba</i>	1					
	<i>AMPHIPODA</i>	<i>Gammarus mucronatus</i>	1					
	<i>DECAPODA</i>	<i>Palaemonetes pugio</i>	1					

**INVERTEBRATE SECTION  
LABORATORY IDENTIFICATION BENCH SHEET**

Client: BAKER ENVIRONMENTAL Job Number/Task: 04919  
 Location: NEW R. EST. - CAMP LESJUNE SITE 7 Sample ID: 7-NC  
 Coll Date: 6/94 Prelim. Sorter: \_\_\_\_\_ Split Sorter: \_\_\_\_\_  
 Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 2.0 Presort ID Time: 0.25 Date-Identifier: 10/11/94  
 Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
 QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comm
<u>2</u>	<u>TUBIFICIDA</u>	<u>→</u>	<u>18</u>					<u>TURIEL</u>
	<u>CAPITELLIDA</u>	<u>Capitella capitata</u>	<u>9</u>					
	<u>PRYLLODOCIDA</u>	<u>Nereis succinea</u>	<u>65</u>					
	<u>SPIONIDA</u>	<u>Polydora sp.</u>	<u>1</u>					
	<u>ISOPODA</u>	<u>Cyathura polita</u>	<u>1</u>					



**INVERTEBRATE SECTION  
LABORATORY IDENTIFICATION BENCH SHEET**

Client: BAKER ENVIRONMENTAL  
 Location: NEW R. EST., CAMP LEJUNE SITE 7

Job Number/Task: 14919-03  
 Sample ID: 7-NC03-8NO2

Coll Date: 6/94 Prelim. Sorter: MJR Split Sorter: \_\_\_\_\_

Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 2.0 Presort ID Time: 0.25 Date-Identifier: 10/11/94 MWM

Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_

QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
	<i>RYNCHOBDELLIDA</i>	→	1					<i>PISCICOLIDAE</i>
	<i>CAPITELLIDA</i>	<i>Capitella capitata</i>	93					
	<i>PHYLLODOCIDA</i>	<i>Nereis succinea</i>	125					

**INVERTEBRATE SECTION  
LABORATORY IDENTIFICATION BENCH SHEET**

Client: BAKER ENVIRONMENTAL Job Number/Task: 04919-  
Location: NEW R. EST.-Camp LEVENE SITE 7 Sample ID: 7-NC03-BN  
Coll Date: 6/24 Prelim. Sorter: \_\_\_\_\_ Split Sorter: \_\_\_\_\_  
Subsampled Taxa: \_\_\_\_\_  
ID Time Budget: 2.0 Presort ID Time: 0.25 Date-Identifier: 10/11/24  
Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
	<u>CAPITELLIDA</u>	<u>Capitella capitata</u>	<u>79</u>					
	<u>PHYLLOPOIDA</u>	<u>Nereis succinea</u>	<u>158</u>					

# INVERTEBRATE SECTION LABORATORY IDENTIFICATION BENCH SHEET

Client: BAKER ENVIRONMENTAL

Job Number/Task: 04919-03

Location: NEW R. EST. - CAMP LEJUENE SITE 7

Sample ID: 7-NG04-BN01

Coll Date: 6/94

Prelim. Sorter: MJB

Split Sorter: \_\_\_\_\_

Subsampled Taxa: \_\_\_\_\_

ID Time Budget: 2.0

Presort ID Time: 0.25

Date-Identifier: 10/13/94 MJB

Split/Midge and worm ID Time: \_\_\_\_\_

Date-Identifier: \_\_\_\_\_

QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
	CAPITELLIDA	<i>Capitella capitata</i>	33					
	"	<i>Heteromastus filiformis</i>	1					
	PHYLLODOCIDA	<i>Nereis succinea</i>	44					





**INVERTEBRATE SECTION  
LABORATORY IDENTIFICATION BENCH SHEET**

Client: BAKER ENVIRONMENTAL

Job Number/Task: 04919-03

Location: NEW RIVER EST. SITE 7

Sample ID: 7-NC04-BN03

Coll Date: 6/94 Prelim. Sorter: SMW Split Sorter: \_\_\_\_\_

Subsampled Taxa: \_\_\_\_\_

ID Time Budget: 2.0

Presort ID Time: 0.25

Date-Identifier: 10/13/94 SMW

Split/Midge and worm ID Time: \_\_\_\_\_

Date-Identifier: \_\_\_\_\_

QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	= Presort Number	+ Split/QA/QC Number	Comments
	CAPITELLIDA	<i>Capitella capitata</i>	167			
	PHYLLODOXIDA	<i>Nereis succinea</i>	188			
	AMPHIPODA	<i>Parahaustorius longimerus</i>	1			
	DECAPODA	<i>Panaeus sp.</i>	1			PANAEIDAE

Notes:

19 1179:45-10:50

Page \_\_\_\_\_ of \_\_\_\_\_

# INVERTEBRATE SECTION LABORATORY IDENTIFICATION BENCH SHEET

Client: BAKER ENVIRONMENTAL

Job Number/Task: 04919-03

Location: NEW R. EST. - CAMP LEJUENE SITE 7

Sample ID: 7-WT01-BN

Coll Date: 6/24

Prelim. Sorter: KMF

Split Sorter: \_\_\_\_\_

Subsampled Taxa: \_\_\_\_\_

ID Time Budget: 2.0

Presort ID Time: 0.25

Date-Identifier: 10/13/94 NWTM

Split/Midge and worm ID Time: \_\_\_\_\_

Date-Identifier: \_\_\_\_\_

QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
No		<del>ORGANISMS</del>						

**INVERTEBRATE SECTION  
LABORATORY IDENTIFICATION BENCH SHEET**

2000

Client: BAKER ENVIRONMENTAL Job Number/Task: 04919-03  
 Location: NEW R. EST. - LAND LEASING SITE 7 Sample ID: 7-WT01-BN02  
 Coll Date: 6/94 Prelim. Sorter: KMF Split Sorter: \_\_\_\_\_  
 Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 2.0 Presort ID Time: 0.25 Date-Identifier: 10/13/94 WJM  
 Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
 QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
	DIPTELA	Chironomus decorus g.	1					



## INVERTEBRATE SECTION LABORATORY IDENTIFICATION BENCH SHEET

Client: BAKER ENVIRONMENTAL Job Number/Task: 04919-03  
 Location: NEW R. EST. - CAMP LEJUENE SITE 7 Sample ID: 7-WT02-BNO  
 Coll Date: 6/99 Prelim. Sorter: KMF Split Sorter: \_\_\_\_\_  
 Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 2.0 Presort ID Time: 0.25 Date-Identifier: 10/13/94 MSM  
 Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
 QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
③	TUBIFICIDA	Limnodrilus hoffmeisteri	67					

# INVERTEBRATE SECTION LABORATORY IDENTIFICATION BENCH SHEET

Client: BAKER ENVIRONMENTAL Job Number/Task: 04919-03  
 Location: NEW R.FST. - CAMP LEVENS SITE 7 Sample ID: 7-WT02-BN  
 Coll Date: 6/94 Prelim. Sorter: KMF Split Sorter: \_\_\_\_\_  
 Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 2.0 Presort ID Time: 0.25 Date-Identifier: 10/13/94 mm  
 Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
 QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
③	TUBIFICIDA	<i>Linnædrilus hoffmeisteri</i>	74					



**INVERTEBRATE SECTION  
LABORATORY IDENTIFICATION BENCH SHEET**

Client: BAKER ENVIRONMENTAL Job Number/Task: 0491-C  
 Location: NEW R. EST. - CAMP LEJUENE SITE 7 Sample ID: 7-W. 35  
 Coll Date: 6/94 Prelim. Sorter: CRE Split Sorter: \_\_\_\_\_  
 Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 2.0 Presort ID Time: 0.25 Date-Identifier: 10/12/94  
 Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
 QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comme
	<u>TUBIFICIDA</u>		<u>1</u>					<u>TUBIFICI</u>
	<u>CAPITELLIDA</u>	<u>Capitella capitata</u>	<u>30</u>					
	<u>PHYLLODOCA</u>	<u>Nereis succinea</u>	<u>31</u>					
	<u>SPIONIDA</u>	<u>Polydora sp.</u>	<u>5</u>					
	<u>TEREBELLIDA</u>	<u>Hypanionella grayi</u>	<u>10</u>					
	<u>DIPTERA</u>	<u>Chironomus decorus sp.</u>	<u>3</u>					

Notes: 10/12 9:15 - 9:30



**INVERTEBRATE SECTION  
LABORATORY IDENTIFICATION BENCH SHEET**

Client: BAKER ENVIRONMENTAL  
 Location: NEWA. EST. - CAMP LEJUENE SITE 7  
 Coll Date: 6/94 Prelim. Sorter: DEB Split Sorter: \_\_\_\_\_  
 Subsampled Taxa: \_\_\_\_\_  
 ID Time Budget: 2:0 Presort ID Time: 0.25 Date-Identifier: 10/13/94 MJM

Job Number/Task: 04919-03  
 Sample ID: 7-WTD3-BN03

Split/Midge and worm ID Time: \_\_\_\_\_ Date-Identifier: \_\_\_\_\_  
 QA/QC Time: \_\_\_\_\_

QC Check	Taxonomic Order	Taxon	Total Number	=	Presort Number	+	Split/QA/QC Number	Comments
	CAPITELLIDA	CAPITELLA capitata	17					
	PHYLLODOIDA	Nereis succinea	95					
	SPIONIDA	Polydora sp.	7					
	TEREBELLIDA	Hypania grayi	43					
	DIPTERA	Chironomus decorus sp.	1					
	VENERIDIDA	Macoma tenta	2					

**APPENDIX S**  
**TERRESTRIAL REFERENCE VALUES AND**  
**CDI SPREADSHEETS**

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**APPENDIX S.1**  
**TRVs**

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## Derivation of Terrestrial Reference Values

The following section discusses the procedures used to develop the terrestrial reference values (TRVs) used in the terrestrial portion of the ERA.

Most of the whitetailed deer, bobwhite quail, and cottontail rabbit TRVs for inorganic chemicals were derived from mineral tolerance values (MTLs) contained in the Mineral Tolerance of Domestic Animals (NAS, 1980). This book defines an MTL as "that dietary level that, when fed for a limited period, will not impair animal performance and should not produce unsafe residues in human food derived from the animal." (NAS, 1980) The values in this book were reported as mg mineral/kg feed. Therefore, these values were first converted to mg mineral/kg body weight-day using the following equation (Opresko, 1993):

$$\text{TRV} = \text{MTL} * \text{CR}$$

where:

TRV = Terrestrial Reference Value (mg mineral/kg body weight-day)

MTL = Mineral Tolerance Value (mg mineral/kg food)

CR = consumption rate (kg food/kg body weight-day)

For the whitetailed deer TRVs derived from the cattle MTLs, a consumption rate of 0.05 kg food/kg body weight-day was used for the cow (O'Dell, 1971). Because the cattle MTL was developed primarily with cow studies that were conducted for less than 6 months, the new TRV was multiplied by 0.1 to account for subchronic to chronic uncertainty. The TRV for a cow then was adjusted to a TRV for a deer to account for differences in the body size using the following equation (Opresko, 1993):

$$\text{TRV (deer)} = [\text{TRV (cow)}] * [\text{bw (cow)/bw (deer)}]^{1/3}$$

Where:

TRV (deer) = Deer Terrestrial Reference Value  
(mg mineral/kg body weight-day)

TRV (cow) = Cow Terrestrial Reference Value  
(mg mineral/kg body weight-day)

bw (cow) = body weight of a cow (100 kg)

bw (deer) = body weight of a deer (45.4 kg)

For the bobwhite quail TRVs derived from the poultry MTLs, a consumption rate of 0.41 kg food/kg body weight was calculated based on an average poultry weighing 0.5 kg, and the following allometric model (Nagy, 1987):

$$CR \text{ (birds)} = 0.648 (bw)^{0.651}$$

Where:

CR (birds) = consumption rate for birds  
(kg food/kg body weight-day)

bw = body weight for an average bird (0.5 kg)

The TRV for poultry then was adjusted to a TRV for a bobwhite quail to account for differences in the body size using the same equation that was used to adjust the cow to the deer. The body weight used for the bobwhite quail was 0.174 kg.

For the cottontail rabbit TRVs derived from the rabbit MTLs, a consumption rate of 0.081 was calculated using the following equation:

$$CR \text{ (rabbit)} = FR/bw$$

Where:

CR (rabbit) = consumption rate for rabbits  
(kg food/kg body weight-day)

FR = feeding rate of a cottontail rabbit (0.237 kg/day)

bw = body weight of a cottontail rabbit (1.229 kg)

The TRV (rabbit) was not adjusted for body size since a rabbit was used in the TRV calculation.

The following procedures were used for deriving TRV for the whitetailed deer, bobwhite quail, and cottontail rabbit when MTLs were not available, and for species that did not have MTLs. Their TRVs were determined using No Observed Adverse Effects Levels (NOAELs) or Lowest Observed Effects Levels (LOAELs). When available, the NOAEL or LOAEL from the Integrated Risk Information System (IRIS) was used in the TRV development. However, if a toxicity value was not available from IRIS, then one was obtained from various literature sources including Agency for Toxic Substances Registry Toxicological Profiles, Toxicological Benchmarks for Wildlife (Opresko *et.al.*, 1994) and published articles. Chemicals that only had diet concentration (as opposed to NOAELs) were converted to TRVs using the above equation and the appropriate consumption rates and body weights. The attached table contains the respective body weights used in the TRV adjustments.

As is presented in the attached table, toxicity data from many species were used to develop the TRVs. The attached table presents which animal was used to develop a particular TRV in parentheses. When possible, the chronic reproductive or developmental NOAEL value was used in the development of the TRV. However, in

some instances, only a subchronic NOAEL or a chronic or sub-chronic LOAEL for some chemicals were found in the literature. If a LOAEL was used, the number was divided by 10 as an uncertainty factor. If a subchronic value was used it also was divided by 10 as an uncertainty factor. Finally, toxicity values were not found for all the chemicals. Where possible, the toxicity of a similar chemical was used for these chemicals (i.e., using endrin for endrin aldehyde). The attached table identifies, in parentheses, which chemicals were used as surrogates.

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**APPENDIX S.2**  
**CDI SPREADSHEETS**

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EQUATIONS USED TO CALCULATE EXPOSURE FOR THE SHORT-TAILED SHREW  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION C10-274  
 MCB CAMP LEJEUNE, NORTH CAROLINA

Food Source Ingestion of: lv=vegetation lw=worms	Feeding Rate (l in kg/d)	Incidental Soil Ingestion (ls in kg/d)	Rate of Drinking Water Ingestion (lw in l/d)	Rate of Worm Ingestion (lwo in kg/d)	Rate of Fruit Ingestion (lfr in kg/d)	Rate of Mammal Ingestion (lm in kg/d)	Rate of Vegetation Ingestion (lv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminated Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cv=constituent conc. in fruit H=ratio of home range area to site area
Small Mammals w=90%	0.009	0.001	0.004	0.0078894	NA	NA	0.0008768	0.017	0.964	5	1.000	$E = \frac{(Cw)(lw) + [(Cs)(lv) + (Cwo)(lwo) + (Cv)(ls)]H}{BW}$
Vegetation v=10%								Small Mammal	0.032	1	All ACCs	

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Constituent Concentration in Fruit (mg/kg) (Cv)	Constituent Concentration in Mammals (mg/kg) (Cm)	Total Exposure (mg/kg/d)	TRV	RATIO
Aluminum	0.004	2.20	7181.90	761.00	NA	NA	6.91E+02	2.33E+00	2.96E+02
Arsenic	0.040	0.00	2.20	ND	NA	NA	1.06E-01	1.62E-01	6.93E-01
Barium	0.160	0.04	36.90	3.90	NA	NA	3.50E+00	8.65E-01	6.11E+00
Beryllium	0.010	ND	0.40	ND	NA	NA	1.91E-02	1.49E+00	1.29E-02
Chromium	0.008	ND	11.50	ND	NA	NA	5.49E-01	6.60E+00	8.32E-02
Cobalt	0.020	ND	1.90	3.70	NA	NA	1.78E+00	2.41E+00	7.38E-01
Copper	0.400	0.01	2.70	1.90	NA	NA	1.00E+00	5.01E+01	2.00E-02
Iron	0.045	2.16	9871.20	331.00	NA	NA	6.23E+02	1.21E+02	5.16E+00
Lead	0.045	0.03	101.10	13.70	NA	NA	1.11E+01	2.19E+01	5.08E-01
Manganese	0.250	0.07	15.70	3.10	NA	NA	2.18E+00	2.41E+01	9.05E-02
Mercury	0.900	ND	0.10	0.09	NA	NA	4.59E-02	8.77E-01	5.23E-02
Nickel	0.060	ND	4.10	ND	NA	NA	1.96E-01	1.37E+01	1.43E-02
Nitradium	0.006	ND	15.70	ND	NA	NA	7.97E-01	1.78E+00	4.47E-01
Zinc	1.500	0.17	18.90	222.00	NA	NA	1.02E+02	4.39E+02	2.33E-01
Alpha-chlordane	0.028	ND	0.00	ND	NA	NA	1.96E-04	1.61E-01	1.30E-03
Gamma-chlordane	0.028	ND	0.00	ND	NA	NA	1.67E-04	1.51E-01	1.11E-03
1,4'-DDD	0.013	ND	0.01	ND	NA	NA	2.72E-04	2.19E+00	1.24E-04
1,4'-DDE	0.020	ND	0.01	0.01	NA	NA	4.98E-03	2.19E+00	2.27E-03
1,4'-DDT	0.008	ND	0.01	ND	NA	NA	6.82E-04	2.19E+00	3.11E-04
Dieldrin	0.065	0.00	0.01	0.02	NA	NA	9.62E-03	1.37E-02	7.02E-01
Endosulfan II	0.322	ND	0.01	ND	NA	NA	2.82E-04	1.64E+00	1.71E-04
Endrin ketone	0.022	0.00	ND	ND	NA	NA	2.90E-05	6.95E-01	4.23E-05
Heptachlor-1254	0.022	ND	0.04	ND	NA	NA	1.78E-03	4.17E+00	4.26E-04
Heptachlor-1260	0.022	ND	0.04	ND	NA	NA	1.89E-03	1.37E-02	1.38E-01
Benzo(a)anthracene	0.020	ND	0.39	ND	NA	NA	1.87E-02	1.21E+02	1.55E-04
Benzo(b)fluoranthene	0.006	ND	0.38	ND	NA	NA	1.81E-02	1.21E+02	1.50E-04
Benzo(k)fluoranthene	0.012	ND	0.37	ND	NA	NA	1.77E-02	1.21E+02	1.46E-04
Benzo(g,h,i)perylene	0.007	ND	0.32	ND	NA	NA	1.05E-02	1.21E+02	8.89E-05
Benzo(a)pyrene	0.013	ND	0.34	ND	NA	NA	1.62E-02	1.21E+02	1.34E-04
Bis(2-ethylhexyl)phthalate	0.044	0.08	0.37	ND	NA	NA	3.47E-02	6.78E-01	5.12E-02
Chrysene	0.020	ND	0.38	ND	NA	NA	1.82E-02	1.21E+02	1.51E-04
Di-n-butylphthalate	0.038	ND	0.17	ND	NA	NA	8.11E-03	3.43E+02	2.37E-05
Fluoranthene	0.057	ND	0.39	ND	NA	NA	1.86E-02	1.51E+01	1.23E-03
Indeno(1,2,3-cd)pyrene	0.007	ND	0.25	ND	NA	NA	1.19E-02	1.21E+02	9.97E-05
Phenanthrene	0.097	0.00	0.38	0.00	NA	NA	1.81E-02	1.12E+02	1.61E-04
Pyrene	0.033	ND	0.38	ND	NA	NA	1.82E-02	9.06E+00	2.01E-03
Toluene	1.065	ND	0.01	ND	NA	NA	4.34E-04	8.11E+01	7.11E-06
2-Hexanone	ND	0.00	ND	ND	NA	NA	2.23E-04	NA	ND
2-Butanone	26.326	0.00	ND	0.00	NA	NA	4.46E-04	NA	ND
Xylenes	0.548	0.00	ND	0.00	NA	NA	2.23E-04	4.91E+02	4.55E-07
SUM									3.11E+02

ND - Not Detected  
 NR - Not Retained as a COPC

EQUATIONS USED TO CALCULATE EXPOSURE FOR THE WHITETAILED DEER  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION, CTO-274  
 MCB CAMP LEJEUNE, NORTH CAROLINA

Food Source Ingestion of: lv=vegetation lf=leaf lm=mammals lw=worms lf=fruit	Feeding Rate (l in kg/d)	Incidental Soil Ingestion (ts in kg/d)	Rate of Drinking Water Ingestion (lv in l/d)	Rate of Worm Ingestion (lwo in kg/d)	Rate of Fruit Ingestion (lfr in kg/d)	Rate of Mammal Ingestion (lm in kg/d)	Rate of Vegetation Ingestion (lv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminated Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cfr=constituent conc. in fruit H=ratio of home range area to site area
Vegetation(lv) 100 percent	1.600	0.019	1.100	NA	NA	NA	1.600	45.400	454.000	5	0.011	$E = \frac{(Cw)(lv) + [(Cs)(Bv)(lv) + (Cw)(lw)] (H)}{BW}$

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Constituent Concentration in Fruit (mg/kg) (Cfr)	Constituent Concentration in Mammals (mg/kg) (Cm)	Total Exposure (mg/kg/d)	TRV	RATIO
Aluminum	0.004	2.20	7191.90	NA	NA	NA	9.67E-02	6.51E+00	1.49E-02
Arsenic	0.040	0.00	2.20	NA	NA	NA	1.02E-04	3.25E-01	3.14E-04
Berium	0.150	0.04	36.00	NA	NA	NA	3.21E-03	1.30E-01	2.47E-02
Beryllium	0.010	ND	0.40	NA	NA	NA	3.30E-06	1.07E-01	3.14E-05
Chromium	0.008	ND	11.50	NA	NA	NA	8.51E-05	6.51E+00	1.31E-05
Cobalt	0.020	ND	1.80	NA	NA	NA	2.21E-05	6.51E-02	3.39E-04
Copper	0.400	0.01	2.70	NA	NA	NA	7.29E-04	6.51E-01	1.12E-03
Iron	0.004	2.18	9671.20	NA	NA	NA	1.12E-01	6.51E+00	1.72E-02
Lead	0.045	0.03	101.10	NA	NA	NA	2.96E-03	1.80E-01	1.47E-02
Manganese	0.250	0.07	15.70	NA	NA	NA	3.28E-03	1.30E+00	2.51E-03
Mercury	0.900	ND	0.10	NA	NA	NA	3.54E-05	1.30E-02	2.72E-03
Nickel	0.060	ND	4.10	NA	NA	NA	1.14E-04	3.25E-01	3.50E-04
Niobium	0.008	ND	16.70	NA	NA	NA	1.11E-04	3.25E-01	3.40E-04
Zinc	1.500	0.17	18.90	NA	NA	NA	1.52E-02	3.25E+00	4.68E-03
Alpha-chlordane	0.028	ND	0.00	NA	NA	NA	5.92E-06	1.30E+00	4.55E-06
Gamma-chlordane	0.028	ND	0.00	NA	NA	NA	5.09E-06	1.30E+00	3.88E-06
1,4'-DDD	0.013	ND	0.01	NA	NA	NA	5.47E-06	1.58E-01	3.46E-07
1,4'-DDE	0.020	ND	0.01	NA	NA	NA	1.27E-07	1.58E-01	8.09E-07
1,4'-DDT	0.008	ND	0.01	NA	NA	NA	1.07E-07	1.58E-01	6.78E-07
Dieldrin	0.085	0.00	0.01	NA	NA	NA	1.24E-05	6.51E-01	1.91E-05
Endosulfan II	0.322	ND	0.01	NA	NA	NA	7.63E-07	1.19E-01	6.44E-06
Endrin ketone	0.022	0.00	ND	NA	NA	NA	3.15E-06	4.94E-02	6.38E-05
Aroclor-1254	0.022	ND	0.04	NA	NA	NA	4.91E-07	2.80E-02	1.75E-05
Aroclor-1260	0.022	ND	0.04	NA	NA	NA	5.23E-07	9.88E-04	5.28E-04
Benzo(a)anthracene	0.020	ND	0.39	NA	NA	NA	4.75E-06	8.71E-02	5.45E-05
Benzo(b)fluoranthene	0.008	ND	0.38	NA	NA	NA	2.38E-06	8.71E-02	2.96E-05
Benzo(k)fluoranthene	0.012	ND	0.37	NA	NA	NA	3.32E-06	8.71E-02	3.81E-05
Benzo(g,h,i)perylene	0.007	ND	0.22	NA	NA	NA	1.57E-06	8.71E-02	1.80E-05
Benzo(a)pyrene	0.013	ND	0.34	NA	NA	NA	3.27E-06	8.71E-02	3.75E-05
Bis(2-ethylhexyl)phthalate	0.044	0.08	0.37	NA	NA	NA	1.87E-03	4.89E-02	3.83E-02
Chrysene	0.020	ND	0.38	NA	NA	NA	4.62E-06	8.71E-02	5.30E-05
Di-n-butylphthalate	0.038	ND	0.17	NA	NA	NA	3.29E-06	2.47E+01	1.32E-07
Fluoranthene	0.057	ND	0.39	NA	NA	NA	1.04E-05	1.09E+00	9.51E-06
Indeno(1,2,3-cd)pyrene	0.007	ND	0.25	NA	NA	NA	1.77E-06	8.71E-02	2.03E-05
Phenanthrene	0.097	0.00	0.38	NA	NA	NA	1.58E-05	8.10E+00	1.97E-06
Pyrene	0.033	ND	0.38	NA	NA	NA	6.67E-06	6.53E-01	1.02E-05
Toluene	1.065	ND	0.01	NA	NA	NA	3.90E-06	4.41E+00	6.63E-07
2-Hexanone	ND	0.00	ND	NA	NA	NA	2.42E-05	NA	ND
2-Butanone	26.328	0.00	ND	NA	NA	NA	4.93E-05	NA	ND
Xylenes	0.548	0.00	ND	NA	NA	NA	2.42E-05	3.54E+01	6.85E-07
								SU	1.23E-01

ND - Not Detected  
 NA - Not Applicable

EQUATIONS USED TO CALCULATE EXPOSURE FOR THE RACCOON  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION, CTO-274  
 MCB CAMP LEJUNE, NORTH CAROLINA

Food Source Ingestion of: Iv=vegetation If=fish Im=mammals Iw=worms Ifi=fruit	Feeding Rate (i in kg/d)	Incidental Soil Ingestion (Is in kg/d)	Rate of Drinking Water Ingestion (Iw in l/d)	Rate of Worm Ingestion (Iwo in kg/d)	Rate of Fruit Ingestion (Ifi in kg/d)	Rate of Fish Ingestion (If in kg/d)	Rate of Vegetation Ingestion (Iv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminated Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cfi=constituent conc. in fruit H=ratio of home range area to site area
Vegetation Iv=40%	0.214	0.020	0.422	NA	0.088	0.129	NA	5.120	258.984	5	0.019	$E = \frac{(Cw)(Iw) + (Cf)(If) + ((Cs)(Iv)(Iv) + (Cs)(Is))}{BW} [H]$
Fish If=60%												

Contaminant of Concern	Soil to Plant Transfer Coefficient (B)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Fish Bioconcentration Factor (BCF)	Constituent Concentration in Fishes (mg/kg) (Cf) (=SW*BCF)	Total Exposure (mg/kg/d)	TRV	RATIO
Aluminum	0.001	2.20	7191.90	NA	231.000	608.20	1.35E+01	3.48E-01	3.88E+01
Arsenic	0.006	0.00	2.20	NA	44.000	0.11	3.02E-03	2.27E-02	1.33E-01
Barium	0.015	0.04	36.80	NA	8.000	0.30	1.35E-02	1.02E-01	1.32E-01
Beryllium	0.002	ND	0.40	NA	19.000	0.00	3.08E-05	2.21E-01	1.39E-04
Chromium	0.005	ND	11.50	NA	16.000	0.00	8.97E-04	9.88E-01	9.10E-04
Cobalt	0.007	ND	1.80	NA	40.000	0.00	1.42E-04	3.61E-01	3.93E-04
Copper	0.250	0.01	2.70	NA	36.000	0.44	1.26E-02	7.49E+00	1.68E-03
Iron	0.001	2.16	9971.20	NA	ND	0.00	9.37E-01	1.90E+01	5.19E-02
Lead	0.009	0.03	101.10	NA	49.000	1.33	4.38E-02	3.27E+00	1.33E-02
Manganese	0.050	0.07	15.70	NA	35.000	2.41	6.77E-02	3.60E+00	1.98E-02
Mercury	0.200	ND	0.10	NA	5500.000	0.00	1.42E-05	1.31E-01	1.08E-04
Nickel	0.060	ND	4.10	NA	47.000	0.00	3.94E-04	2.05E+00	1.93E-04
Vanadium	0.003	ND	16.70	NA	ND	0.00	1.29E-03	2.65E-01	4.87E-03
Zinc	0.900	0.17	18.90	NA	47.000	7.90	2.19E-01	6.54E+01	3.35E-03
Alpha-chlordane	0.028	ND	0.00	NA	14100.000	0.00	3.48E-07	2.25E-02	1.55E-05
Gamma-chlordane	0.029	ND	0.00	NA	14100.000	0.00	2.97E-07	2.25E-02	1.32E-05
1,4'-DDD	0.013	ND	0.01	NA	53600.000	0.00	4.61E-07	3.27E-01	1.41E-06
1,4'-DDE	0.020	ND	0.01	NA	53600.000	0.00	6.71E-07	3.27E-01	2.66E-06
1,4'-DDT	0.008	ND	0.01	NA	53600.000	0.00	1.13E-06	3.27E-01	3.46E-06
Dieldrin II	0.085	0.00	0.01	NA	4870.000	2.34	5.87E-02	2.04E-03	2.87E+01
Endosulfan II	0.322	ND	0.01	NA	270.000	0.00	1.07E-06	2.45E-01	4.36E-06
Endrin ketone	0.022	0.00	ND	NA	ND	0.00	1.07E-05	1.02E-01	1.05E-04
Aroclor-1254	0.022	ND	0.04	NA	31200.000	0.00	3.12E-06	6.21E-01	5.02E-06
Aroclor-1260	0.022	ND	0.04	NA	31200.000	0.00	3.32E-06	2.04E-03	1.62E-03
Benzo(a)anthracene	0.020	ND	0.30	NA	30.000	0.00	3.26E-06	1.80E-01	1.90E-04
Benzo(b)fluoranthene	0.006	ND	0.38	NA	30.000	0.00	2.89E-05	1.80E-01	1.65E-04
Benzo(k)fluoranthene	0.012	ND	0.37	NA	30.000	0.00	2.97E-05	1.80E-01	1.65E-04
Benzo(a,h)pyrene	0.007	ND	0.22	NA	30.000	0.00	1.73E-05	1.80E-01	9.61E-05
Benzo(a)pyrene	0.013	ND	0.34	NA	30.000	0.00	2.75E-05	1.80E-01	1.52E-04
Bis(2-ethylhexyl)phthalate	0.044	0.08	0.37	NA	130.000	10.01	2.58E-01	1.01E-01	2.55E+00
Chrysene	0.020	ND	0.38	NA	30.000	0.00	3.16E-05	1.80E-01	1.75E-04
Dibutylphthalate	0.038	ND	0.17	NA	89.000	0.00	1.51E-05	5.11E+01	2.96E-07
Fluoranthene	0.057	ND	0.39	NA	1150.000	0.00	3.70E-05	2.25E+00	1.84E-05
Indeno(1,2,3-cd)pyrene	0.007	ND	0.25	NA	30.000	0.00	1.97E-05	1.80E-01	1.00E-04
Phenanthrene	0.097	0.00	0.38	NA	30.000	0.00	4.09E-05	1.68E+01	2.44E-06
Pyrene	0.030	ND	0.38	NA	30.000	0.00	3.33E-05	1.35E+00	2.47E-06
Tobacene	1.065	ND	0.01	NA	10.700	0.00	3.85E-06	9.12E+00	4.23E-07
2-Hexanone	ND	0.00	ND	NA	ND	0.00	8.25E-05	NA	ND
2-Butanone	26.326	0.00	ND	NA	ND	0.00	1.65E-04	NA	ND
Xylenes	0.548	0.00	ND	NA	2.200	0.00	1.38E-04	7.32E+01	1.88E-06
SUM									7.04E+01

ND - Not Detected  
 NA - Not Applicable

EQUATIONS USED TO CALCULATE EXPOSURE FOR THE EASTERN COTTONTAIL RABBIT  
 OPERABLE UNIT NO. 1 (SITE 7)  
 REMEDIAL INVESTIGATION, CTO-274  
 MCB CAMP LEJEUNE, NORTH CAROLINA

Food Source Ingestion of: lv=vegetation lf=fish lm=mammals lw=worms lf=fruit	Feeding Rate (l in kg/d)	Incidental Soil Ingestion (ls in kg/d)	Rate of Drinking Water Ingestion (lw in l/d)	Rate of Worm Ingestion (lwo in kg/d)	Rate of Fruit Ingestion (lfr in kg/d)	Rate of Mammal Ingestion (lm in kg/d)	Rate of Vegetation Ingestion (lv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminated Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cfr=constituent conc. in fruit H=ratio of home range area to site area
Vegetation (lv) 100 percent	0.237	0.006	0.119	NA	NA	NA	0.237	1.229	9.297	5	0.538	$E = \frac{Cw(lw) + [(Cs)(Bv)(lv) + (Ca)(ls)] H}{BW}$

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Constituent Concentration in Fruit (mg/kg) (Cfr)	Constituent Concentration in Mammals (mg/kg) (Cm)	Total Exposure (mg/kg/d)	TRV	RATIO
Aluminum	0.004	2.2000	7181.90	NA	NA	NA	2.11E+01	1.16E+01	1.82E+00
Arsenic	0.040	0.0024	2.20	NA	NA	NA	1.48E-02	2.90E+00	5.12E-03
Barium	0.150	0.0372	36.80	NA	NA	NA	6.68E-01	1.16E+00	5.76E-01
Beryllium	0.010	ND	0.40	NA	NA	NA	1.41E-03	3.55E-01	3.97E-03
Chromium	0.008	ND	11.50	NA	NA	NA	3.76E-02	5.80E+01	6.48E-04
Cobalt	0.020	ND	1.80	NA	NA	NA	8.22E-03	5.80E-01	1.42E-02
Copper	0.400	0.0123	2.70	NA	NA	NA	1.20E-01	1.16E+01	1.03E-02
Iron	0.004	2.1600	9671.20	NA	NA	NA	2.69E+01	2.90E+01	9.95E-01
Lead	0.045	0.0271	101.10	NA	NA	NA	7.26E-01	1.74E+00	4.17E-01
Manganese	0.250	0.0689	15.70	NA	NA	NA	4.53E-01	2.32E+01	1.85E-02
Mercury	ND	ND	0.10	NA	NA	NA	8.59E-03	1.20E-01	7.89E-02
Nickel	0.060	ND	4.10	NA	NA	NA	3.57E-02	2.90E+00	1.23E-02
Vanadium	0.006	ND	18.70	NA	NA	NA	5.11E-02	5.80E-02	8.81E-01
Zinc	1.500	0.1680	18.90	NA	NA	NA	3.00E+00	2.90E+01	1.04E-01
Alpha-chlordane	ND	ND	0.00	NA	NA	NA	2.11E-03	3.82E-02	5.84E-04
Gamma-chlordane	0.026	ND	0.00	NA	NA	NA	1.60E-05	3.62E-02	4.98E-04
1,4'-DDD	0.013	ND	0.01	NA	NA	NA	2.20E-05	5.26E-01	4.18E-05
1,4'-DDE	0.020	ND	0.01	NA	NA	NA	4.76E-05	5.26E-01	8.03E-05
1,4'-DDT	0.008	ND	0.01	NA	NA	NA	4.71E-05	5.26E-01	8.95E-05
Dieldrin	0.065	0.0005	0.01	NA	NA	NA	1.37E-04	3.29E-03	4.15E-02
Endosulfan II	0.222	ND	0.01	NA	NA	NA	2.15E-04	3.95E-01	5.36E-04
Endrin ketone	0.022	0.0001	ND	NA	NA	NA	1.26E-03	1.65E-01	7.67E-03
Aroclor-1254	0.022	ND	0.04	NA	NA	NA	1.79E-04	1.00E+00	1.78E-04
Aroclor-1260	0.022	ND	0.04	NA	NA	NA	1.91E-04	3.29E-03	3.90E-02
Benzo(a)anthracene	0.020	ND	0.39	NA	NA	NA	1.77E-03	2.90E-01	8.12E-03
Benzo(b)fluoranthene	0.006	ND	0.38	NA	NA	NA	1.18E-03	2.90E-01	4.07E-03
Benzo(k)fluoranthene	0.012	ND	0.37	NA	NA	NA	1.36E-03	2.90E-01	4.70E-03
Benzo(g,h,i)perylene	0.007	ND	0.22	NA	NA	NA	7.02E-04	2.90E-01	2.42E-03
Benzo(a)pyrene	0.013	ND	0.34	NA	NA	NA	1.31E-03	2.90E-01	4.52E-03
Bis(2-ethylhexyl)phthalate	0.044	0.0770	0.37	NA	NA	NA	1.00E-02	1.63E-01	6.17E-02
Chrysene	0.020	ND	0.38	NA	NA	NA	1.73E-03	2.90E-01	5.85E-03
Di-n-butylphthalate	0.038	ND	0.17	NA	NA	NA	1.10E-03	8.23E+01	1.33E-05
Fluoranthene	0.057	ND	0.35	NA	NA	NA	3.27E-03	3.63E+00	8.02E-04
Indeno(1,2,3-cd)pyrene	0.007	ND	0.29	NA	NA	NA	7.86E-04	2.90E-01	2.74E-03
Phenanthrene	0.097	0.0000	0.38	NA	NA	NA	4.75E-03	2.70E+01	1.78E-04
Pyrene	0.033	ND	0.38	NA	NA	NA	2.27E-03	2.18E+00	1.05E-03
Toluene	1.065	ND	0.01	NA	NA	NA	1.03E-03	1.47E+01	7.01E-05
2-Hexanone	ND	0.0010	ND	NA	NA	NA	9.70E-05	NA	ND
2-Butanone	26.326	0.0020	ND	NA	NA	NA	1.84E-04	NA	ND
Xylenes	0.948	0.0010	ND	NA	NA	NA	9.70E-05	1.18E+02	8.24E-07
							SUM		5.13E+00

ND - Not Detected  
 NA - Not Applicable

EQUATIONS USED TO CALCULATE EXPOSURE FOR THE BOBWHITE QUAIL  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION, CTO 274  
 MCB CAMP LEJEUNE, NORTH CAROLINA

Food Source Ingestion of: lv=vegetation lf=fish lm=mammals lw=worms lfr=fruit	Feeding Rate (l in kg/d)	Incidental Soil Ingestion (ls in kg/d)	Rate of Drinking Water Ingestion (lw in l/d)	Rate of Worm Ingestion (lwo in kg/d)	Rate of Fruit Ingestion (lfr in kg/d)	Rate of Mammal Ingestion (lm in kg/d)	Rate of Vegetation Ingestion (lv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminated Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cfr=constituent conc. in fruit H=ratio of home range area to site area
Vegetation (lv) 100%	0.013	0.001	0.019	NA	NA	NA	0.013	0.174	26.242	5	0.191	$\frac{E=(Cw)(lw) + [(Cs)(Bv) + (Cw)(ls)]H}{BW}$

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Constituent Concentration in Fruit (mg/kg) (Cfr)	Constituent Concentration in Mammals (mg/kg) (Cm)	Total Exposure (mg/kg/d)	TRV	RATIO
Aluminum	0.094	2.2000	7191.90	NA	NA	NA	9.405	3.06E+01	3.07E-01
Arsenic	0.040	0.0024	2.20	NA	NA	NA	0.004	1.96E+01	2.14E-04
Barium	0.150	0.0372	36.90	NA	NA	NA	0.131	3.06E+00	4.27E-02
Beryllium	0.010	ND	14.50	NA	NA	NA	0.001	1.47E+00	3.71E-04
Chromium	0.008	ND	11.50	NA	NA	NA	0.015	1.33E+02	9.97E-05
Cobalt	0.020	ND	1.90	NA	NA	NA	0.003	1.53E+00	1.78E-03
Copper	0.400	0.0123	2.70	NA	NA	NA	0.021	4.99E+01	4.00E-04
Iron	0.004	2.1600	9671.20	NA	NA	NA	12.814	1.53E+02	8.38E-02
Lead	0.045	0.0271	101.10	NA	NA	NA	0.193	7.52E+00	2.57E-02
Manganese	0.250	0.0689	15.70	NA	NA	NA	0.065	3.08E+02	2.77E-04
Mercury	0.900	ND	0.10	NA	NA	NA	0.001	3.06E-01	4.75E-03
Nickel	0.060	ND	4.10	NA	NA	NA	0.009	4.59E+01	1.89E-04
Vanadium	0.008	ND	16.70	NA	NA	NA	0.022	4.39E+01	4.94E-04
Zinc	1.500	0.1690	19.90	NA	NA	NA	0.461	1.53E+02	3.02E-03
Alpha-chlordane	0.026	ND	0.09	NA	NA	NA	0.000	3.30E+00	1.96E-06
Gamma-chlordane	0.026	ND	0.09	NA	NA	NA	0.000	3.30E+00	1.96E-06
1,4'-DDD	0.013	ND	0.01	NA	NA	NA	0.000	8.90E-02	9.13E-05
1,4'-DDE	0.020	ND	0.01	NA	NA	NA	0.000	8.90E-02	1.80E-04
1,4'-DDT	0.006	ND	0.01	NA	NA	NA	0.000	8.90E-02	2.16E-04
Dieldrin	0.065	0.0005	0.01	NA	NA	NA	0.000	1.16E-01	6.42E-04
Endosulfan II	0.322	ND	0.01	NA	NA	NA	0.000	2.94E+01	1.24E-06
Endrin ketone	0.022	0.0001	ND	NA	NA	NA	0.000	1.16E+00	1.24E-05
Aroclor-1254	0.022	ND	0.04	NA	NA	NA	0.000	6.95E-01	8.29E-05
Aroclor-1260	0.022	ND	0.04	NA	NA	NA	0.000	1.36E-02	4.51E-03
Benzo(a)anthracene	0.020	ND	0.39	NA	NA	NA	0.001	1.20E+00	4.92E-04
Benzo(b)fluoranthene	0.008	ND	0.38	NA	NA	NA	0.000	1.20E+00	4.13E-04
Benzo(k)fluoranthene	0.012	ND	0.37	NA	NA	NA	0.001	1.20E+00	4.28E-04
Benzo(g,h,i)perylene	0.007	ND	0.22	NA	NA	NA	0.000	1.20E+00	2.41E-04
Benzo(a)pyrene	0.013	ND	0.34	NA	NA	NA	0.000	1.20E+00	4.00E-04
Bis(2-ethylhexyl)phthalate	0.044	0.0770	0.37	NA	NA	NA	0.009	2.30E+00	3.96E-03
Chrysene	0.020	ND	0.38	NA	NA	NA	0.001	1.20E+00	4.79E-04
Din-butylphthalate	0.038	ND	0.17	NA	NA	NA	0.000	2.28E-01	1.33E-03
Fluoranthene	0.057	ND	0.39	NA	NA	NA	0.001	1.50E+01	5.25E-05
Indeno(1,2,3-cd)pyrene	0.007	ND	0.25	NA	NA	NA	0.000	1.20E+00	2.74E-04
Phenanthrene	0.097	0.0000	0.39	NA	NA	NA	0.001	1.12E+02	9.00E-06
Pyrene	0.033	ND	0.38	NA	NA	NA	0.001	8.99E+00	7.28E-05
Toluene	1.065	ND	0.01	NA	NA	NA	0.000	6.06E+01	2.55E-06
2-Hexanone	ND	0.0010	ND	NA	NA	NA	0.000	NA	ND
2-Butanone	26.328	0.0020	ND	NA	NA	NA	0.000	NA	ND
Xylenes	0.548	0.0010	ND	NA	NA	NA	0.000	4.87E+02	2.26E-07
								SUM	4.85E-01

ND - Not Detected  
 NA - Not Applicable

EQUATIONS USED TO CALCULATE EXPOSURE FOR THE RED FOX  
 OPERABLE UNIT NO. 11 (SITE 7)  
 REMEDIAL INVESTIGATION, C10-274  
 MCB CAMP LEJEUNE, NORTH CAROLINA

Food Source Ingestion of: lv=vegetation lf=fish lm=materials lw=worms lf=fruit	Feeding Rate (f in kg/d)	Incidental Soil Ingestion (ls in kg/d)	Rate of Drinking Water Ingestion (lw in l/d)	Rate of Worm Ingestion (two in kg/d)	Rate of Fruit Ingestion (fr in kg/d)	Rate of Mammal Ingestion (lm in kg/d)	Rate of Vegetation Ingestion (lv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminated Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cfr=constituent conc. in fruit H=ratio of home range area to site area
Small Mammals m=80%	0.601	0.017	0.395	NA	NA	0.481	0.1202	4.535	1245.4			$E = \frac{Cw[(lv) + (lf)(lm) + (Cs)(Bv)](fv) + (Cfr)(Bf)](f)}{BW}$
Vegetation v=20%	0.112 Small Mammal	0.00269 Small Mammal	0.0652 Small Mammal	NA	NA	NA	0.112 Small Mammal	0.3725 Small Mammal		5	0.004	$E = \frac{Cm[(lv) + (Cs)(Bv)](fv) + (Cfr)(Bf)](f)}{BW}$
								Small Mammal	0.032	1	All ADCs	

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Constituent Concentration In Water (mg/l) (Cw)	Constituent Concentration In Soil (mg/kg) (Cs)	Constituent Concentration In Worms (mg/kg) (Cwo)	Ingestion-to-Issue Biotransfer Factor (Bf)	Constituent Concentration In Mammals (mg/kg) (Cm)	Total Exposure (mg/kg/d)	TRV	RATIO
Aluminum	0.004	2.20	7191.90	NA	1.50E-03	9.15E-02	2.97E-01	1.95E+01	1.52E-02
Arsenic	0.040	0.08	2.20	NA	2.00E-03	8.55E-05	2.48E-04	2.37E-02	1.04E-02
Barium	0.150	0.04	36.80	NA	1.50E-04	2.90E-04	4.30E-03	1.07E-01	4.03E-02
Beryllium	0.010	ND	0.40	NA	1.00E-03	4.09E-06	6.39E-06	2.30E-01	2.77E-06
Chromium	0.008	ND	11.50	NA	5.50E-03	5.99E-04	1.81E-04	1.03E+00	1.76E-04
Cobalt	0.020	ND	1.80	NA	2.00E-02	4.76E-04	3.08E-05	3.75E-01	8.22E-05
Copper	0.400	0.01	2.70	NA	1.00E-02	3.46E-03	1.20E-03	7.89E+00	1.64E-04
Iron	0.004	2.18	9871.20	NA	2.00E-02	1.67E+00	3.36E-01	1.68E+01	1.79E-02
Lead	0.045	0.03	101.10	NA	3.00E-04	6.31E-04	4.29E-03	3.41E+00	1.26E-03
Manganese	0.250	0.07	15.70	NA	4.00E-04	5.32E-04	6.51E-03	3.75E+00	1.74E-03
Mercury	0.900	ND	0.10	NA	2.50E-01	6.95E-03	1.40E-05	1.36E-01	1.03E-04
Nickel	0.089	ND	4.10	NA	6.00E-03	8.21E-04	8.75E-05	9.25E+01	2.69E-06
Niobium	0.006	ND	18.70	NA	2.50E-03	3.71E-04	2.59E-04	2.77E-01	9.25E-04
Zinc	1.500	0.17	18.90	NA	1.00E-01	8.69E-01	1.78E-02	1.30E+00	1.28E-02
Alpha-chlordane	0.028	ND	0.00	NA	7.94E-03	4.86E-07	7.05E-08	9.75E-02	7.42E-07
Beta-chlordane	0.026	ND	0.00	NA	7.94E-03	4.15E-07	6.19E-08	9.75E-02	6.34E-07
1,4'-DDD	0.013	ND	0.01	NA	2.51E-02	1.60E-06	9.36E-08	3.41E-01	2.75E-07
1,4'-DDE	0.020	ND	0.01	NA	1.26E-02	1.74E-06	1.79E-07	3.41E-01	5.98E-07
1,4'-DDT	0.008	ND	0.01	NA	6.31E-02	8.62E-06	2.28E-07	3.41E-01	6.71E-07
Dieldrin	0.085	0.00	0.01	NA	1.00E-03	3.43E-07	4.27E-05	6.51E-03	6.58E-03
Endosulfan II	0.322	ND	0.01	NA	1.00E-04	6.19E-08	2.90E-07	7.42E-01	3.91E-07
Endrin ketone	0.022	0.00	ND	NA	1.00E-02	2.26E-07	1.11E-05	3.25E-02	3.40E-04
Aroclor-1254	0.022	ND	0.04	NA	1.00E-02	6.20E-08	6.45E-07	6.47E-01	9.97E-07
Aroclor-1260	0.022	ND	0.04	NA	1.00E-02	5.83E-08	6.97E-07	2.13E-03	3.93E-04
Benzo(a)anthracene	0.020	ND	0.39	NA	1.26E-02	6.49E-05	6.88E-08	1.88E-01	3.55E-05
Benzo(b)fluoranthene	0.006	ND	0.38	NA	1.00E-01	3.42E-04	6.05E-08	1.88E-01	3.22E-05
Benzo(k)fluoranthene	0.012	ND	0.37	NA	3.16E-02	1.25E-04	6.02E-08	1.88E-01	3.21E-05
Benzo(g,h,i)perylene	0.007	ND	0.22	NA	7.94E-02	1.62E-04	3.50E-08	1.88E-01	1.87E-05
Benzo(a)pyrene	0.013	ND	0.34	NA	2.51E-02	9.55E-05	5.59E-08	1.88E-01	2.97E-05
Bis(2-ethylhexyl)phthalate	0.044	0.08	0.37	NA	3.16E-03	6.93E-05	6.55E-03	1.05E-01	6.22E-02
Chrysene	0.020	ND	0.39	NA	1.26E-02	6.30E-05	6.50E-08	1.88E-01	3.46E-05
Di-n-butylphthalate	0.038	ND	0.17	NA	3.98E-03	1.27E-05	3.23E-06	5.32E+01	6.07E-08
Fluoranthene	0.057	ND	0.39	NA	2.00E-03	1.89E-05	9.17E-06	2.35E+00	3.48E-08
Indeno(1,2,3-cd)pyrene	0.007	ND	0.25	NA	8.13E-02	1.88E-04	3.98E-06	1.88E-01	2.12E-05
Phenanthrene	0.097	0.00	0.38	NA	7.94E-04	1.09E-05	9.55E-08	1.76E+01	5.47E-07
Pyrene	0.039	ND	0.38	NA	6.01E-03	3.30E-05	7.05E-08	1.41E+00	5.01E-06
Toluene	1.065	0.01	0.01	NA	1.28E-05	3.75E-08	1.17E-08	9.49E+00	1.23E-07
2-Hexanone	ND	0.00	ND	NA	ND	0.00E+00	8.60E-05	NA	ND
2-Butanone	28.326	0.00	0.00	NA	4.90E-08	1.71E-11	1.70E-04	NA	ND
Xylenes	0.549	0.00	ND	NA	3.98E-05	6.97E-09	8.50E-05	7.62E+01	1.12E-08
								SUM	1.72E-01

ND - Not Detected  
 NA - Not Applicable